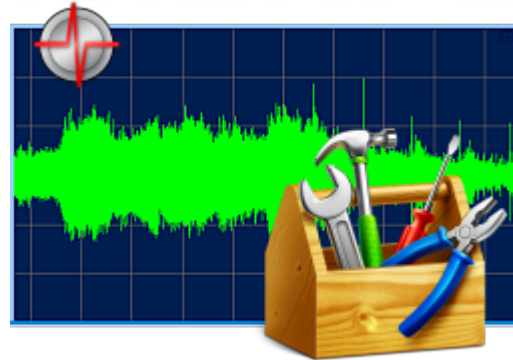


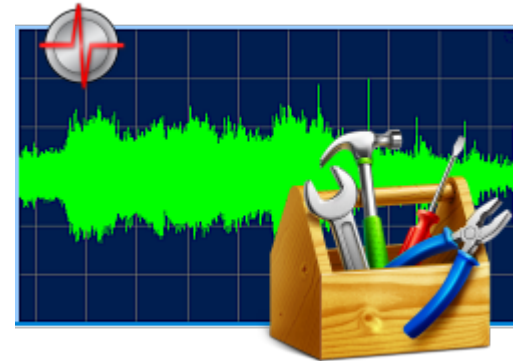
TasWavEditor



Basic usage guide

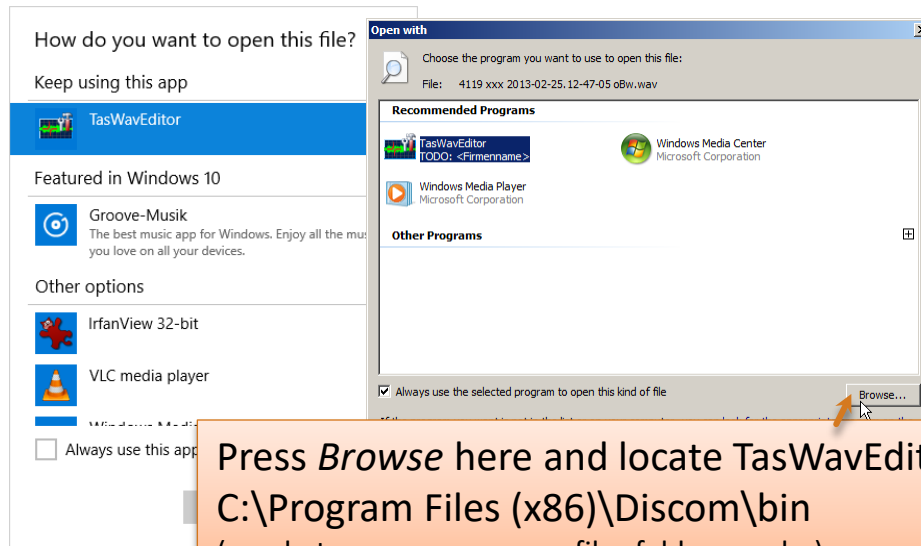
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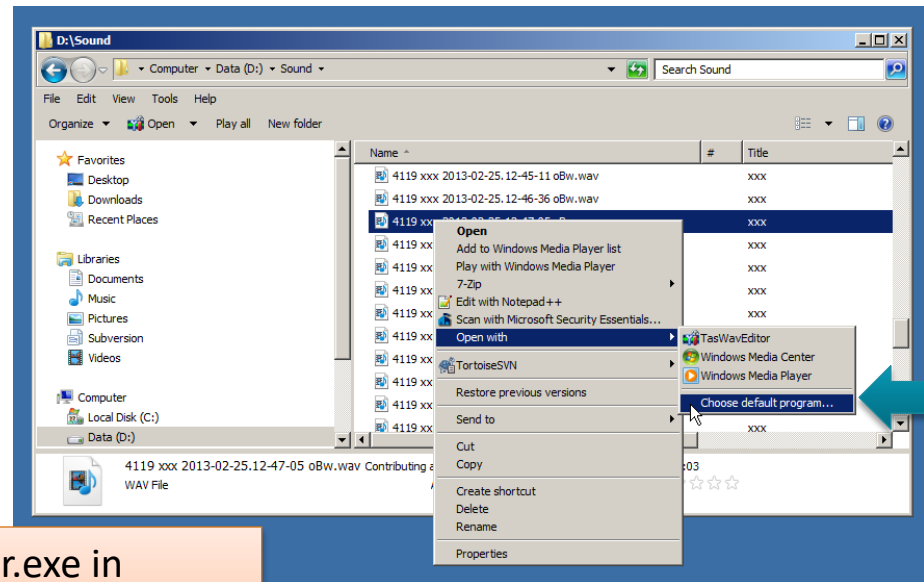


Starting TasWavEditor

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*:



Press *Browse* here and locate TasWavEditor.exe in C:\Program Files (x86)\Discom\bin (or whatever your program files folder may be)



Keep “Always use...” checked to automatically start TasWavEditor by double-clicking on wave files.

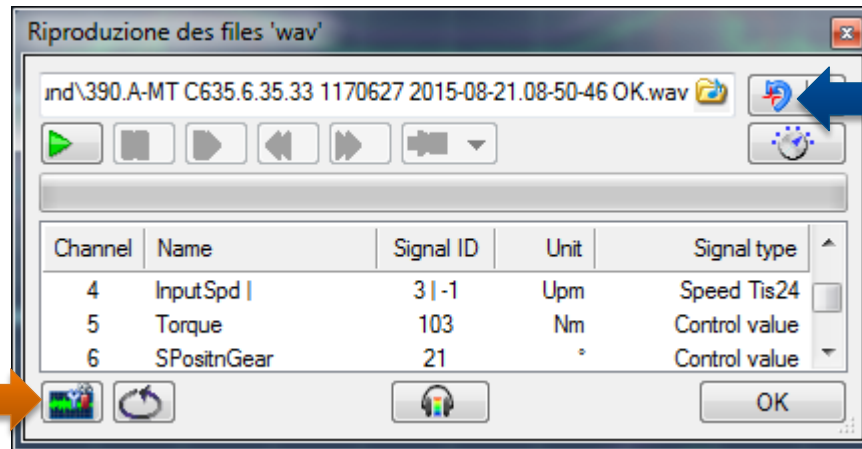
When you start TasWavEditor directly (for example by using a desktop link), you will immediately be prompted for the wave file you want to load.

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 this button to automatically load the most recent completed recording.

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

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.

'Ribbon':
Change the display style and call editor functions here.

Channel structure:
Lists the channels in the wave file and their properties.

