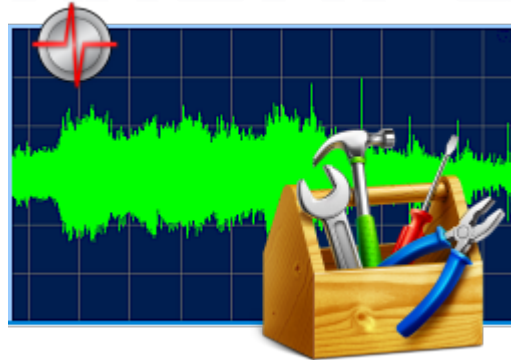


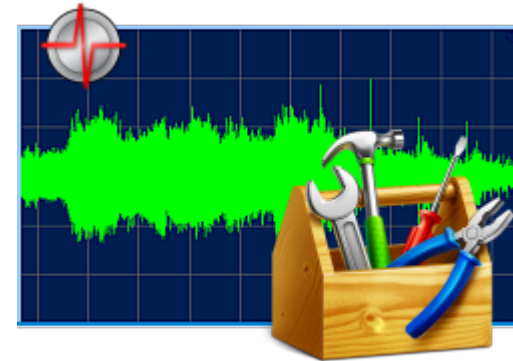
TasWavEditor



Basic usage guide

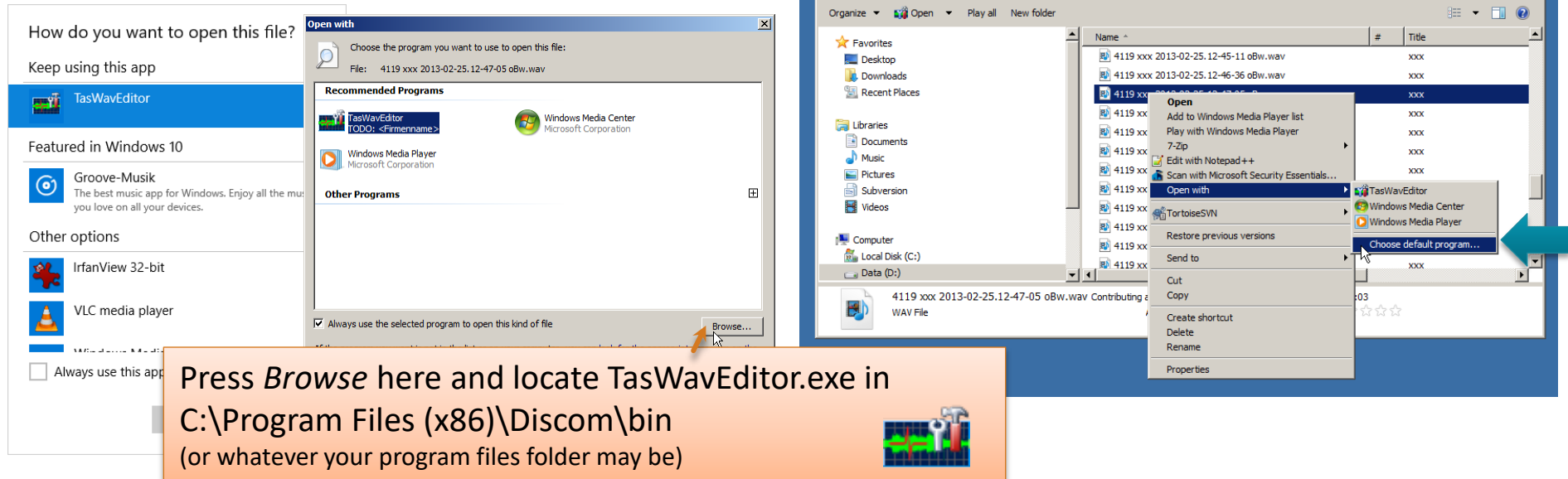
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Starting TasWavEditor

In Windows Explorer, find a wave file (e.g. in D:\Sound on a measurement PC). Right-click on the file and choose *Open with...* from context menu. If TasWavEditor is already in the list, select it. Else, use *Choose default program*:



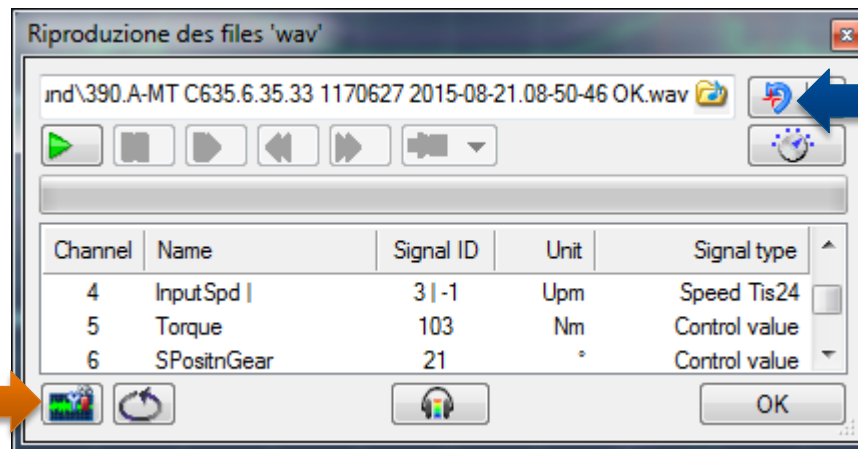
When you start TasWavEditor directly (for example by using a desktop link), you will immediately be prompted for the wave file you want to load.

Loading Wave Files

You can load additional files into TasWavEditor by using the usual “File – Open” command from the menu, or by dragging them into the TasWavEditor window.

When you start TasWavEditor directly (for example by using a desktop link), you will immediately be prompted for the wave file you want to load.

In the TasAlyser measurement application, the “Wave Playback” window offers direct access to TasWavEditor:



Press here to open the currently loaded wave file in TasWavEditor.

Press this button to automatically load the most recent completed recording.

So with two button clicks you can load the latest test run from TasAlyser into TasWavEditor.

Overview

After loading a wave file, TasWavEditor shows an overview of the sensor signals:

'Start' button:

Load recent files, print the scope picture, and more.

Channel structure:

Lists the channels in the wave file and their properties.

Docking windows:

There are more information windows docked here.

File Name:

You can load multiple files into TasWavEditor

Cue Point:

Events during the test runs are marked with vertical lines

'Ribbon':

Change the display style and call editor functions here.

'Scope' pane:

Shows sensor signals along with test run events.

Speed decoding:

For speed signal channels, TasWavEditor shows the original sensor signal in yellow and the decoded speed as an orange line. Decoded speeds get ' ω ' added to their names.

'Scope' controls:

Use these controls to zoom into the signal.

Using the 'Scope'

There is a lot of functionality hidden in the scope...

Hit me:





You can also navigate around by using the keyboard arrow keys and the mouse wheel.

Use the keyboard keys + and – for zooming y axis in and out and 'home' button for autoscale.

Where am I?:

Check 'Display mouse position' to get a crosshair cursor and a display of the mouse position in the scope panes.

