MDA V8 – Functionality Overview

Summary of Major Features and Usage Concepts

Functionality Scope based on
MDA V8.7.0 and Former Versions

MDA V8 – Functionality Overview

Summary of Major Features and Usage Concepts (Based on MDA V8.7.0)

- **Basics**
  - Home Page, Ribbon, Keyboard Support, Meaning of ‘Configuration’, Error Handling, Customization Possibilities, User Settings
- **Measure File Handling**
  - Measure File Handling, Export of Measure Data, Time Offset, Textual File Formats, CAN Bus Trace Files
- **Signal Handling**
  - Signal Selection, Definition of Display Name, Calculated Signals, Look-Up Tables, Bit Extraction
- **Instruments**
  - Overview of Instruments, Time Navigation & Synchronization, Oscilloscope, Scatter Plot, Table, Event List, Statistical Data, GPS Map View, Battery Instruments
- **Configuration Handling**
  - Configuration Management, Import of Configurations from INCA or MDA V7 (XDA), and MDA V8
- **MDA V8 in Combination with other Applications**
  - INCA & MDA V7, EHANDBOOK-NAVIGATOR, Command Line Tools ‘mdfconvert.exe’ and ‘mdfcombine.exe’

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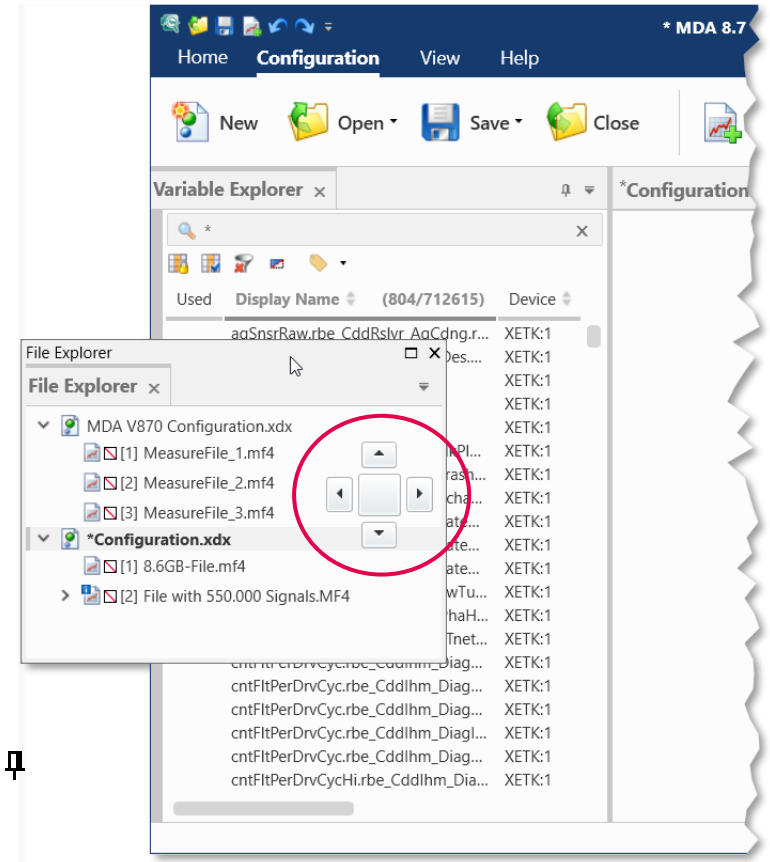
MDA V8 – Functionality Overview

General Notes

– MDA V8.7 is the latest product release of the new generation of ETAS' measure data analysis tool
– It combines high performance (even with 'huge' files), and user-friendly operation concepts
– Installation of MDA V8 includes MCD Core* and DirectX9, it requires a 64 bit operating system version of Windows® 10 or 11, or Windows® Server 2016, 2019 or 2022 *

Docking Windows Technology

– State-of-the-art technology is used, like Windows ribbon concept, or docking window mechanism, i.e., objects can be positioned at any desired place using drag & drop via the title bar
– Docking windows and other UI elements provide an auto-hide pin

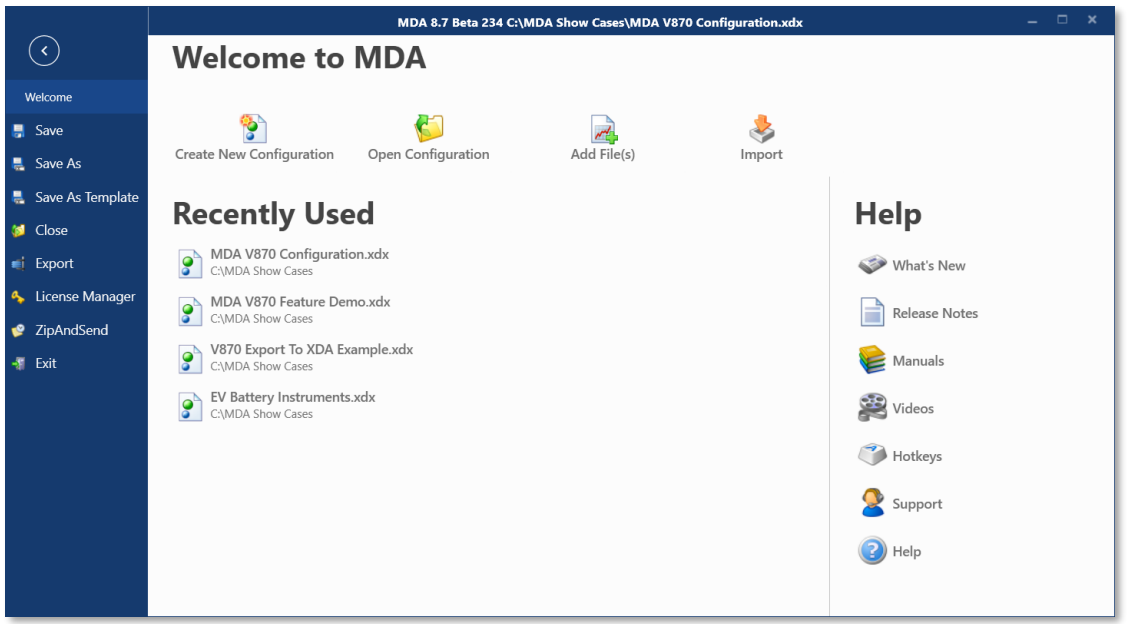


* Notes:
- MCD Core is a base component for ETAS tools used for high performance data handling.
- For more details about supported Operating Systems see the latest Release Notes document.