Docking windows:
There are more information windows docked here.

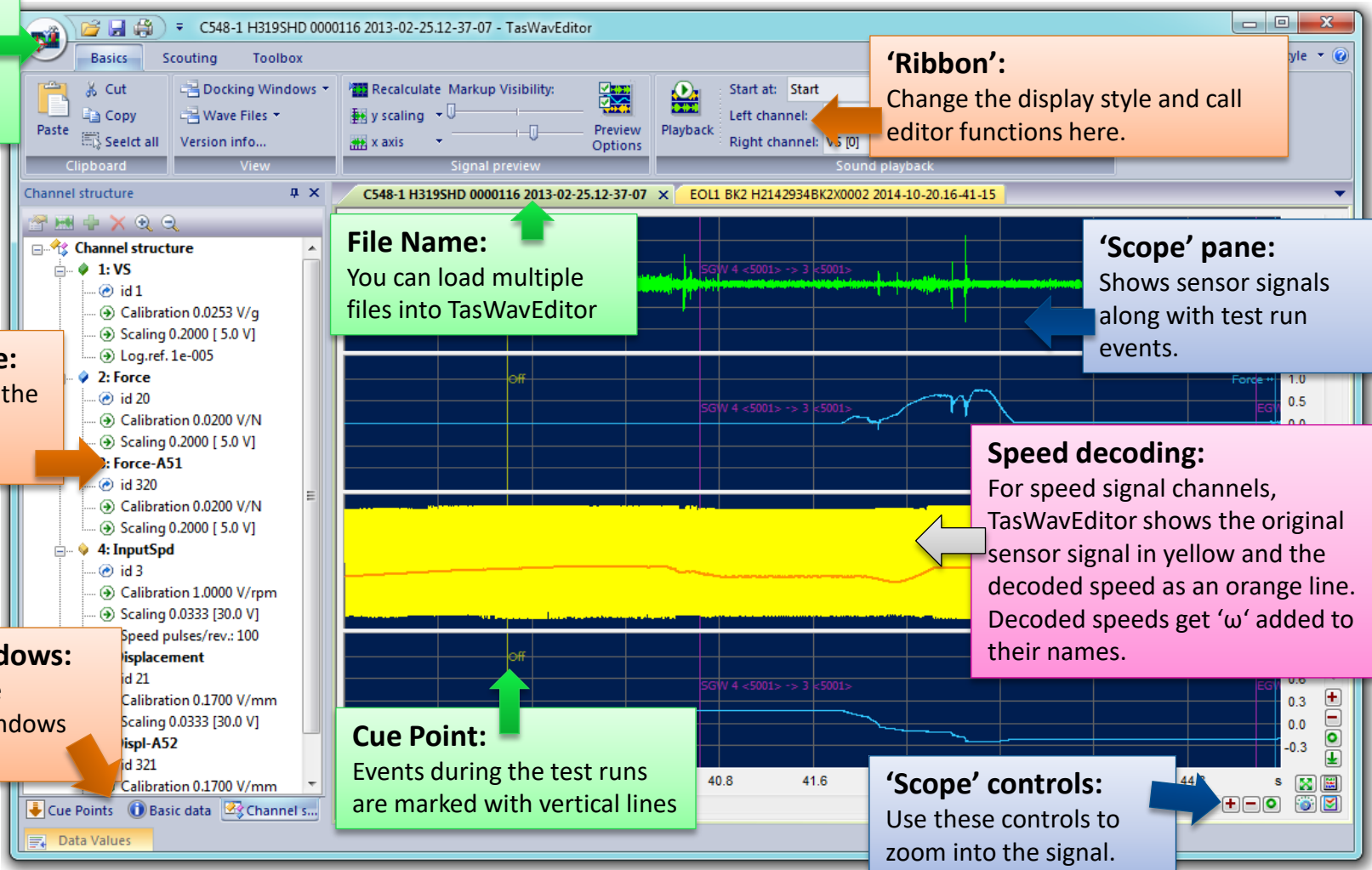
File Name:
You can load multiple files into TasWavEditor

'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.

Cue Point:
Events during the test runs are marked with vertical lines

'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.

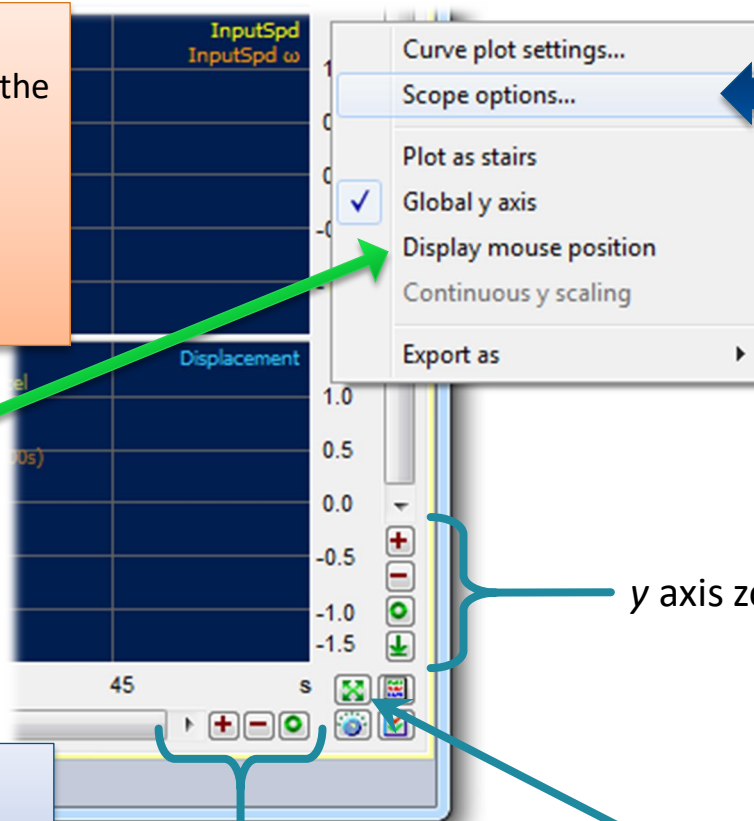
Zoom controls:

- 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.



y axis zoom controls

global autoscale button

x axis zoom controls

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.