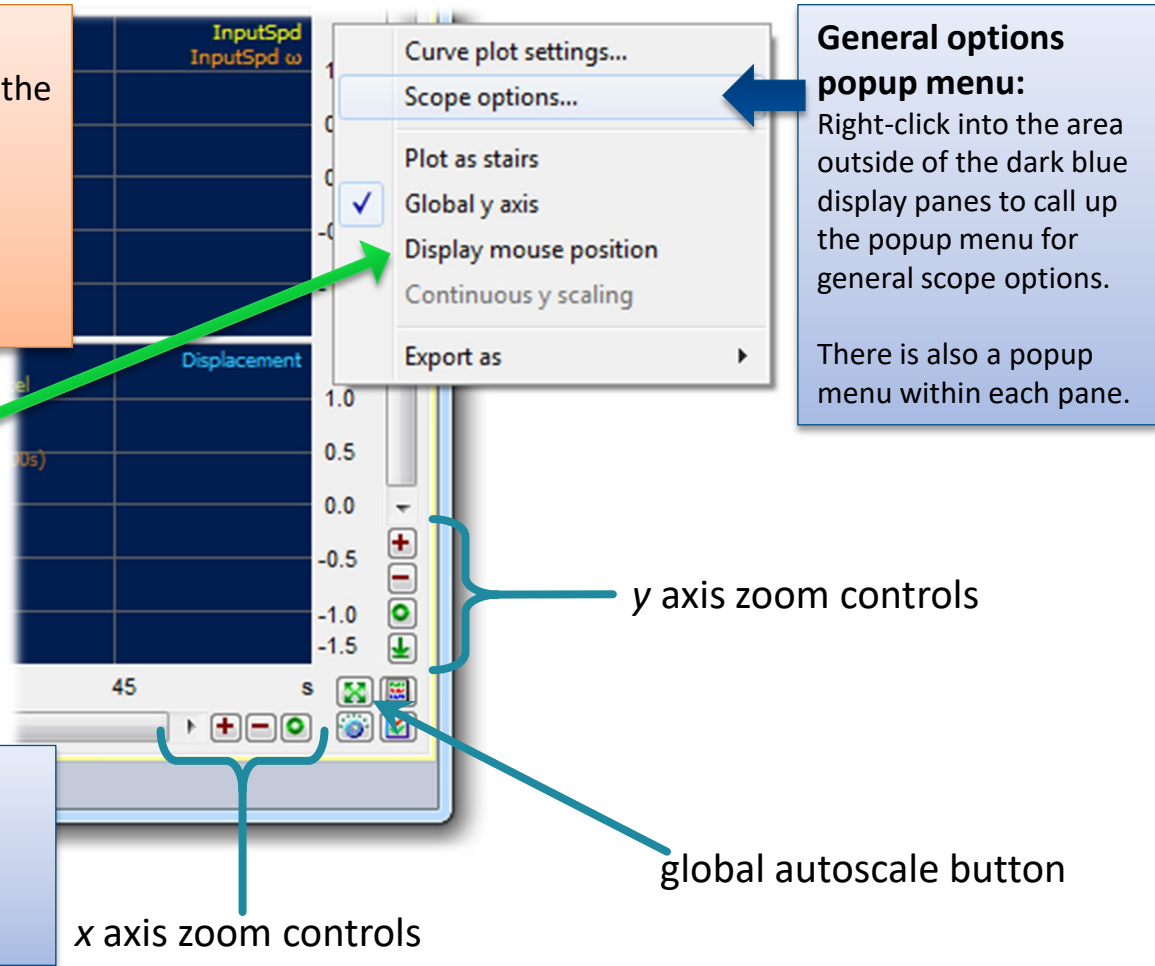
Zoom controls:

-  zoom in
-  zoom out
-  autoscale axis
-  scroll to zero position

General options popup menu:

Right-click into the area outside of the dark blue display panes to call up the popup menu for general scope options.

There is also a popup menu within each pane.



Listening to Sensor Signals

TasWavEditor can play back the sensor signals on the computer's sound card. This way you can directly listen to the raw data using your headphone or speakers.

Play!
Start and stop playback here.

Starting Point:
Playback can start at any test run event (see Cue Points on page 8) or can use the cursor positions (see page 11).

Docking Windows II:
Docking windows can be grabbed by their title bar and moved around. If you have closed a docking window, re-open it with this ribbon menu button.

Channel Selection:
Choose here which wave file channel will be directed to the left and right stereo channel of the headphone or speakers.

The screenshot shows the TasWavEditor interface. The top ribbon has tabs for Basics, Scouting, Toolbox, and Decoding. The Basics tab is active, showing options like Cut, Copy, Paste, Select all, and Docking Windows. The Decoding tab shows Recalculate, Markup Visibility, y scaling, x axis, Preview Options, and Playback. The Playback section includes a Start at dropdown (Mode: 1-S1 (46.7 s)), a checkbox for Use cursor positions, and dropdowns for Left channel (KS_EMot [1]) and Right channel (KS_GetrFI [2]). The Sound playback section has an output volume slider. The main area displays a signal preview with multiple channels (1-Z1, 1-Z2, 1-S1) and a time axis. The bottom left shows a list of channels: Tas Box input A.3.1, 5: Dz_Abtr1 | Dz_Abtr2, TIS speed channel, id 6 / 7, Speed pulses/rev.: 60 / 60, Tas Box input A.0.1, 6: KS_GetrAbtr, and id 103.

Channel Tricks

The Channel Info window toolbar offers some useful functions:

Hide Channel

Channel Sorting selection

Edit Channel Properties
(See more details on page 15)

Add or Delete Channel
You can use TasWavEditor to delete a channel from the wave file or to insert a new channel as a copy of an existing one. Afterwards, save the file under a new name.

Fold/Expand Tree View
Folds or expands all additional information in the channel info tree view.

Hide Channel:
You can hide and un-hide a channel from display also by double-clicking on the name.
Right-clicking on a name will open a context menu with channel functions.

Channel structure

Channel structure toolbar icons: Edit Channel Properties (green), Add/Delete Channel (pink), Fold/Expand Tree View (blue), Hide Channel (orange), Channel Sorting selection (blue), and a magnifying glass icon.

Channel structure window content:

- 1: OutSpd1
 - TIS speed
 - Tas Box input A.0.2
- 2: InputSpd
 - TIS speed channel, id -1 / 7
 - Speed pulses/rev.: 0 / 64
 - Tas Box input A.0.2
- 3: VS1
 - id 11
 - Calibration 0.0026 V/m/s²
 - Scaling 0.2000 [5.0 V]
 - Log.ref. 1e-005
 - Tas Box input A.1.1
- 4: VS2
 - id 12
 - Calibration 0.0026 V/m/s²
 - Scaling 0.2000 [5.0 V]
 - Log.ref. 1e-005
 - Tas Box input A.1.2
- 5: Mic1
- 6: Mic2
- 7: Mic3
- 8: Torque
 - id 2
 - Calibration -0.0200
 - DC Offset -0.0090
 - Scaling 0.1000 [10.0 V]
 - Tas Box input A.3.2
- 9: TqF
 - id 17
 - Calibration 0.0200 V/Nm
 - Scaling 0.1000 [10.0 V]
 - Log.ref. 1e-005
 - Tas Box input A.4.1
- 10: TAC
 - id 16