MDA V8 – Functionality Overview

Welcome to MDA V8 – the Home Page

- After start of MDA V8 the Home Page appears
- Here you find the most relevant actions
  - Opening or creating a configuration
  - Adding a measure file
  - Importing an XDX, ZDX or XDA configuration*
- Additionally direct access is given to
  - ETAS License Manager
  - ZipAndSend for issue reporting
  - any kind of documentation materials, like Manuals, Release Notes or an overview page for all available MDA V8 feature videos

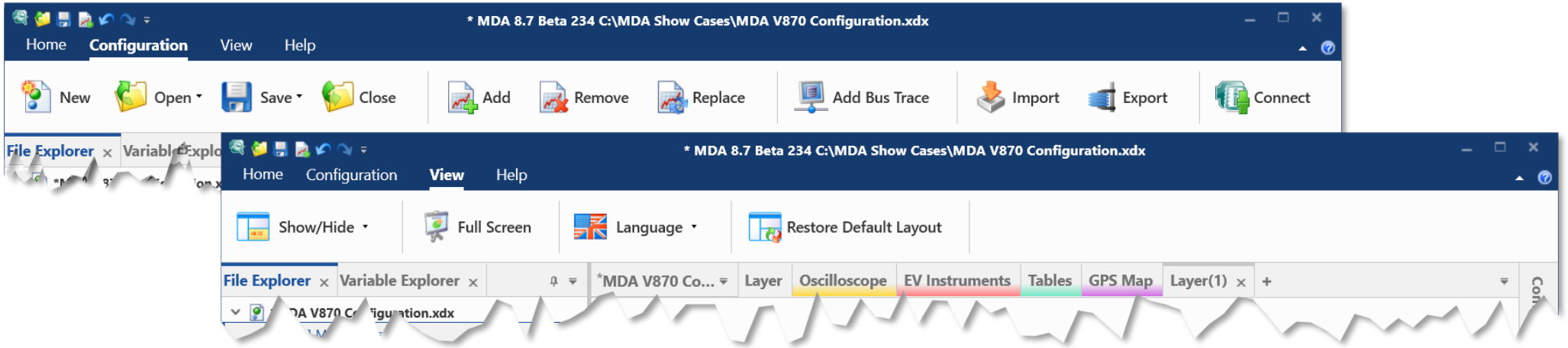


* Notes:
- XDX is the format extension used for MDA V8 configurations. If exported from MDA V8 a ZDX format variant is created, which includes also e.g. measure files.
- XDA configurations created with INCA or MDA V7 can be imported to reuse instruments or calculated signals. See Video "Import and Layer Handling" (#6).
- A brief overview how to use MDA V8 is given in the introduction video "Just Start" (#20).

MDA V8 – Functionality Overview

Ribbon: Get quickly access to frequently used functionalities

– In MDA V8's UI the functionality is structured in ribbons, namely for Configuration, View and Help
– For an efficient usage of the available space the ribbon can be set to auto-hide *
– A Quick Access Toolbar enables access to main functionality (like Open, Save, Add or Undo)



– Within the 'View' ribbon e.g., the start-up language can be set,
or the default position and behavior of the docking windows can be restored *

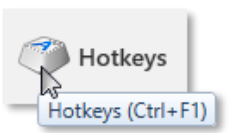
* Notes:
- These settings are persisted in 'settings.user' file, and applied when MDA V8 application is re-opened.
- See video "Optimizing the View" (#7) how to use docking windows, and optimize screen space usage for instruments.

MDA V8 – Functionality Overview

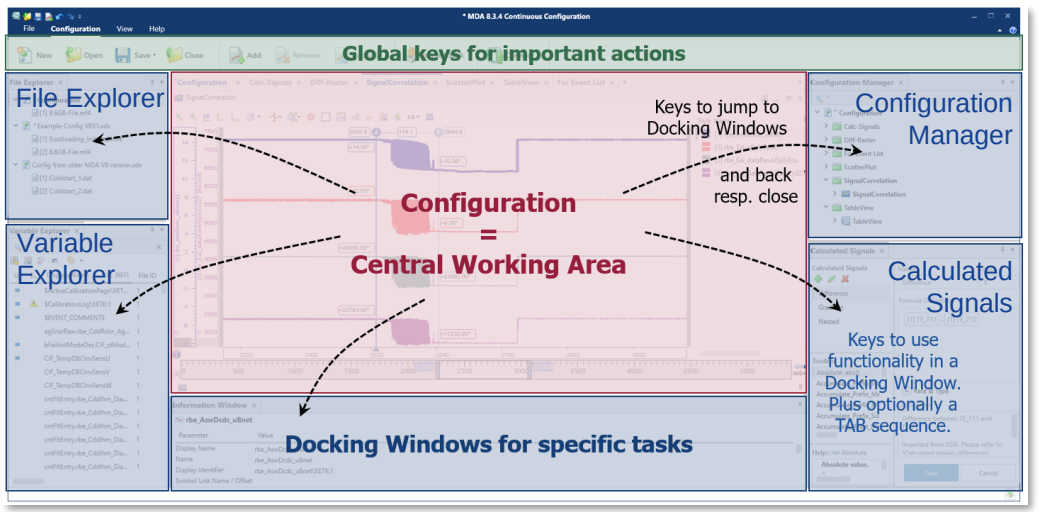
Different ways to operate MDA V8: via mouse and using the keyboard