Start at: Mode: 1-S1 (46.7 s) Use cursor positions
Left channel: KS_EMot [1] Output volume:
Right channel: KS_GetrFI [2]

Clipboard View Signal preview Sound playback

Vorderachse 9J1901131#G022 20

1-Z1 On Off 1-Z2 On
1-Z1 On Off 1-Z2 On
1-Z1 On Off 1-S1 On Off 1-Z2 On
1-Z1 On Off 1-S1 On Off 1-Z2 On

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
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
 - 1: OutSpd1
 - TIS speed
 - Tas Box in
 - 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]
 - Log.ref. 1e-005
 - 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

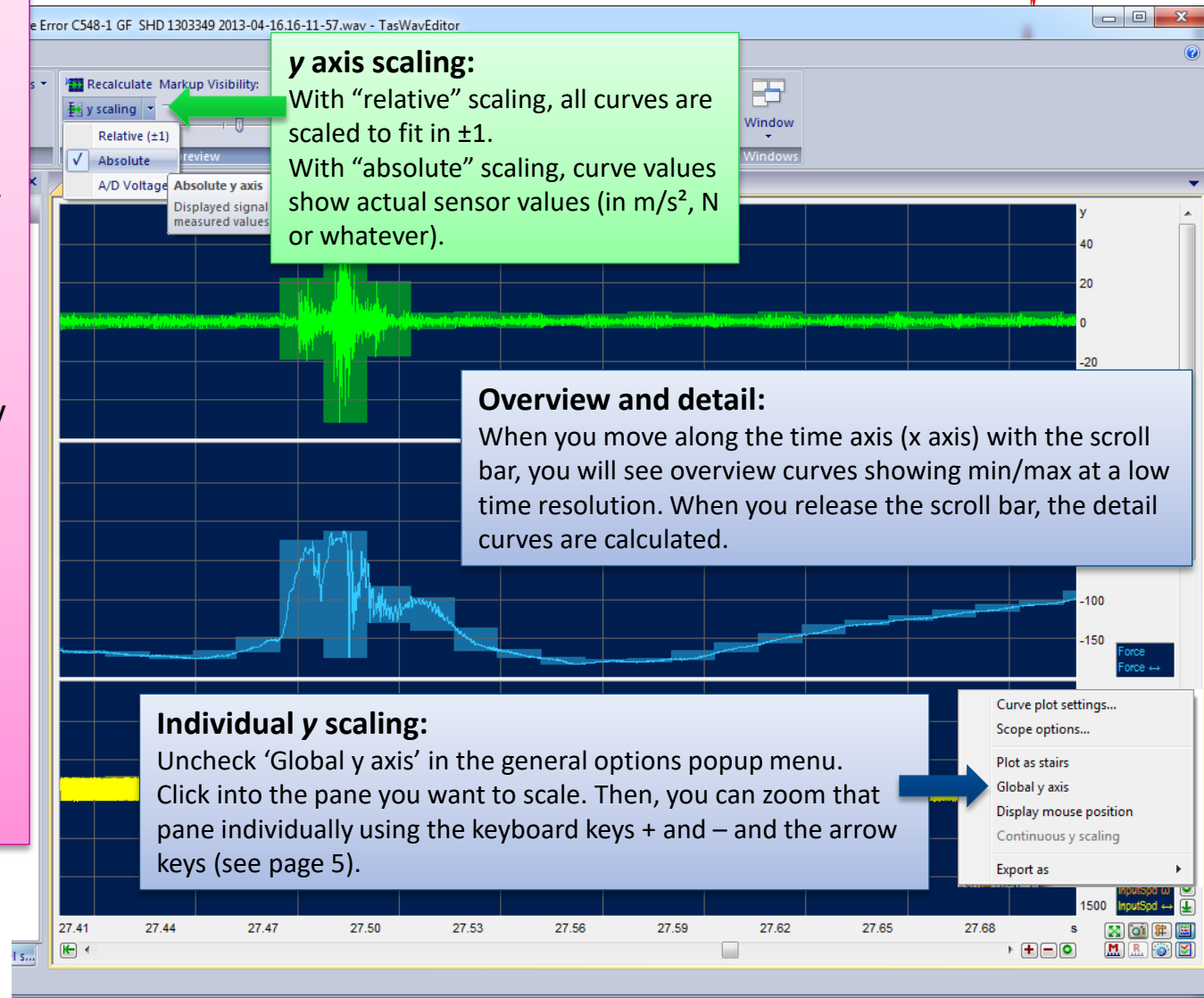
Y Axis Scaling

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.

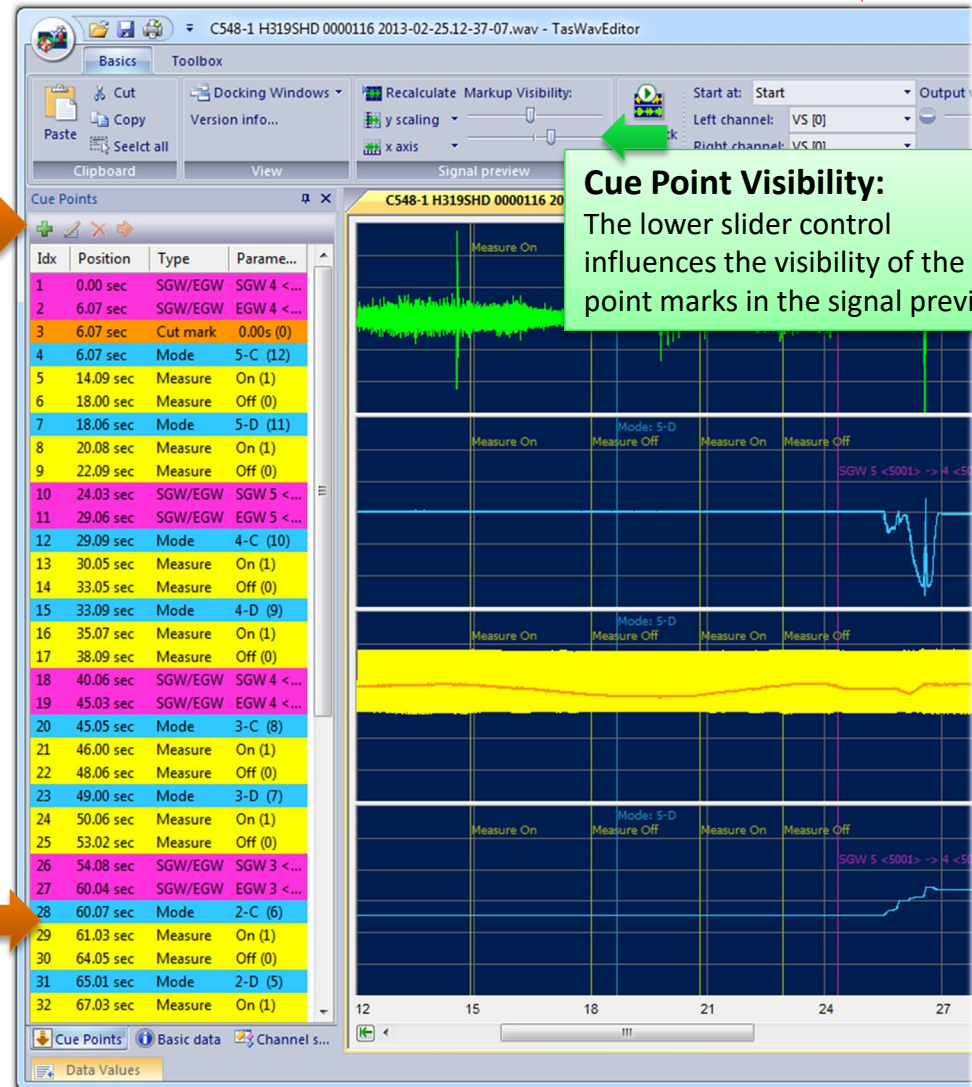
Signal Playback:

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.

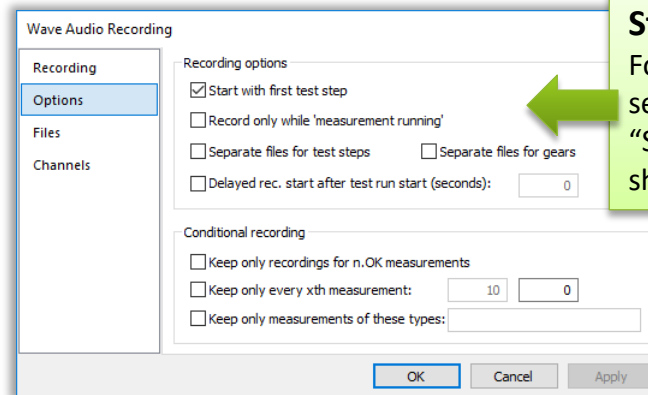
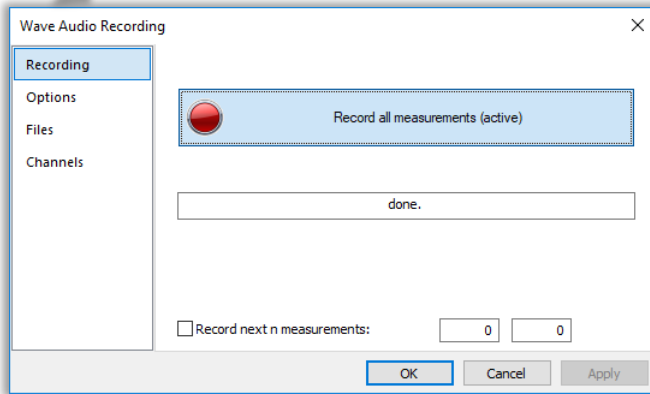


Cue Point Visibility:
The lower slider control influences the visibility of the cue point marks in the signal preview.

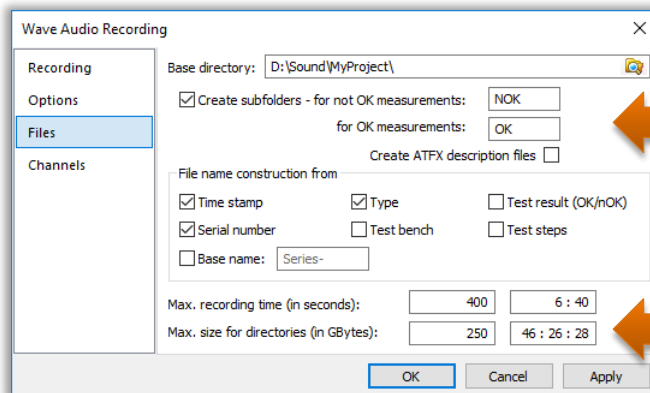
Addendum: Wave Recording Settings in TasAlyser **DISCOM**



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.

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

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: [empty]

Use original time stamp

Execute o...

Output Parameters

Direct monitor output (bypass filtering)

Use calibration factors from wave file

Cancel

Open recording in TasWavEditor

Looped playback (until 'Stop' is pressed)

Direct access to audio monitor (for listening along)

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

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

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:

Can't find it?:
If you have closed a docking window like the 'Data Values', re-open it with this ribbon menu button.

Used in Playback:
The signal playback can be constrained to the cursor interval.

Placing Cursors:
Right-click into the pane where you want to set a cursor and choose 'place cursor here'. You can move a cursor by dragging it with the mouse.

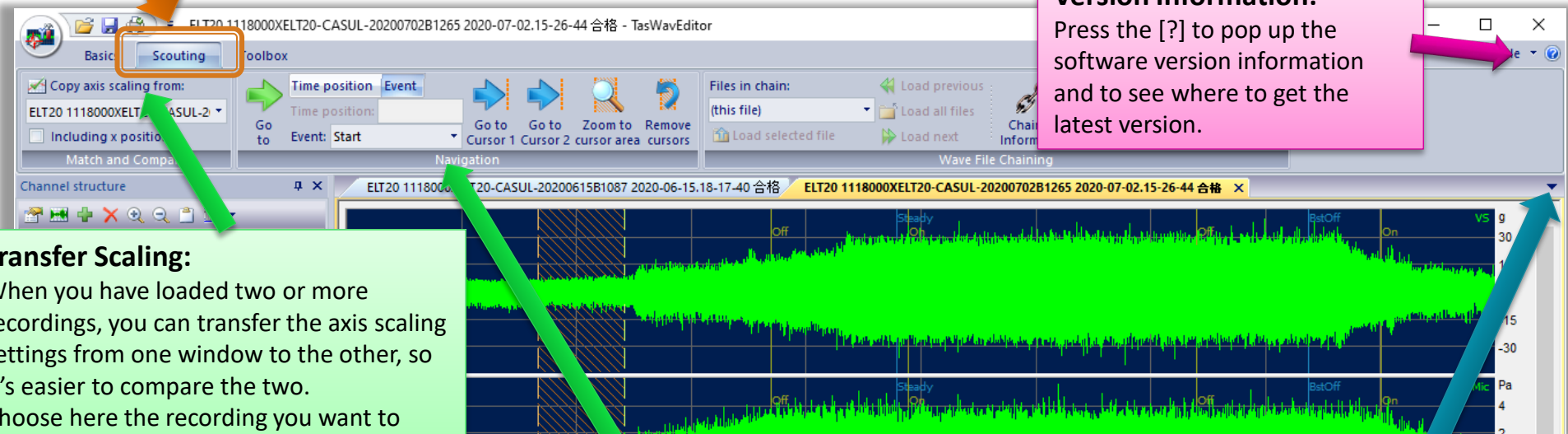
Data Values:
Open the 'Data Values' docking window to read the curve values at the cursor positions.