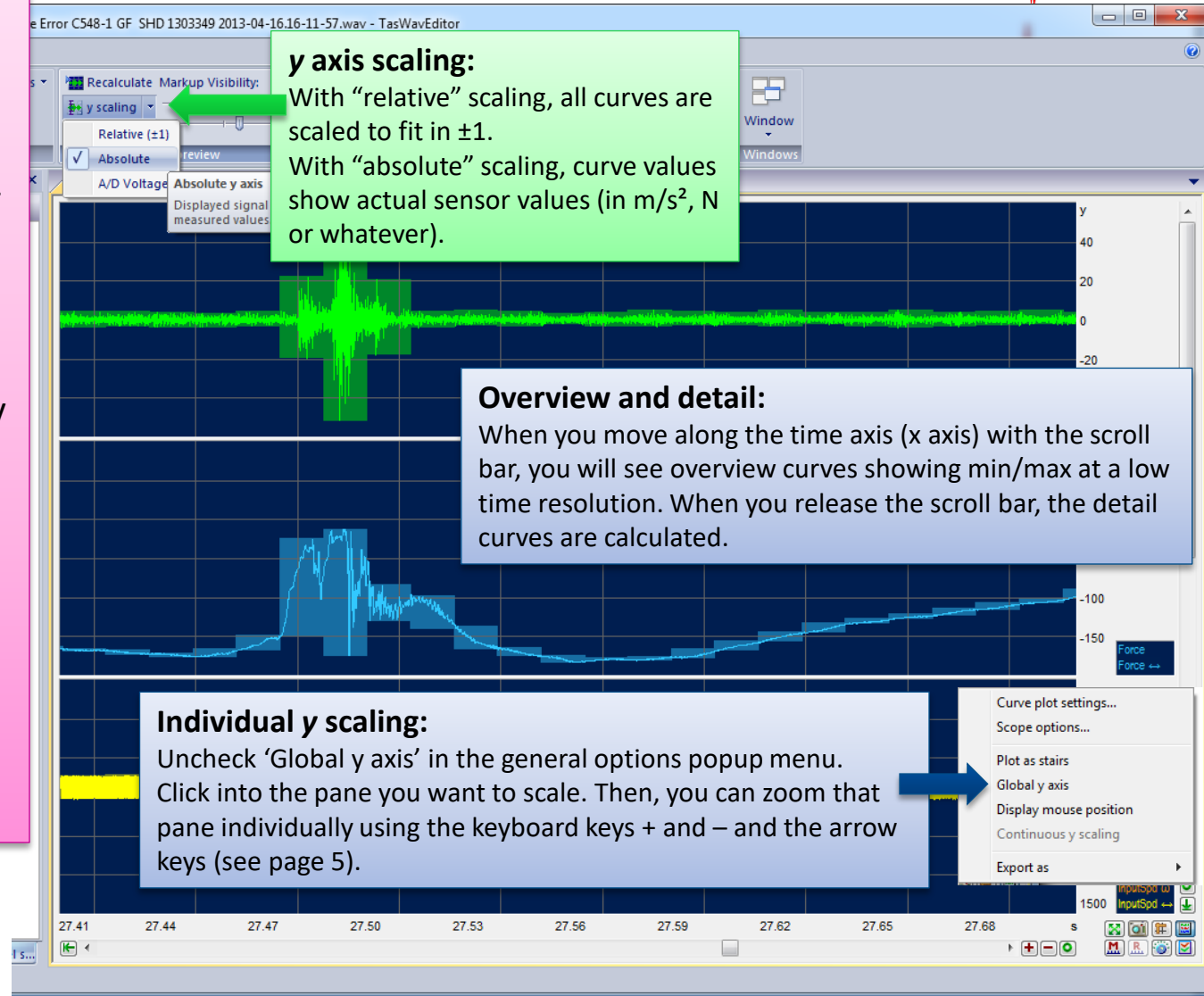
Y Axis Scaling

There are three ways of scaling for the y axis:

Relative will scale each channel to full gain = ± 1 . This is useful for a quick overview and for comparing the signal levels of similar sensors.

Absolute will use the individual y axis of each channel. This is useful for reading absolute values (like acceleration, speed or torque).

A/D Voltage shows the gain as input voltage at the Tas Box. You can detect overload or inappropriate gain settings here.



Cue Points

“Cue Points” are events during the test run like test step changes.

TasWavEditor shows these cue points in the signal preview and as a list in a docking window:

Editing Cue Points:

You can change cue point positions, remove and add cue points. Use the toolbar to edit, add and remove cue points.

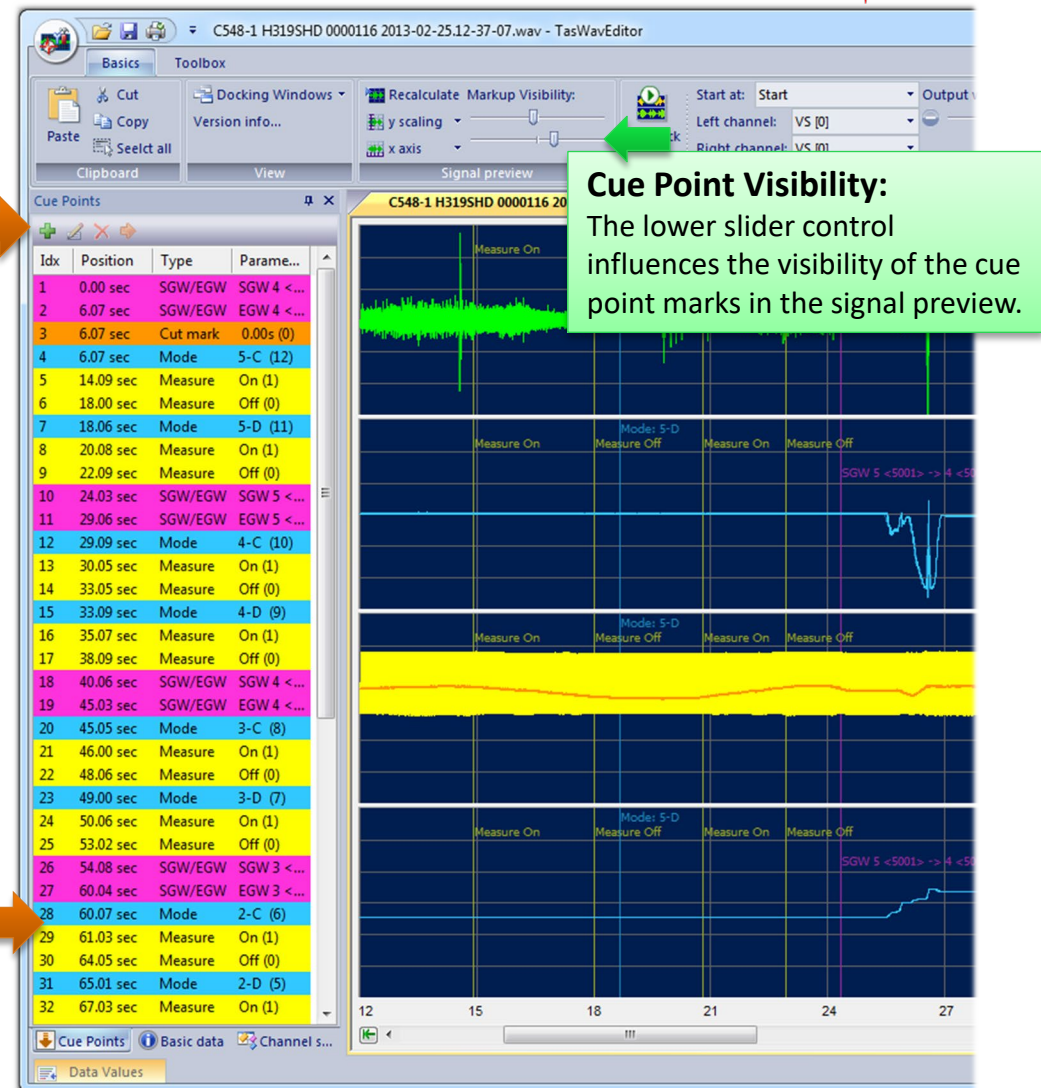
Signal Playback:

Use the playback section in the Ribbon to hear the sensor signals on the PC soundcard. Select the channels you want to hear and the cue point where to start.



Jump to Cue Point:

When you double-clicking on a list row, the signal preview is scrolled so that this cue point gets visible.

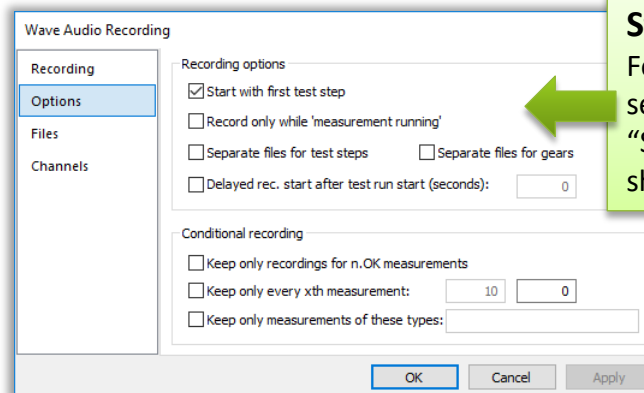
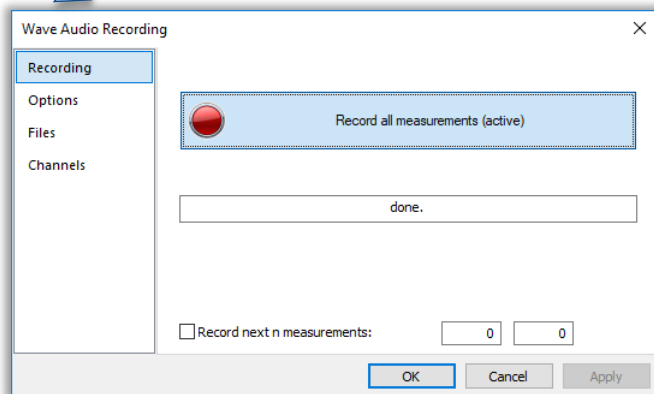


Addendum: Wave Recording Settings in TasAlyser DISCOM



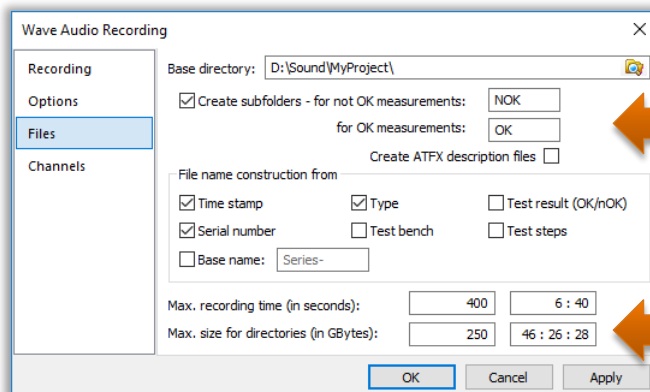
Wave Audio
Recording

The Wave Recording settings in the measurement application TasAlyser define, what is recorded into the wave files and how they are named.