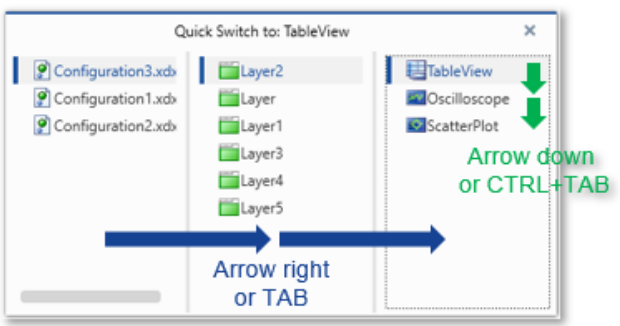
- Important actions can be done via global short-cuts
- Docking windows are opened individually, and can be closed using Shift+ESC
- Clear indication of focused element by blue borders
- All hotkeys for supported operations are listed in context menus or the tooltip of the icon

- CTRL+F1 provides an overview of all supported keyboard combinations *



- ‘Quick Switch’ window (opens via CTRL+TAB) enables quick navigation between different instruments, layers or even configurations



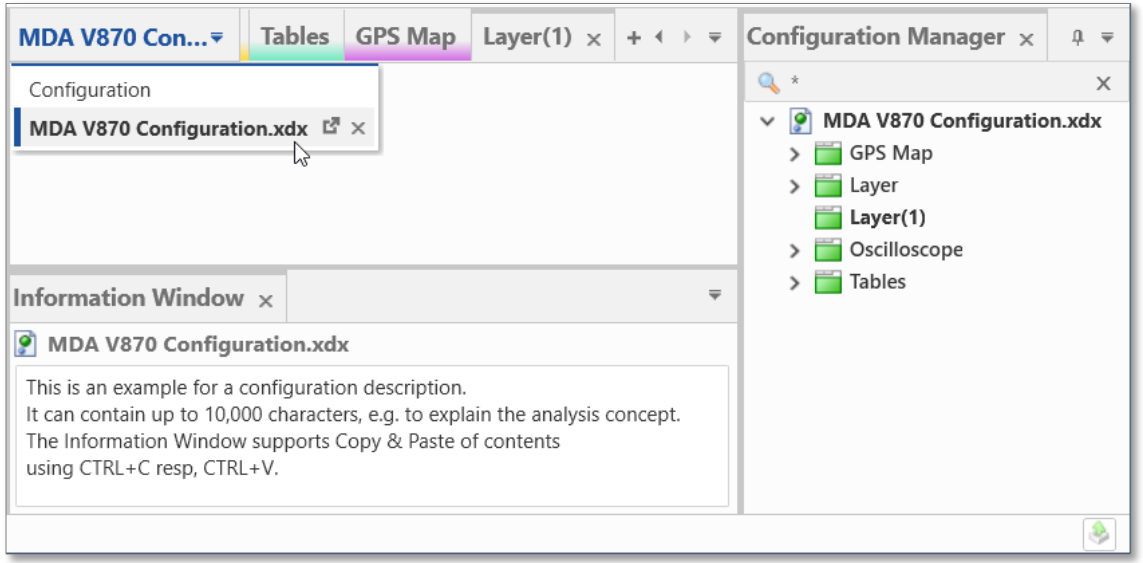


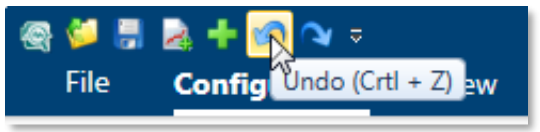
* Note: Pure navigation keys (like arrows down, page up or similar) are not listed.

MDA V8 – Functionality Overview

Configuration: Manage even complex display and analysis tasks

- A configuration is the central working place for the display and analysis of measure data
- Layers, instruments and signals assigned to instruments are part of a configuration
- Measure files are linked to configurations
- One MDA V8 session allows to have multiple configurations opened and used in parallel
- A configuration description can be given in the Information Window (Ctrl+I)
- A star indicates when a configuration contains unsaved changes
- UNDO (Ctrl+Z) and REDO (Ctrl+Y) are supported for configuration changes