Cursor positions:
You can enter the cursor positions manually into the table fields. Clear a table field to remove the cursor.

Keep it open:
Press the little 'pin' to keep the docking window open.

	Cursor 1	Cursor 2	Difference	Minimum	Maximum	Frequency / Order
Position	39.7 s	41.0 s	1.29 s			
[g]	0.0	-1.0	-0.97	-22.0	22.0	
fftForce [N]	16.8	31.1	14.25	-61.0	303.4	
OutputSpdL ω [rpm]	322.9	322.7	-0.15	321.9	324.4	
OutputSpdR ω [rpm]	322.8	322.7	-0.13	322.0	324.5	
Torque [Nm]					-0.7	
FrontSpeed ω [rpm]					2450.5	

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



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 or select the Cue Point and press the [Go to] button. If you have set cursors, you can also move directly to the cursor positions, zoom to the cursor area or remove the cursors.

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]:

Display Options

Scaling Settings

- Scaled to gain (± 1): Global y axis
- Absolute scaling: Individual y axes
- A/D voltage (Volt): Global y axis

Mark Cue Points

- Mode:
- Measure:
- Ratio/Diff:
- SGW/EGW:
- Cut mark:

Use short cue point labels:

Speed Pulse Detection Settings

(The number of pulses per revolution from the speed signal generator is a channel property and can be changed there.)

Lower / Upper Trigger Threshold

Schmitt-Trigger levels for detection of speed pulses in the analog signal:

- Calculate from data: 1.22315 22.7488
- Use fixed values: 0.25 0.75

Pulse divider, Pulse gaps

Use pulse divider: 1

Fill pulse gaps:

Expected relative length of gaps: 1

Options

Gating time (min. time for output), ms: 0

Detect falling flanks:

Optimize for TTL signals:

Noise pulses, Interference

Filter out noise pulses:

- Min. pulse distance (ms): 0
- Max. change from pulse to next (%): 20
- Max. count of discarded pulses: 5

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).

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

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	= 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.

The screenshot shows the TasWavEditor interface. The 'Channel structure' window displays a tree view with channels: 1: SpnObn, 2: InputSpd |, 3: B..., and 5: Torque. A context menu is open over channel 3, with 'Properties' selected. The 'Basic data' window shows metadata for the file. Two 'Channel Properties' dialog boxes are open. The first dialog is for channel 'BKS' with a 'Calibration' of 0.7. The second dialog is for channel 'InputSpd |' with 'Speed pulses/rev.' set to 80. A 'Save' button in the top toolbar is highlighted with a red box and an arrow pointing to it.

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.

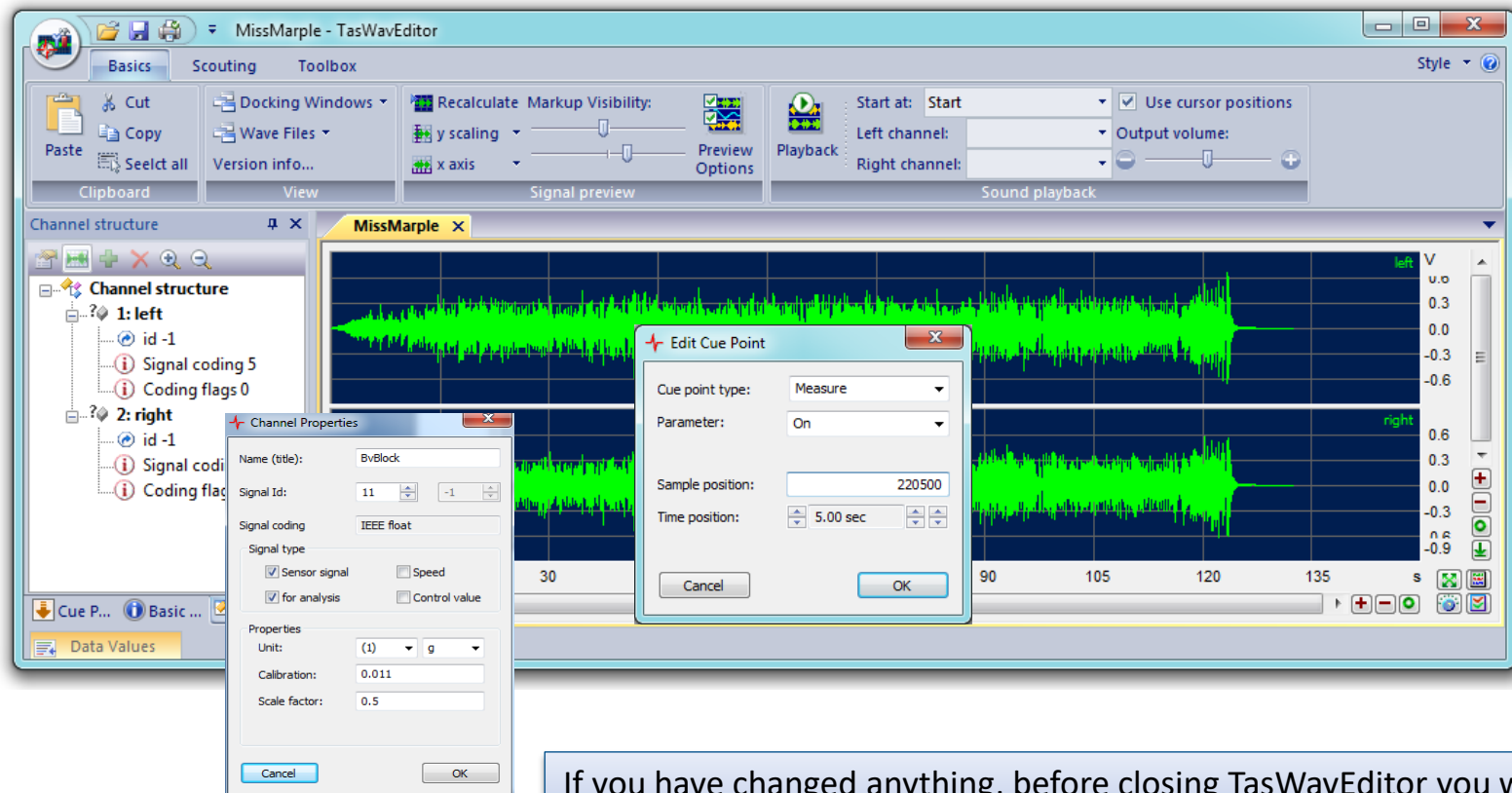
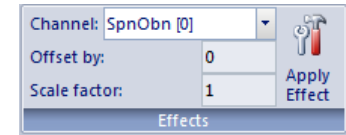
When you replay the changed wave file in the TasAnalyser measurement application, you will get a new "measurement" with the changed settings.