Standard Settings

For test stands with automated sequences, only the checkmark “Start with first test step” should be set.



Sub-folders and maximum directory size

The “max. size for directories” is counted separately for each subfolder. In this example TasAlyser will keep up to 250 GB *each* for OK and not OK test runs. When the max. dir. size is reached, the oldest recordings are delete automatically.

(The maximum size for a single wave file is 2GB according to the wave file format specification. From that limit the maximum recording time is derived.)

Addendum: Wave Playback Tricks

TasAlyser's Wave Playback has some useful extra functionality:

When 'Pause' is pressed, you can jump forward or backward or directly go to a certain test run event (= Cue Point).

Directly load the recording of the last test run or the recently used files

Use these buttons to control archive writing and learning from wave playback.

Wave Audio Playback

A1 070817000004 TorqSweep 2010-14.13-37-02.wav

Chan...	Name	Signal ID	Unit	Signal type
1	VS1	11	g	Sensor
2	CM_1	12	g	Sensor
3	CM_I	14	g	Sensor
4	InSpd OutSpdR	3 6	rpm	Speed Tis24

3/5 31.62 sec

Settings for playback

Open recording in TasWavEditor

Looped playback (until 'Stop' is pressed)

Direct access to audio monitor (for listening along)

When playback is paused, the current time position is shown here (so you can find it in TasWavEditor)

You can load multiple wave files or drag-and-drop them into TasAlyser, and then replay the whole list.

Wave Playback Settings

Playback Options

Playback relative speed: 1:1

Learning Recording

Archives Commands

Reproduction of test cycle

☒ Activate test cycle command playback

Change Metadata:

☐ Type: Model3

☐ Bench: HBK1

☒ Serial: MyTrialRun123

☒ Time Stamp:

☐ Use original time stamp

Execute on

☒ Test

☒ Test

☒ Start

☒ Rabi

☒ Gear

Output Parameters

☐ Direct monitor output (bypass filtering)

☒ Use calibration factors from wave file

Cancel

Different type, serial number, different time stamp?

Set the check marks at the according fields and enter different information.

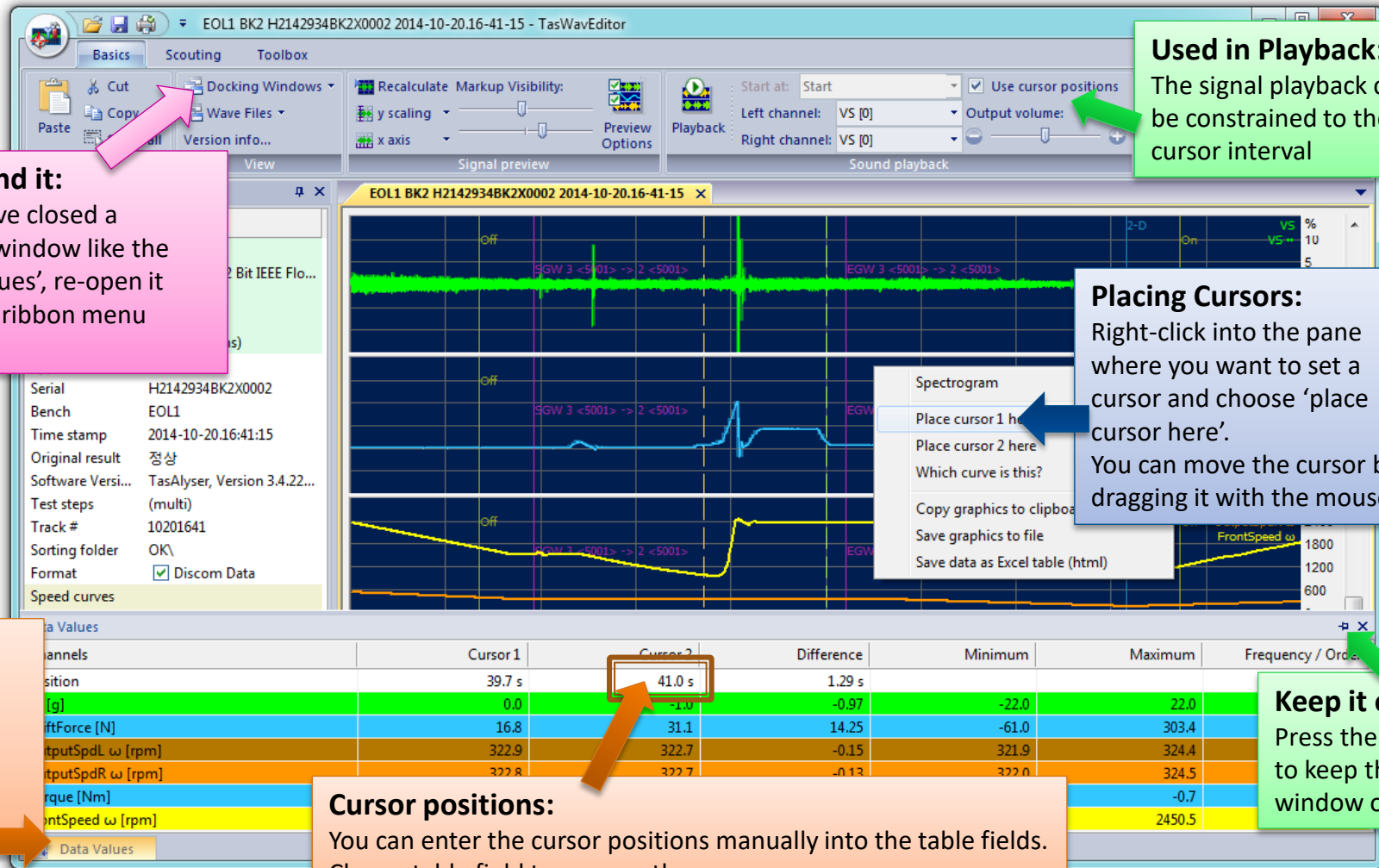
Leave the 'Time Stamp' field empty to use the time stamp from the wave file (instead of the time of playback).

Then generate a measurement archive with the new metadata.

Using Cursors and Data Value Display



You can place two data cursors in the signal preview to read out the values:



Scouting

The *Scouting* ribbon provides functions for navigating within the recording.

The screenshot shows the TasWavEditor software interface. The 'Scouting' ribbon is active, showing options for 'Copy axis scaling from:', 'Including x position', and 'Match and Compare'. The 'Time position' is set to 23.54. The 'Event' is set to 'Start'. The 'Navigation' panel includes 'Go to' and 'Go to Cursor 1' buttons. The main display shows a waveform with a green arrow pointing to the 'Go to' button. A pink box highlights the 'Version Information' button in the top right corner. A blue box highlights the 'File List' menu in the top right corner. A green box highlights the 'Transfer Scaling' section in the bottom left corner. A green box highlights the 'Navigation' section in the bottom center. A blue box highlights the 'File List' section in the bottom right corner.

Version Information:
Press the [?] to pop up the software version information and to see where to get the latest version.

Transfer Scaling:
When you have loaded two or more recordings, you can transfer the axis scaling settings from one window to the other, so it's easier to compare the two. Choose here the recording you want to copy *from* and whether you also want to transfer the x position, then press [Copy axis scaling from].

Navigation:
Use the controls in this panel to shift the view to a specific time position or Cue Point event. Enter the time in seconds and press the [Go to] button. If you have set cursors, you can also move directly to the cursor positions.