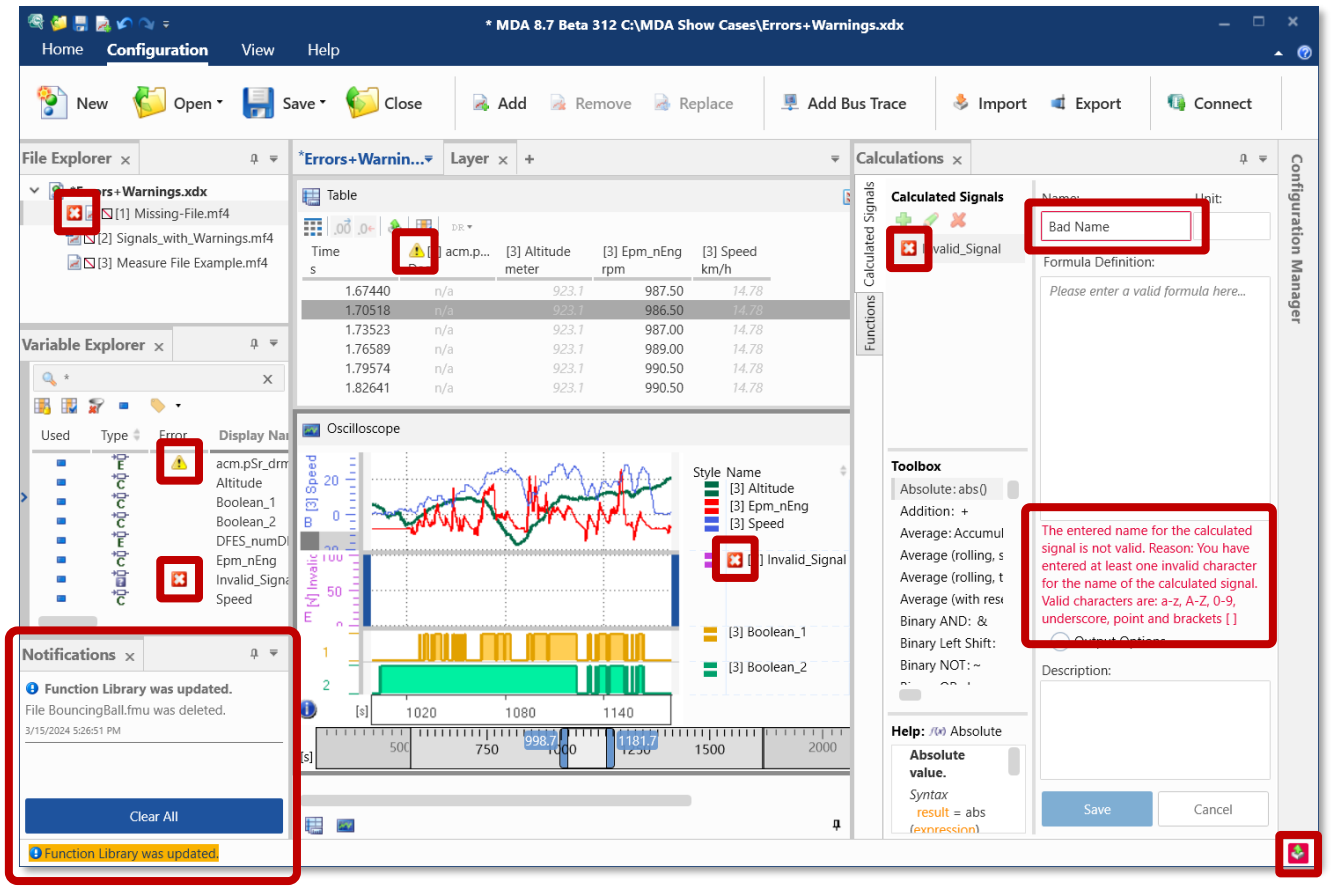
Important Compatibility Limitations:

- MDA V8 configurations (XDX, and ZDX) cannot be opened in MDA V7.x.
- MDA V8.7 supports an export of configuration objects (like oscilloscopes) into XDA format for reuse in former MDA V8 versions. An export to XDA does not include all object settings and not all objects (excluded are e.g. calculated signals, time offset …).
- Per MDA session any configuration can be opened only once, but for reuse the configuration can be stored as as template (XDT format).

MDA V8 – Functionality Overview

Unexpected situations: MDA V8 informs you when something unusual happens

- MDA V8 informs you if an activity could not be conducted as planned, or if an object is causing issues
- The information usually happens at the location related to the issue, like
  - a warning or error icon is shown at the respective object (like a not supported signal, a missing file etc.)
  - a red frame around a name field
  - a message in the status bar appears and offers access to ‘Notifications’
- Just hover onto the icon and get more details about the issue

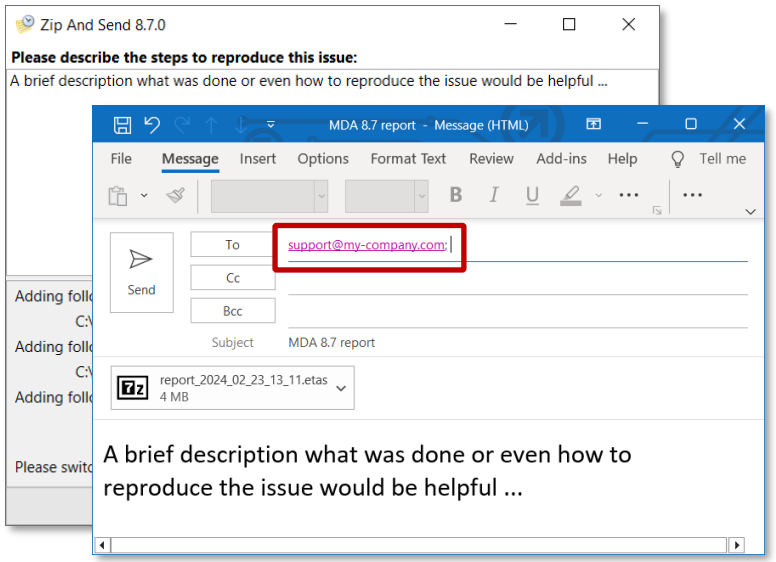


MDA V8 – Functionality Overview

Adapt MDA V8 to your company's working environment

Customer specific support
- Support dialog can include customer specific support information
- MDA support dialog is extendable via the file ‚CustomerSupport.rtf'
- Contents can be plain text, hyperlinks to websites or email addresses

Default ZipAndSend email address
- The default email address used for ZipAndSend operation of MDA V8 log files can be defined
- To enable reproduction of an issue an export to ZDX format of the configuration and files is desirable

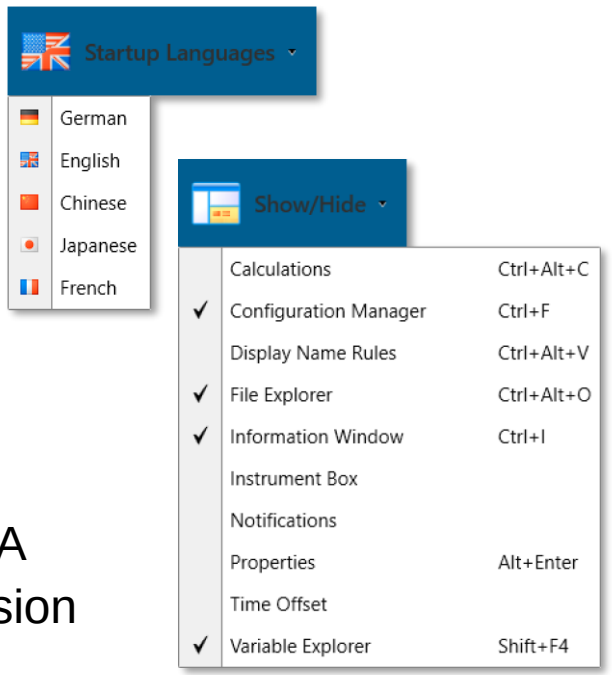


Notes:
- For more details see MDA V8 Installation Guide → Customizing the Support Information.
- ZipAndSend can be opened from MDA's Help ribbon, the Home Page, or in Windows Start menu → ETAS MDA 8.7.