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.

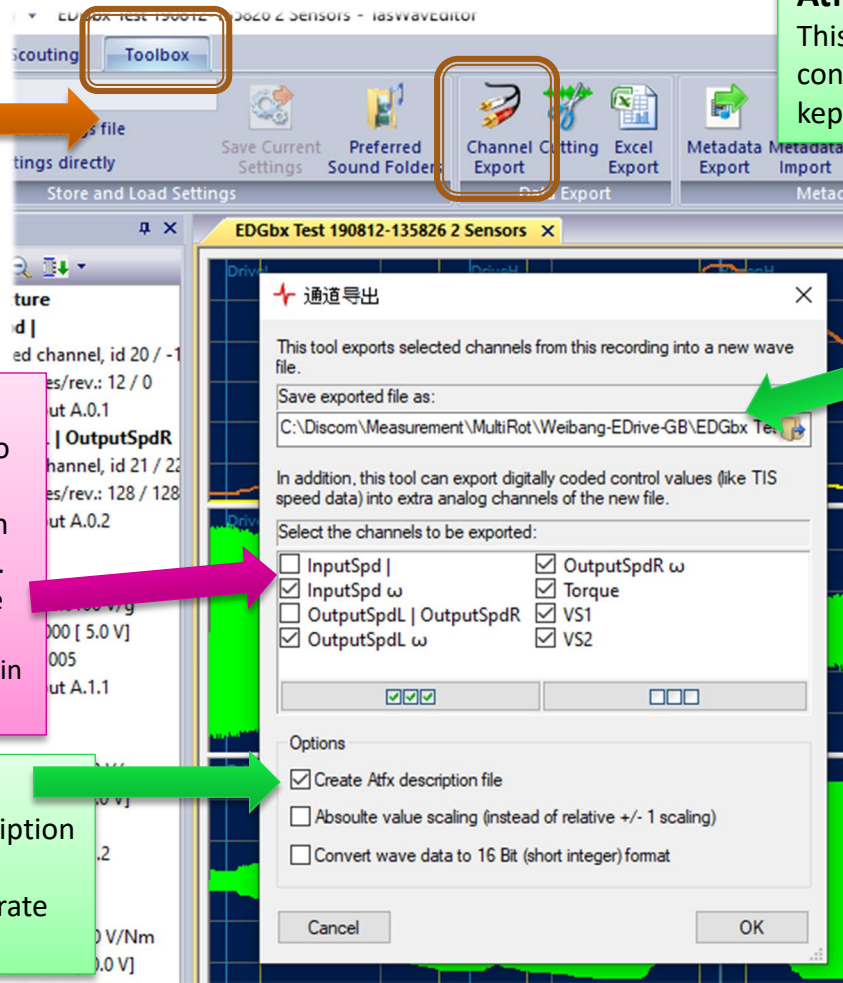
Exporting to Third-Party systems

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 with | in their name.

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 (TIS) Speed and CAN Data Export:
Speed signals originally recorded by a TIS card and also CAN bus data are stored in digitally coded format in the original wave file. For import in third-party systems, these channels have to be converted to analog values. Select the according "analog" channels when exporting, not the original raw data.

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:

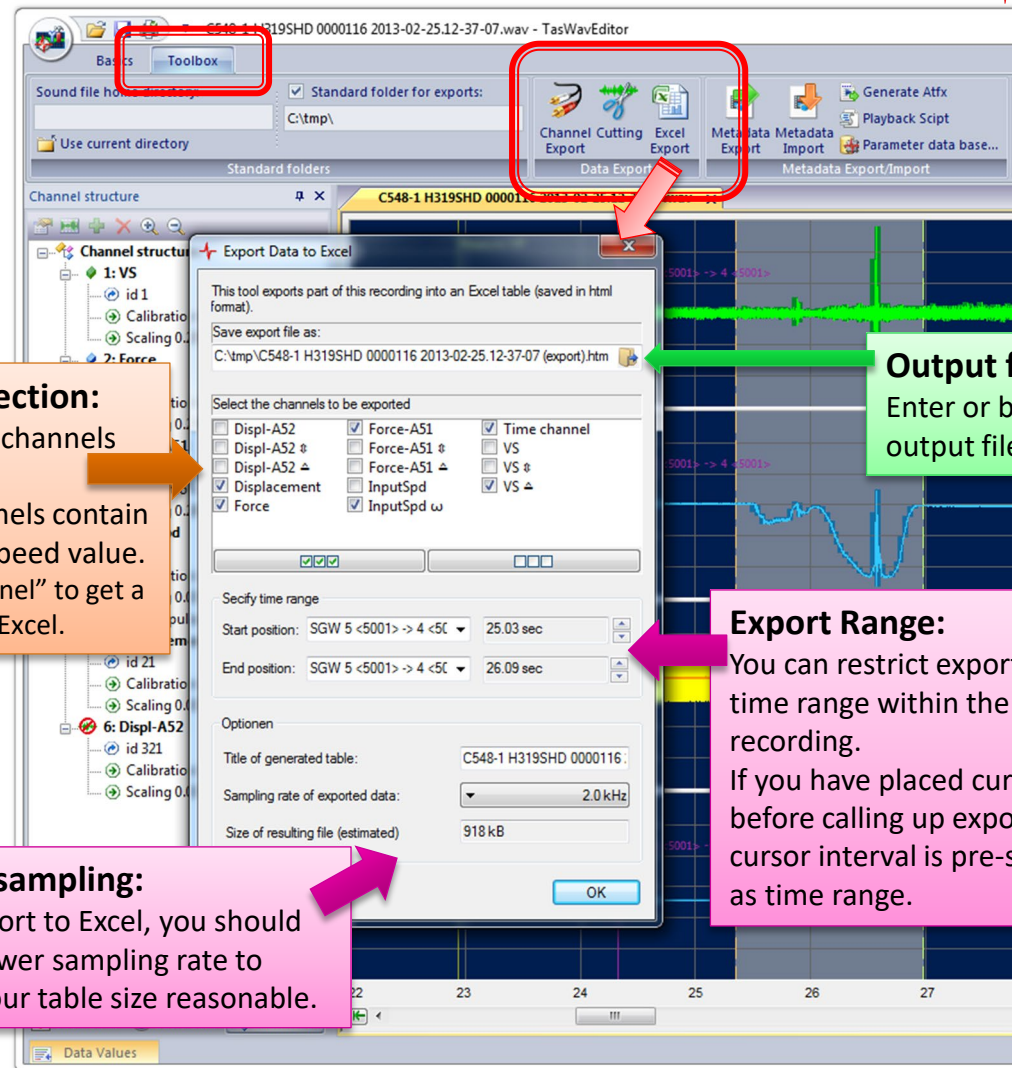
The data are stored in an html file which can be read in directly by Excel (but can also be viewed in any internet browser) – see next page. You should choose a reasonable sampling rate for the exported data in order to restrict the table to a manageable size.