File List:
If you have loaded multiple files into TasWavEditor, use this menu to easily switch between them.

Speed Calculation Options

The TasAlyser pulse detection offers a set of advanced options for calculating the rotational speed from the raw data. To access these options in TasWavEditor, go to the Preview Options and press [Speed pulse detector settings]:

The screenshot shows the TasWavEditor interface with two dialog boxes open. The 'Display Options' dialog box is in the foreground, and the 'Speed Pulse Detection Settings' dialog box is in the background. Arrows point from text boxes to specific settings in the dialog boxes.

Cue Point Selection
Other preview options include the selection which Cue Points are marked with vertical lines in the curves.

Pulse Detection
Set the Schmitt Trigger thresholds manually if the automatic calculation is not appropriate.

Divider and Gating Time
For pulse trains with slight variability, use a pulse divider and/or a gating time (e.g. 10 ms).

To save your Preview Options and Speed Decoding settings, go to the 'Toolbox' ribbon and create a settings file.

Changing Channel Properties and Metadata

With TasWavEditor you can change calibration factors and other channel properties *a posteriori*.

1 - Call it:

Call the command "Properties" from the channel tree context menu (or use the toolbar button).

Property	Value
Audio length	93.06 s
Channels	8 channel, 32 Bit IEEE Float
Sample rate	50.000 kHz
Length in sam...	4 653 056
Samples per bl...	4096 (= 81 ms)
Type	BK2
Serial	H2142934BK2X0002
Bench	EOL1
Time stamp	2014-10-20.16:41:15
Original result	정
Software Versi...	Ta
Test steps	(m
Track #	10
Sorting folder	Ok
Format	✓
Speed curves	
Time resolution	6
=	3
Length	15000

Metadata:

You also can change the measurement metadata by directly editing them in the 'Basic Data' window.

3 - Save it:

Press the "Save" button to replace your original file or use the "Save as..." command to create a copy.

2 - Change it:

Change the channel properties as desired, for example by entering a new calibration factor or by correcting the speed pulses per revolution.

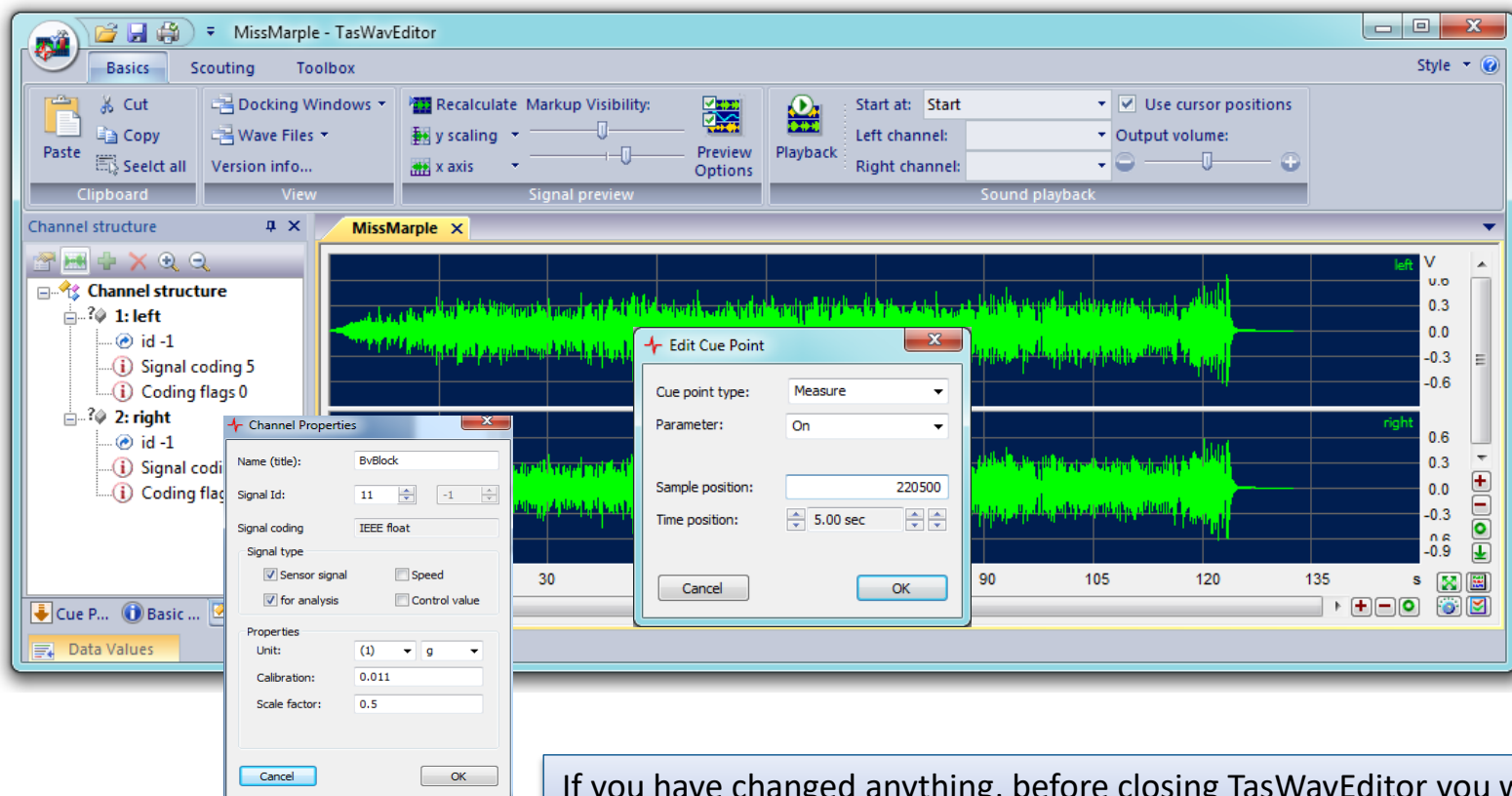
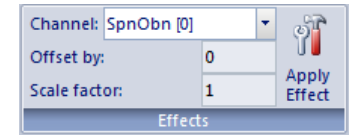
When you replay the changed wave file in the TasAlyser measurement application, you will get a new "measurement" with the changed settings.

Editing the data



TasWavEditor has some simple capabilities for editing the sensor data, but can change any aspect of 'Metadata' (like channel descriptions, cue points and more).

You can load a wave file recorded by any other tool and fix the metadata, add channel descriptions and Cue Points and thus make it TasAlyser playable.



If you have changed anything, before closing TasWavEditor you will be prompted to save the changed wave file, optionally with a new name.

Exporting to Third-Party systems

Many third-party applications can read WAV raw data and use 'ATFX' files to import the channel descriptions. Because the TIS speed information is digitally coded, the speed channels have to be exported as analog values:

Channel Export:

Use the 'Channel Export' function in the 'Toolbox' ribbon to export for third-party systems.

Channel Selection:

Choose which channels to export. Speed ω channels contain the decoded speed value. For third-party systems, use these channels and not the original TIS channels.

Atfx file:

Check 'create Atfx description file' to export channel descriptions into a separate file.