MDA V8 – Functionality Overview

Spend less time with configuring as MDA V8 persists automatically your settings

- MDA V8 persists automatically many settings defined by the user
  - Application: language, status & appearance of docking windows, paths
  - Per instrument: default appearance, like background color and others
  - For signals: color, decimals, connection style, marker symbols, etc.
- Settings are stored in the user specific ‘settings.user’ file
- These settings are loaded and re-used, when the application is started
- As a result the effort for configuring the tool layout, behavior of actions, or instrument and signal representation is minimized
- A pre-defined set of settings can be rolled out before the first usage of MDA
- User settings are stored per MDA version and migrated when a newer version is used for the first time, old setting files are kept as back-up solution in case a downgrade should be required



Notes:
- For more details about which settings are persisted, and how to roll these out to users, see MDA Manual chapter 1.3.
- Existing files ‘settings_*[version no.]*.user’ **must not** be edited externally, as edited files are rejected by MDA V8.

MDA V8 – Functionality Overview

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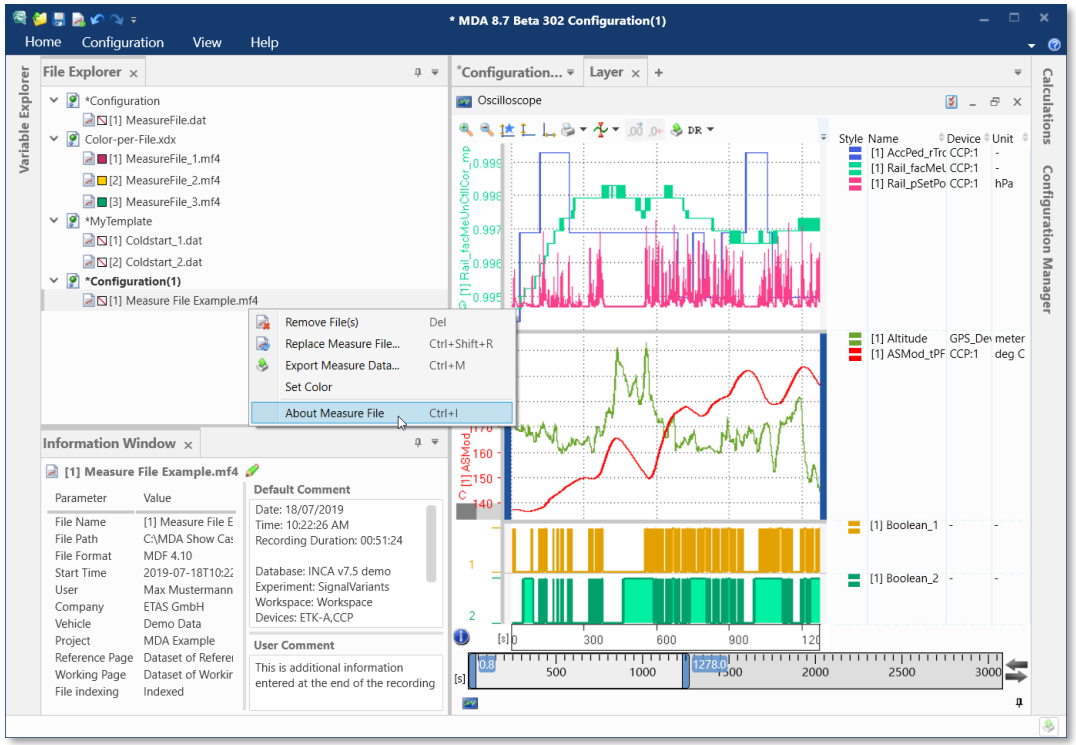
MDA V8 – Functionality Overview

File Explorer: Manage your files in a clearly arranged way

- In the File Explorer all loaded configurations, and the assigned (measure) files are listed
- A configuration contains the selection of signals and how these are displayed, while the signals' values come from the measure file(s)
- Measure files assigned to a configuration appear underneath the configuration entry
- Each file has a file ID for better identification
- By CTRL+I the file comment and other meta data is shown in the Information Window
- File Explorer provides access for
  - removing, replacing, and
  - export or conversion of measure file(s)