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.

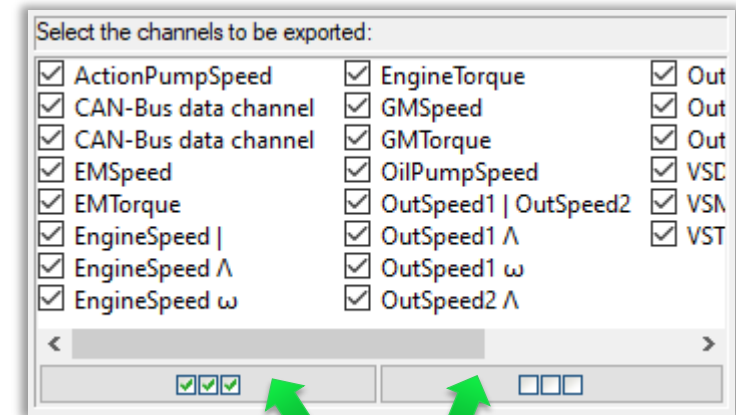
Export Curve Formats

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:

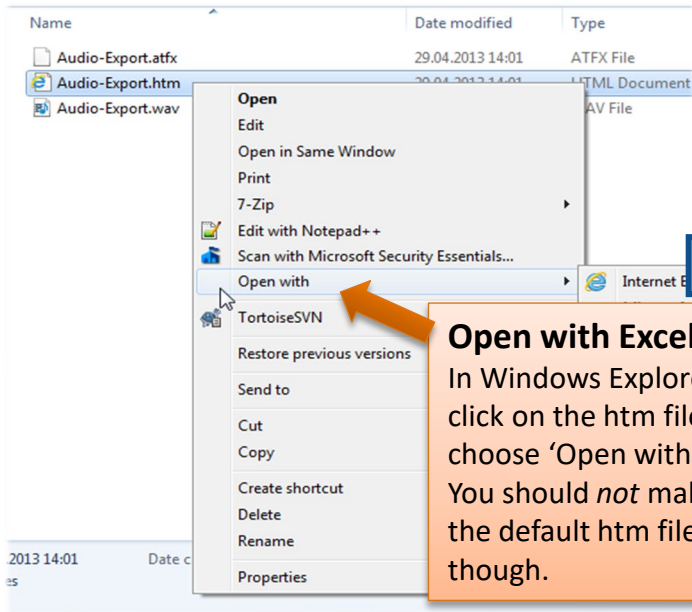
Symbol	Meaning
	TIS speed channels can contain two independent speed signals. The separates the two names and even appears when only one speed signal is used.
ω	Speed as analog value (like 1200.0 rpm). Especially when exporting for a third-party system, TIS speed channels must be converted to analog values. Can also be useful for direct pulse-type speed signals
Λ	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.
≡	Envelope. Useful for sensor channels which are exported to Excel with reduction to a very low sampling rate.
⇕	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.



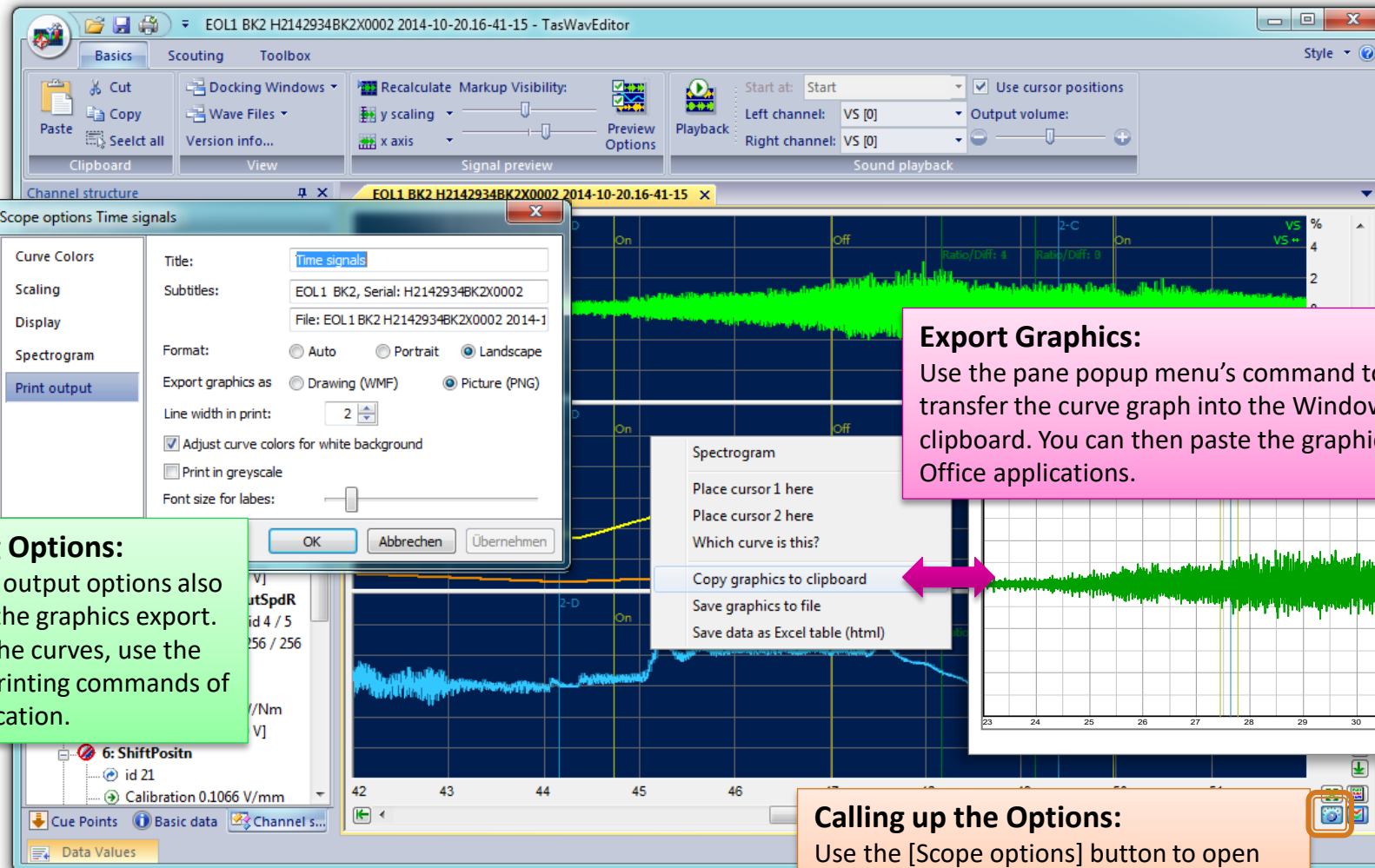
Open with Excel:
In Windows Explorer, right click on the htm file and choose 'Open with...'
You should *not* make Excel the default htm file viewer, though.