Atfx description file:

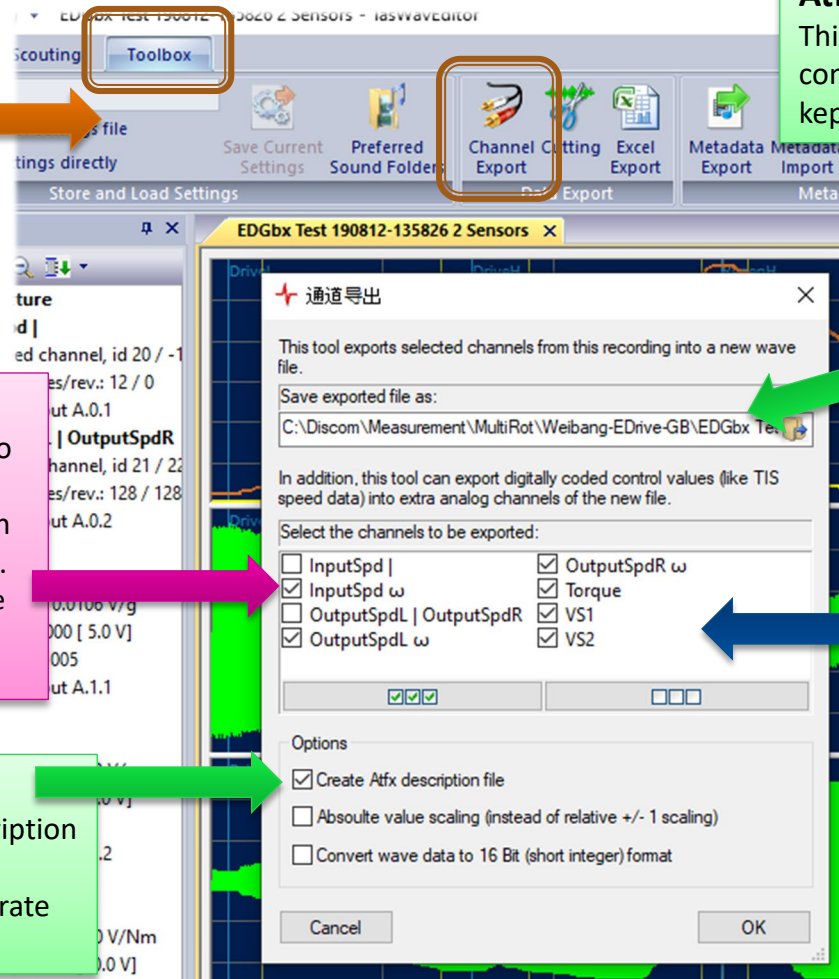
This file (XML format) is a *description* of the contents of the wave file. Both files have to be kept together and should not be renamed.

Export file names:

If switched on, an Atfx file will be generated in the same location as the exported wave file and have the same file name with the extension 'atfx' instead of 'wav'.

Digital Speed Data Export:

Speed signals originally recorded by a TIS card are stored in digitally coded format in the original wave file. For import in third-party systems, these speeds have to be converted to analog values.



Data Export and Cutting

There are two ways to export data: into a new wave file ('Channel Export', 'Cutting') or into an Excel table.

Export functions are accessed via the ribbon 'Toolbox'.

Channel Export and Cutting:

Both generate a new wave file. With 'Cutting' you have the additional options of exporting only part of the file and reducing the sample rate.

Hints for Excel export:

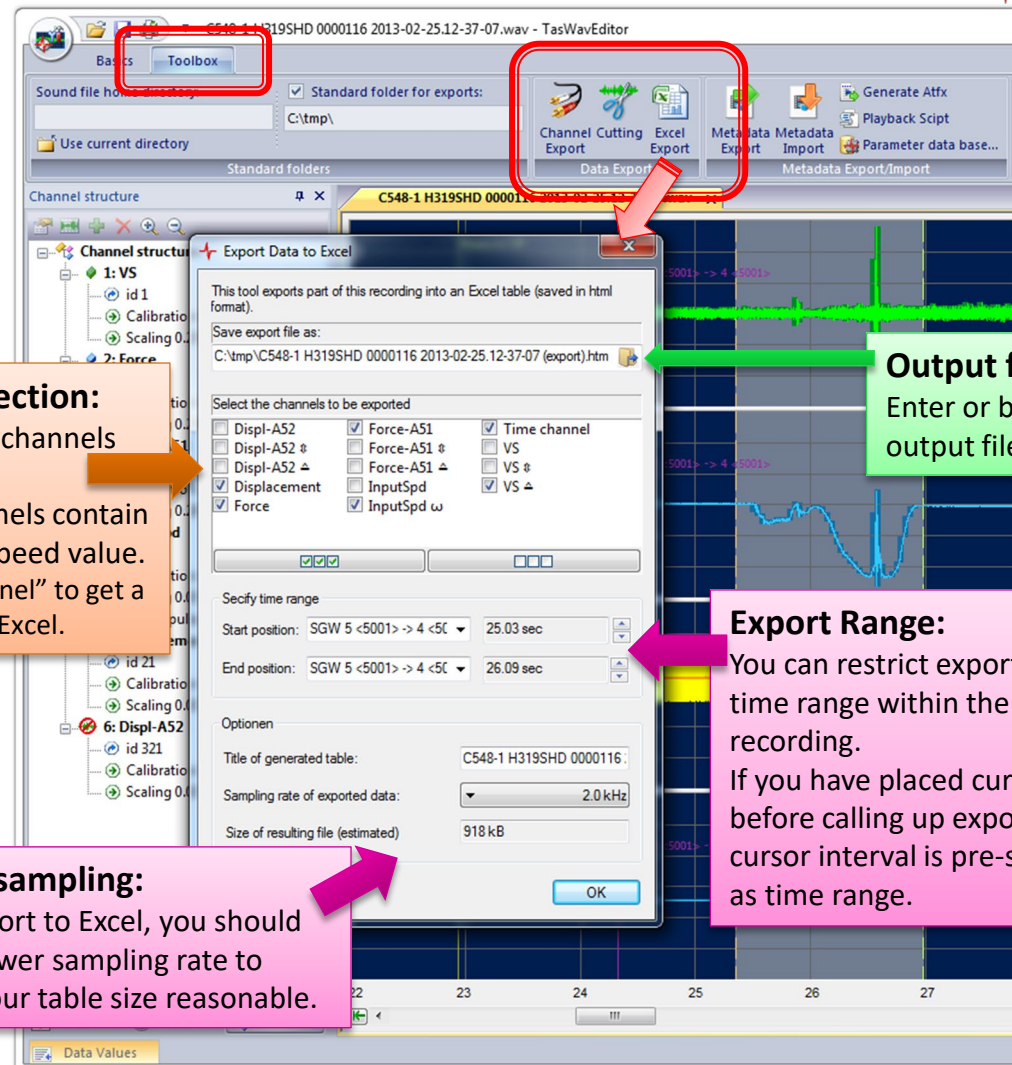
The data are stored in an html file which can be read in directly by Excel (but can also be viewed in any internet browser) – see next page. You should choose a reasonable sampling rate for the exported data in order to restrict the table to a manageable size.

Channel Selection:

Choose which channels to export. Speed ω channels contain the decoded speed value. Use "Time channel" to get a time column in Excel.

Downsampling:

For export to Excel, you should set a lower sampling rate to keep your table size reasonable.



Output file:
Enter or browse for output file name here.

Export Range:

You can restrict export to a time range within the recording. If you have placed cursors before calling up export, the cursor interval is pre-selected as time range.

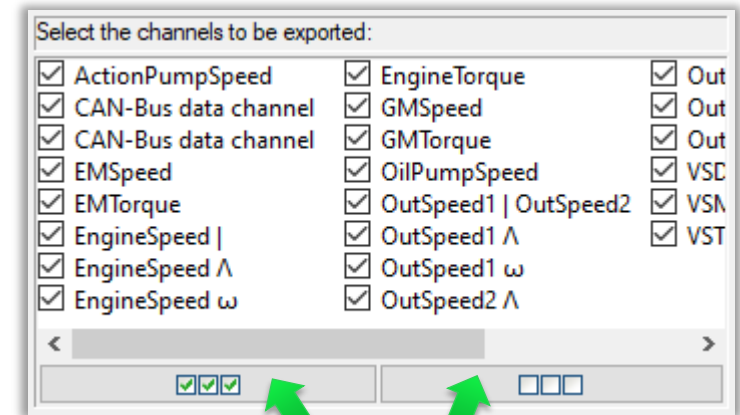
Export Curve Formats

In the first place, all channel exports will write out the original wave raw data.

For some types of channels or types of export formats, derived values can be more useful.

Derived values are marked by specific symbols after the channel name in the selection list:

Symbol	Meaning
	TIS speed channels can contain two independent speed signals. The separates the two names and even appears when only one speed signal is used.
ω	Speed as analog value (like 1200.0 rpm). Especially when exporting for a third-party system, TIS speed channels must be converted to analog values. Can also be useful for direct pulse-type speed signals
\wedge	Speed pulses from TIS speed. Instead of exporting the speed as value, this option generates a signal with pulses that correspond to the original TIS speed pulses.
\triangleq	Envelope. Useful for sensor channels which are exported to Excel with reduction to a very low sampling rate.
\updownarrow	Min/Max curve. Also useful for exporting to very low sampling rates.