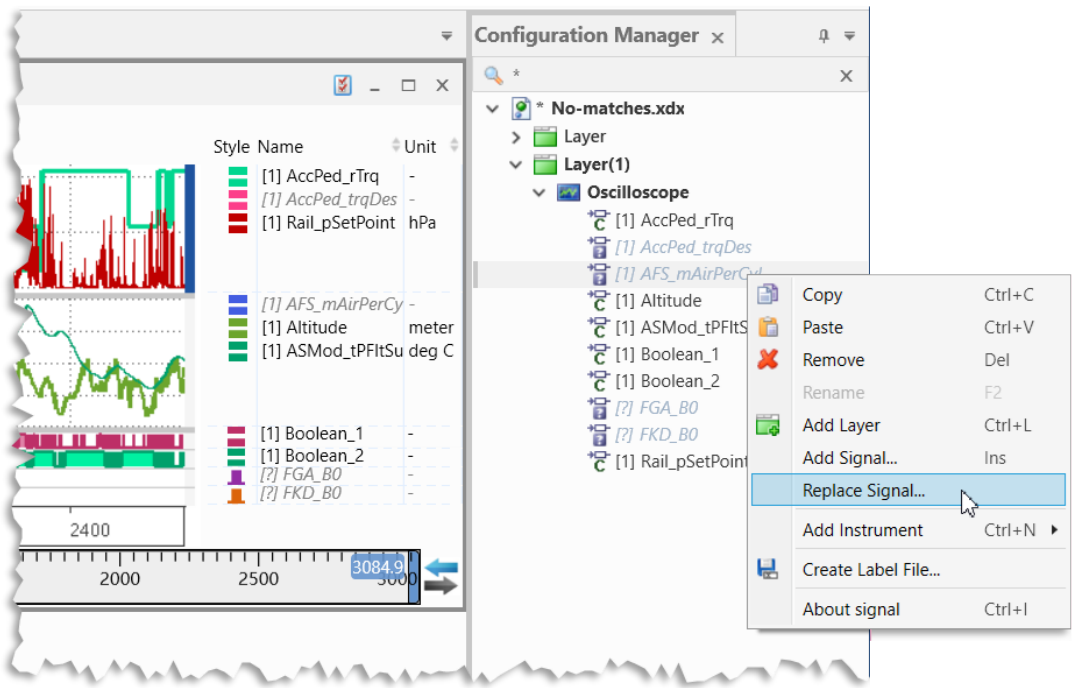


Note: For the basic functionality see videos "Replacing Measure Files" (#13), "Exporting Signals and Files" (#5), and "Displaying Meta Information" (#14).

MDA V8 – Functionality Overview

Improved and consistent handling when input signal is missing

- When removing or replacing a measure file, it might happen that a signal is no longer available
- Missing signals remain in the instruments as placeholders until they are available again
- When a measure file is replaced MDA tries to conduct an automatic signal mapping based primarily on the signal name and optionally on meta information like ECU, device, raster etc.
- Signals which cannot be mapped get in the so-called ‘no-match’ state which is indicated by the *grey italic font* style of the signal name
- Via the context menu entry “Replace Signal …” another signal can be assigned



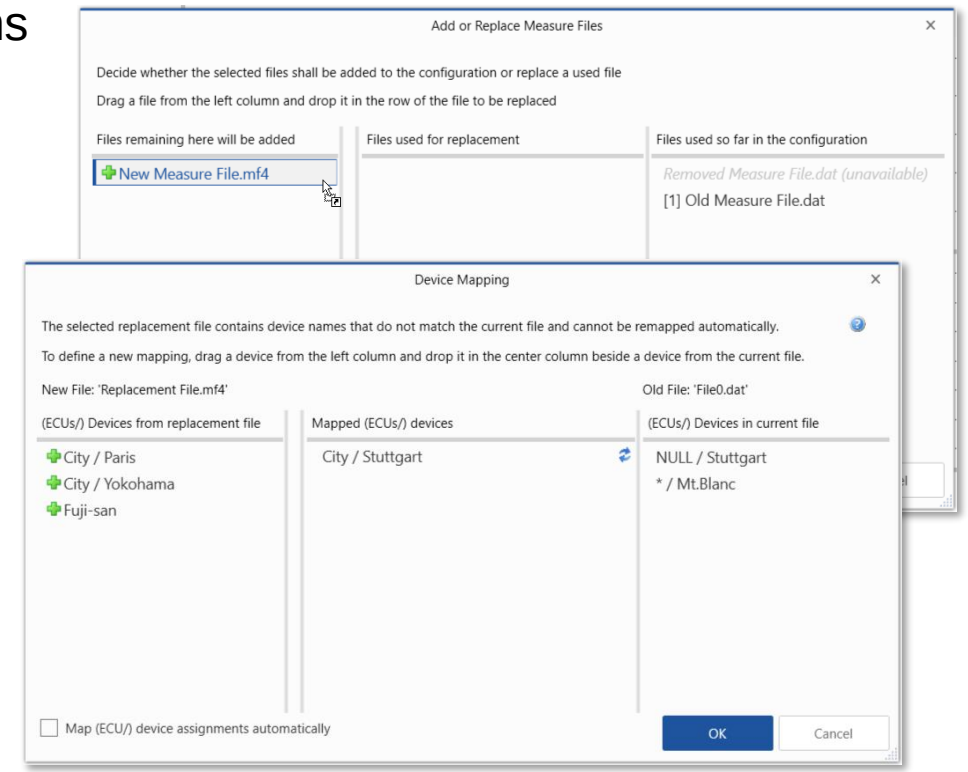
Notes:

- A removed file which is causing signals in no-match state remains a visible entry in the File Explorer, its signals have the file ID entry [?].
- To clean-up a configuration from signals in no-match state, a context menu entry exits in the Configuration Manager, and on the file level in the File Explorer.
- If the input signal of a Calculated Signal is in no-match state, the Calculated Signal is not removed automatically. This needs to be done manually.