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	TSS 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	1550,881542	

Exporting the Graphics

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



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.

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

Calling up the Options:
Use the [Scope options] button to open the settings window where you can adjust graphics export properties.

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.

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

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

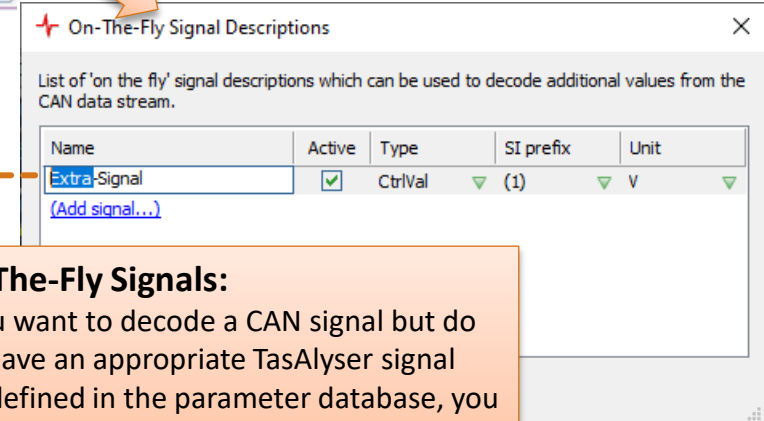
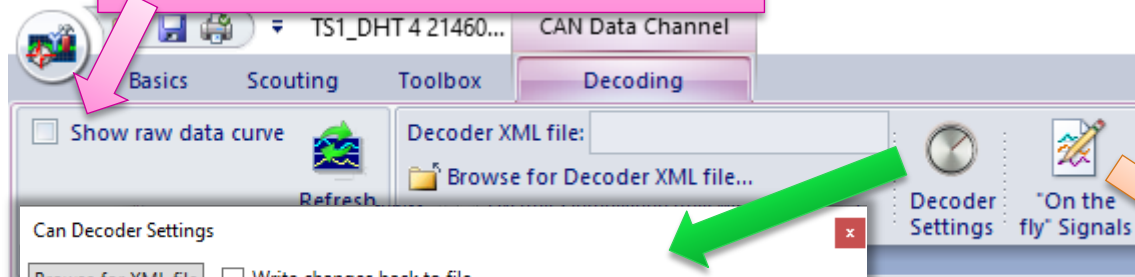
More on CAN Decoding

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 'Can Decoder Settings' dialog box is shown. It has a table with the following data:

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

Decoder settings:
The Can Decoder Settings establish the association between CAN message names and TasAlyser signal names. For those CAN signals you want to get decoded, select an appropriate TasAlyser signal and set the Active check.

On-The-Fly Signals:
If you want to decode a CAN signal but do not have an appropriate TasAlyser 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.

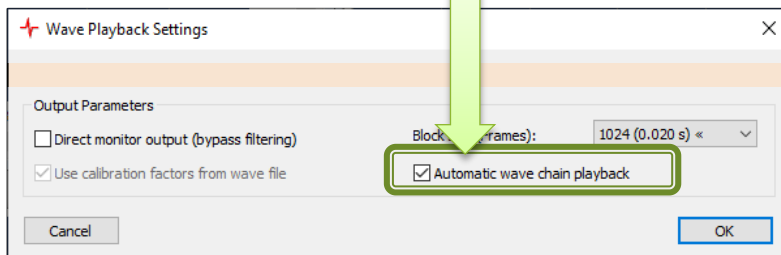
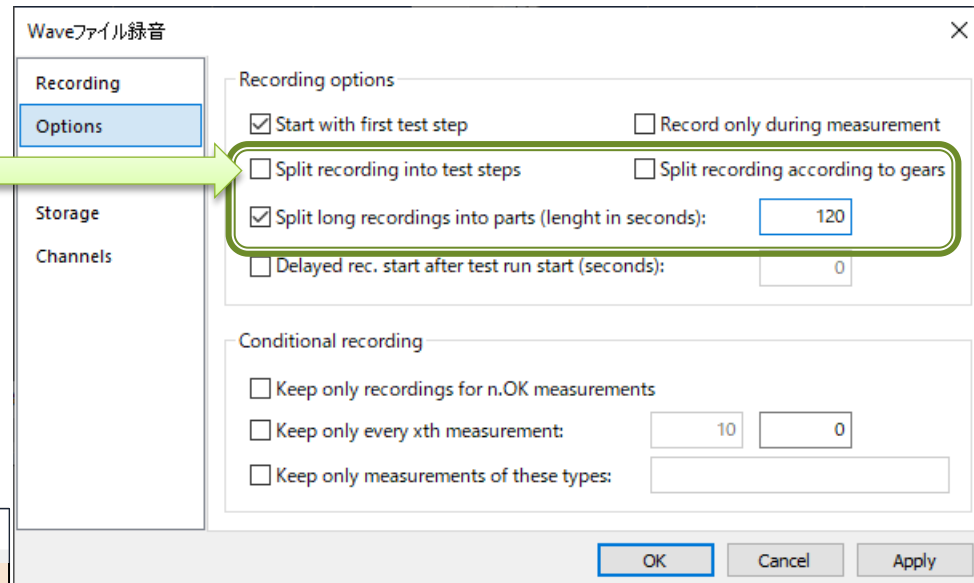
Wave File Chaining

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].