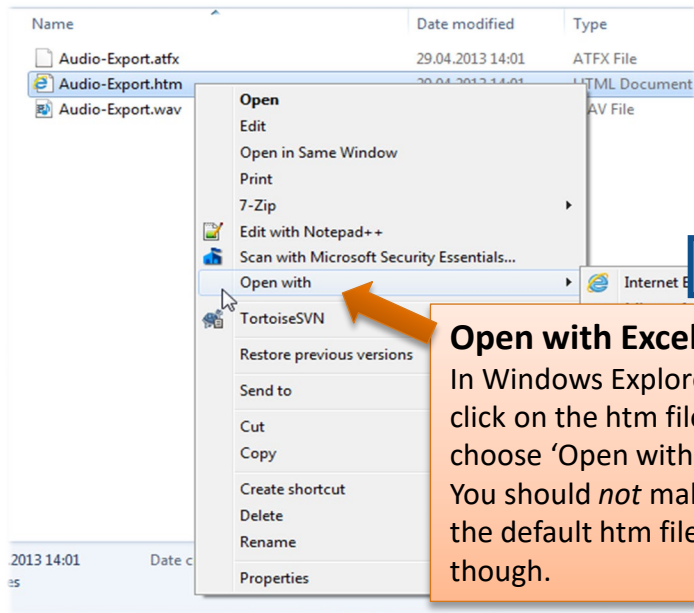


Select all or none:

The left button selects all check boxes, the right button unselects all.

Excel Export Result

The result of Excel export is an htm file which can be opened directly with Excel.



Open with Excel:

In Windows Explorer, right click on the htm file and choose 'Open with...'
You should *not* make Excel the default htm file viewer, though.

Excel export example:

You will get the exported channels as columns in Excel. Now you can use Excel's powers to analyze the data.

	A	B	C	D	E
1	Recording 2013-03-20.12-30-54				
2					
3	Basic data				
4					
5	Property	Value			
6	Start	93.05 sec			
7	End	101.00 sec			
8	Audio length	7.04 sec			
9	Channels	6 channel, 32 Bit IEEE Float			
10	Sample rate	2000 Hz			
11	Type	BR33-7003-AA			
12	Serial	fftb030213143716			
13	Bench	TS3 MT82			
14	Time stamp	2013-03-20.12:30:54			
15					
16	Data Values				
17					
18	Time [s]	SForceGear [N]	SForceLane [N]	InputSpd [rpm]	
19	0	0,000261	-0,099199	1565,106934	
20	0,0005	0,013259	0,116119	1546,671509	
21	0,001	0,007018	-0,015891	1554,109863	
22	0,0015	0,137003	0,099562	1555,261841	
23	0,002	0,169425	0,215628	1547,551147	
24	0,0025	0,036343	-0,048668	1558,84082	
25	0,003	-0,004534	-0,098138	1549,018433	
26	0,0035	0,022901	0,149957	1564,487305	
27	0,004	-0,012329	0,182841	1548,474243	
28	0,0045	0,03006	-0,037421	1549,348145	
29	0,005	-0,021918	0,118906	1562,410767	
30	0,0055	-0,217267	0,20696	1548,570435	
31	0,006	-0,072217	-0,045479	1557,673706	
32	0,0065	0,033754	-0,097446	1550,906128	
33	0,007	0,001396	0,153483	1558,86792	
34	0,0075	-0,000397	0,177728	1551,849121	
35	0,008	0,032489	-0,032703	1546,474487	
36	0,0085	0,100008	0,100007	1552,831542	

Exporting the Graphics

You can export the curve graphics of single panes or of all curves.

The screenshot shows the TasWavEditor interface with a 'Scope options Time signals' dialog box open. The dialog box has tabs for 'Curve Colors', 'Scaling', 'Display', 'Spectrogram', and 'Print output'. The 'Print output' tab is selected, showing options for 'Export graphics as' (Drawing (WMF) or Picture (PNG)), 'Line width in print' (2), 'Adjust curve colors for white background' (checked), 'Print in greyscale' (unchecked), and 'Font size for labels'. A context menu is also visible over the main graph area, with options: 'Spectrogram', 'Place cursor 1 here', 'Place cursor 2 here', 'Which curve is this?', 'Copy graphics to clipboard', 'Save graphics to file', and 'Save data as Excel table (html)'. A pink arrow points from the 'Copy graphics to clipboard' option to a pink callout box. An orange box points to the 'Scope options' button in the bottom left corner of the main window.

Printing Options:
The print output options also apply to the graphics export. To print the curves, use the normal printing commands of the application.

Export Graphics:
Use the pane popup menu's command to transfer the curve graph into the Windows clipboard. You can then paste the graphics to Office applications.

Calling up the Options:
Use the [Scope options] button to open the settings window.

CAN Data Curves

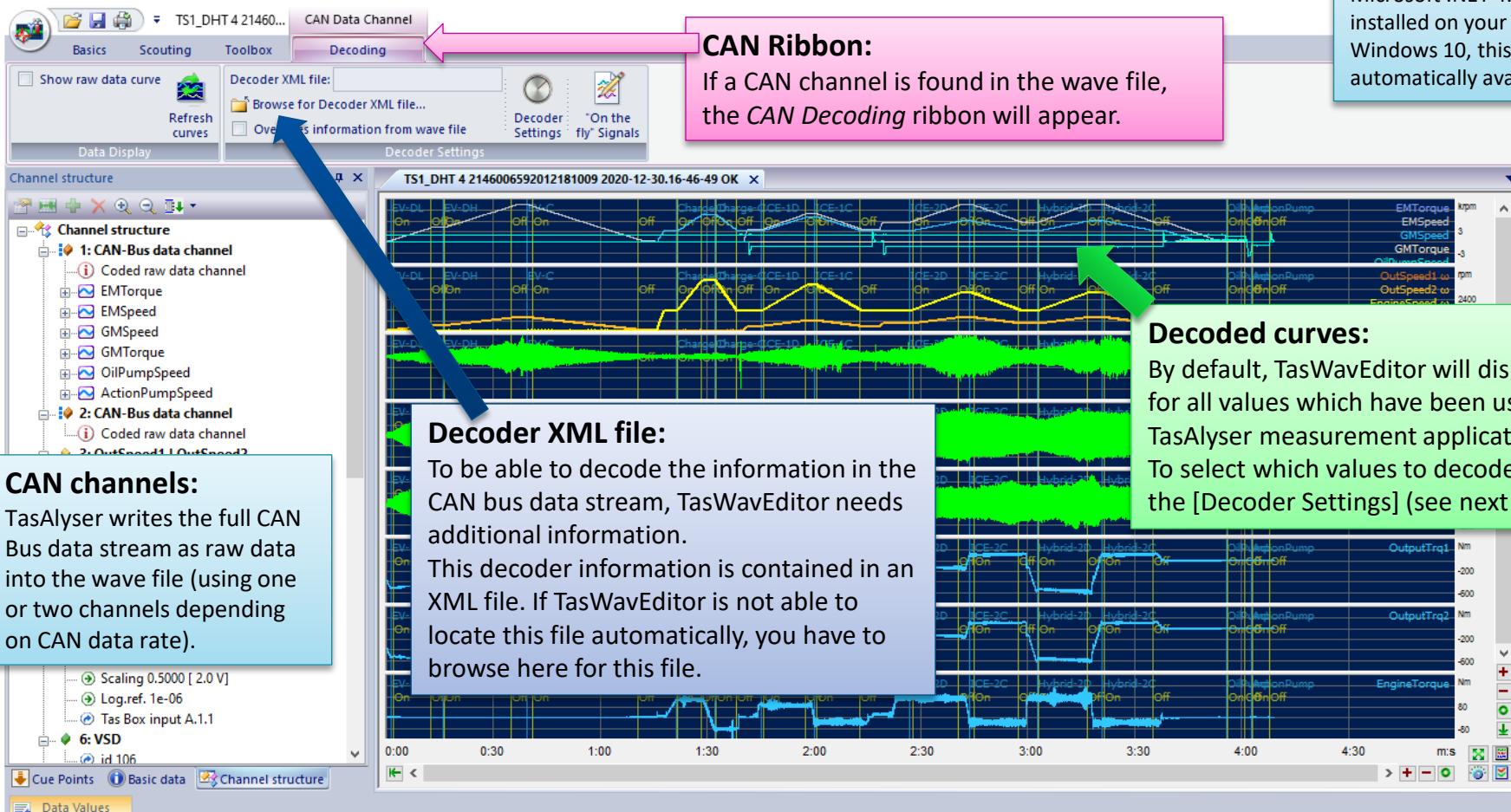
If your wave file contains a channel with CAN bus data, TasWavEditor will try to decode these data and show the according curves. For this, TasWavEditor needs the according Decoder Xml file (extracted from Dbc file).