MDA V8 – Functionality Overview

Easier management of more complex file replacement situations

- MDA supports unclear file adding or replacement situations with so-called ‘mapping’ dialogs:
  the ‘Add or Replace’ and the ‘Device Mapping’ dialog
- In the dialogs the new objects appear on the left and can be assigned by drag&drop to an object on the right
- In case of the Device Mapping a manual device mapping or an automatic mapping can be chosen
- If a manual device mapping is done MDA will respect the device assignments strictly
- An automatic mapping is done only for signals which are present just once in the file and the configuration

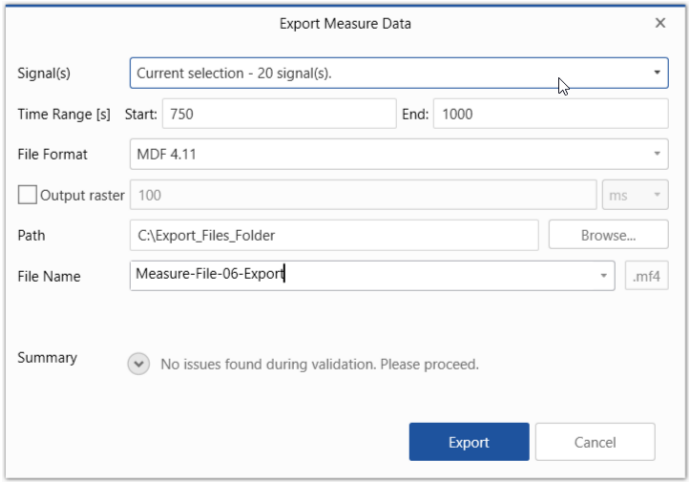


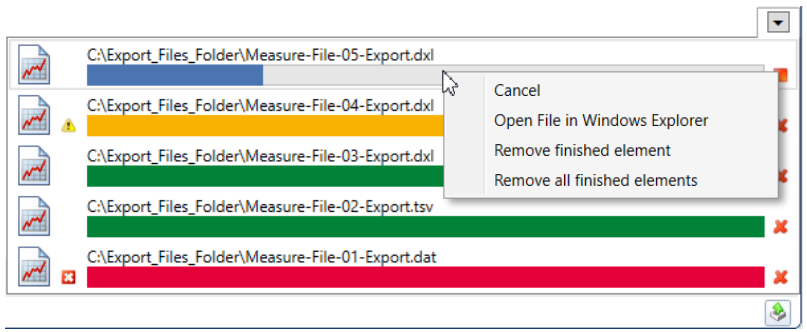
Notes:
- MDA tries to pre-assign files resp. ECU/Device combinations based on the file or ECU/Device names.
- For the final signal mapping the signal name plus the ECU and device information and some raster information is used as defined in ASAM MDF V4 standard.
- Such signal meta information is visible in the Variable Explorer, the Information Window and partly in the instruments (e.g. device).

MDA V8 – Functionality Overview

Export Measure Data: Create your own measure file

- Using ‘Export Measure Data’ allows to create a new measure file*, including any file format conversions
- ‘Export Measure Data’ dialog can be opened from
  - the File Explorer context menu by selecting the measure file to be exported resp. converted
  - the Variable Explorer context menu by multi-selecting signals, even from different files, and incl. calc. signals
  - the toolbar of an oscilloscope, scatter plot or table instrument to export directly the visible time range of the instrument, and optionally only the signals in the instrument
- A progress view shows information about the export process, allows to cancel the export and offers access to the new file



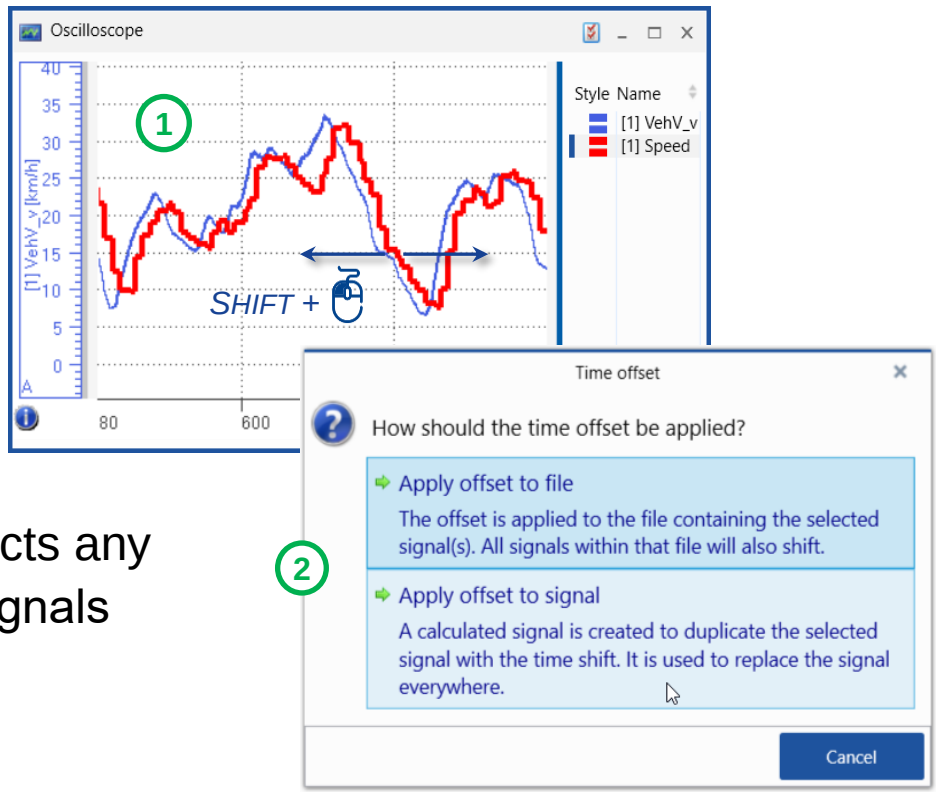


* Notes:
- For a short demo see video “Exporting Signals and Files” (#5).
- In case a time offset was applied to a measure file or a signal, the exported signals will have the offset included.
- Export supports signals with numeric and verbal (Enumerations) conversion, for signals with ‘nested conversion’ (STATUS_STRING_REF) only to MDF V4.x format.