.NET required:

Decoding CAN bus data requires Microsoft .NET 4.0 (or higher) installed on your computer. On Windows 10, this should be automatically available.

CAN Ribbon:

If a CAN channel is found in the wave file, the *CAN Decoding* ribbon will appear.



CAN channels:

TasAnalyser writes the full CAN Bus data stream as raw data into the wave file (using one or two channels depending on CAN data rate).

Decoder XML file:

To be able to decode the information in the CAN bus data stream, TasWavEditor needs additional information.

This decoder information is contained in an XML file. If TasWavEditor is not able to locate this file automatically, you have to browse here for this file.

Decoded curves:

By default, TasWavEditor will display curves for all values which have been used in the TasAnalyser measurement application.

To select which values to decode, adjust the [Decoder Settings] (see next page).

More on CAN Decoding

Raw data curve:

TasWavEditor can generate a curve which shows a peak for each CAN message block in the data stream. Use this checkbox to show this curve and get an idea of the message rate.

A typical CAN bus data stream contains many signals. TasWavEditor can decode any of these but needs a TasAlyser signal description to map onto.

TasAlyser copies information about the known signal descriptions from the parameter database into the wave file metadata.

The screenshot shows the TAS Analyser software interface. The top menu bar includes 'Basics', 'Scouting', 'Toolbox', and 'Decoding'. The 'Decoding' tab is active. Below the menu bar, there are buttons for 'Show raw data curve', 'Refresh', 'Decoder XML file:', and 'Browse for Decoder XML file...'. The 'Can Decoder Settings' dialog box is open, showing a table with columns: Can Id, Can Name, Tas Signal, and Active. The 'On-The-Fly Signal Descriptions' window is also open, showing a list of signals with columns: Name, Active, Type, SI prefix, and Unit. An orange arrow points from the 'Extra-Signal' entry in the 'On-The-Fly Signal Descriptions' window to the 'Extra-Signal' entry in the 'Tas Signal' column of the 'Can Decoder Settings' table. A green arrow points from the 'Browse for XML file...' button in the 'Can Decoder Settings' dialog to the 'Decoder XML file:' field. A pink arrow points to the 'Basics' tab in the top menu bar. A blue arrow points to the 'On the fly' Signals button in the 'Decoder Settings' section.

Can Decoder Settings

Can Id	Can Name	Tas Signal	Active
315	RRWheelSpdValid	-	<input type="checkbox"/>
315	RRWheelDriveDirection	-	<input type="checkbox"/>
315	RollingCounter_ABS_PT2	Extra-Signal	<input type="checkbox"/>
180	GMCU_InvActSts	-	<input type="checkbox"/>
180	GMCU_ActSpd	GMSPeeds	<input checked="" type="checkbox"/>
180	GMCU_ActTrq	GMTorque	<input checked="" type="checkbox"/>
639	VehTotDistance	-	<input type="checkbox"/>

On-The-Fly Signal Descriptions

Name	Active	Type	SI prefix	Unit
Extra-Signal	<input checked="" type="checkbox"/>	CtrlVal	(1)	V

Decoder settings:

The Can Decoder Settings establish the association between CAN message names and TasAnalyser signal names.

For those CAN signals you want to get decoded, select an appropriate TasAnalyser signal and set the Active check.

On-The-Fly Signals:

If you want to decode a CAN signal but do not have an appropriate TasAnalyser signal pre-defined in the parameter database, you can create an "On the fly" signal definition and then use it in the Can Decoder settings.

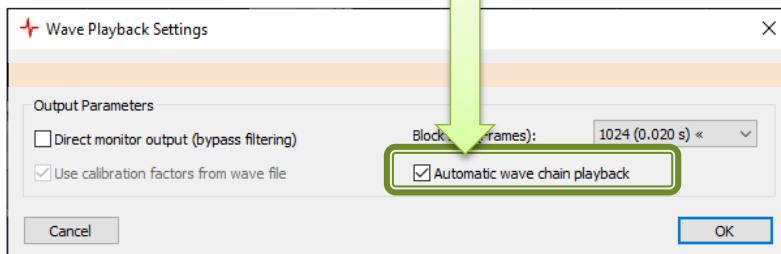
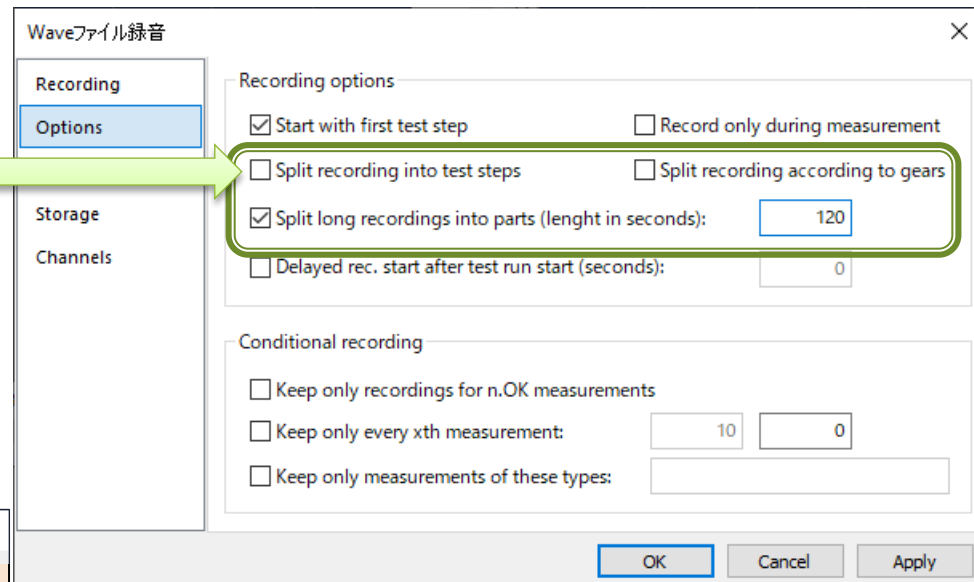
Wave File Chaining

Due to the wave file format specification, a single wave file cannot be larger than 2 GB. This can be a limitation for long test runs and applications with many sensors and high sampling rates. And even 2 GB files can be inconvenient to handle.

Therefore, TasAlyser has the option to split a test run recording into a number of single files. Using specific metadata, these files are *chained*, so TasAlyser can play them back *as if* it was a single, long recording.

In TasAlyser, open the Wave Recorder settings and use one of the three splitting options.

In the Wave Playback options (see also page 11), set the checkmark for wave chain playback to automatically play the whole chain:



All chain files are created in the standard output directory (OK/NOK subfolders cannot be used).

For chain playback, all files must be located in the same folder.

Edit Wave File Chaining

You can examine and edit the chaining information for a wave file in the “Scouting” section:

Chain List:
This selection list shows all wave files which are chained to the current file

Chaining Information:
Press this button to open a window containing the detailed chaining information for the current file.

Load Chain Files:
Use these buttons to load the file currently selected in the list, the next previous file in the chain, the next file, or all files into TasWavEditor.

Create Chain Links:
You can set up a chain link between the current file and any other file which is currently loaded into TasWavEditor. The other file will be placed after the current file in the chain.

Both files must be located in the same folder, and they must fit together (have the same channels and so on).

Select the other file from the list and press [Establish chain link].

The screenshot shows the 'Scouting' section of the TasWavEditor interface. It includes a 'Toolbox' with navigation buttons like 'Go to', 'Go to Cursor 1', 'Go to Cursor 2', 'Zoom to cursor area', and 'Remove cursors'. The 'Files in chain' list shows '(this file)' and a 'Load selected file' button. The 'Chain current file to' dropdown shows '2021-03-09.10-50-00 Up' and an 'Establish chain link' button. The 'Chaining Infos' button is also visible.