MDA V8 – Functionality Overview

Quick an easy synchronization of measure data by applying a ‘Time Offset’

- To compare measure data, often a time offset needs to be applied to synchronize the recorded data
- Just press the SHIFT key and move a signal curve in the oscilloscope
- Then you can decide to apply a time offset for
  - the complete measure file, i.e., all signals of the file
  - an individual signal, i.e. MDA will create a Calculated Signal with the respective time offset *
- A time offset for a file is applied to the data basis, and effects any ‘consumer’ of the data, e.g., instruments and calculated signals
- When exporting measure data the time offset is included



1 Shift a signal graphically

2 Decide about shifting behavior

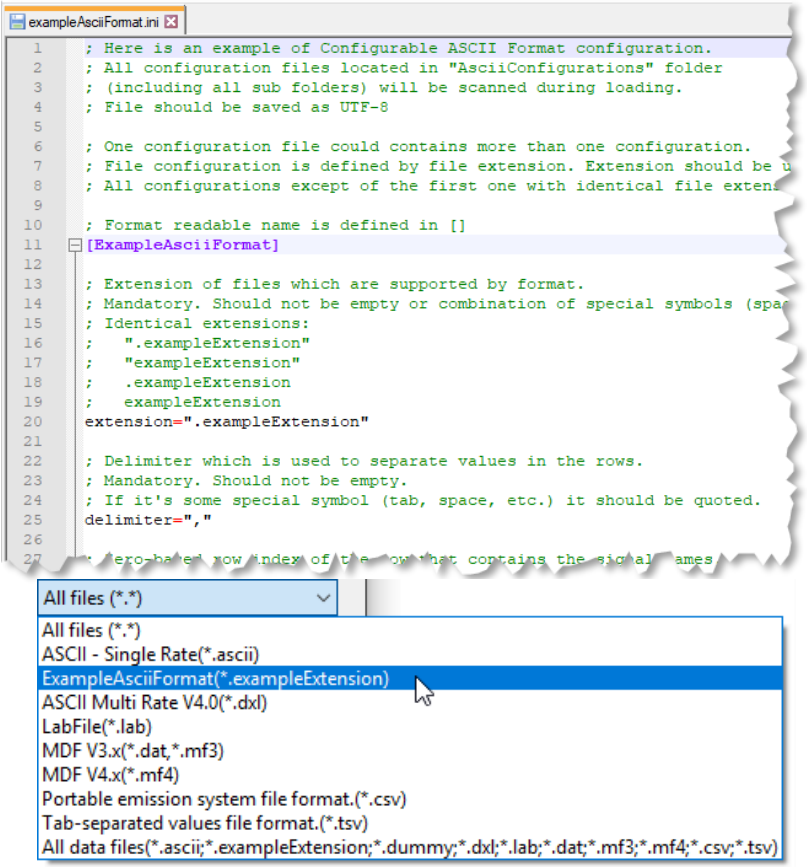
* Notes:
- The time offset value is shown for files in the Time Offset window, and for calc. signal under Output options.
- Time offsets for a file and an individual signal are handled in cumulative manner (i.e., sum up).
- Time stamps of an input signal remain unchanged, i.e., original and shifted signal are available.

MDA V8 – Functionality Overview

Teach MDA V8 to support your own customer-specific textual measure file formats

- MDA V8 supports additional (ASCII based) measure files formats by an easy-to-create configuration (INI) file, which defines how to read & write textual files, like CSV
- An example including a description for such an INI file is provided in the folder
  %ProgramData%\ETAS\MDA\8.x\CorePlugins\Etas.TargetAccess.Targets.MeasureFile.Formats.AsciiConfigurable
- Several options exist to specify e.g., the time channel format, structure of the signal name, device, unit and more

- When starting MDA, all available INI files are loaded
- For all file formats Read and Write support is given

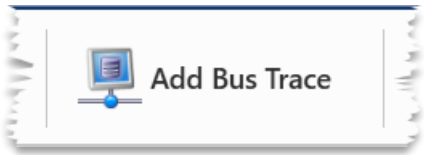


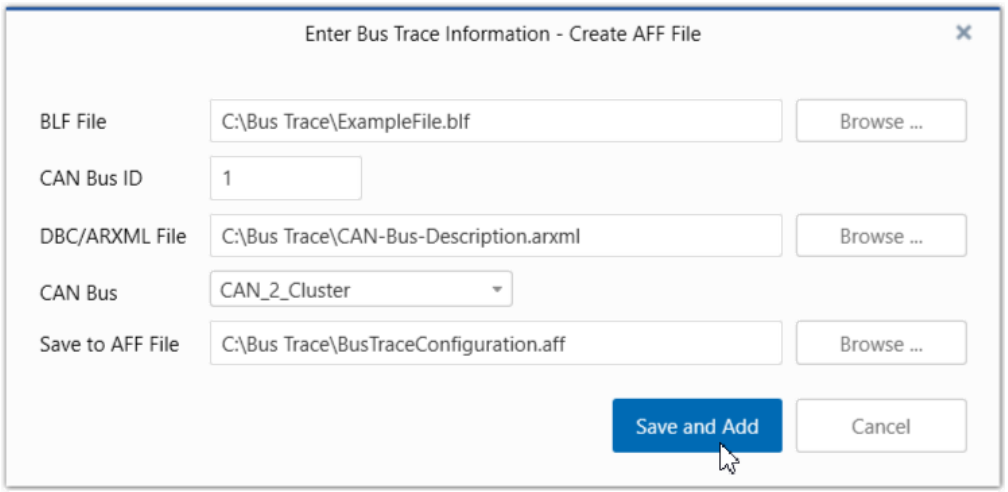
* Notes:
- For detailed information about all options see example INI file in above mentioned folder.
- The textual measure files must fulfill some prerequisites: the file extension must be unique, structure of header and data blocks must be clear, all signals must be available in the same raster.
- Export to such a format is limited to signals having a numeric of a verbal ('enumerations') conversion.

MDA V8 – Functionality Overview

Extend your analysis to trace recordings of the CAN bus

- With an Add-On for MDA V8 CAN Bus Trace files (BLF) can be loaded
- In the Configuration ribbon an additional icon is given to open the dialog for selecting the files
- After selection of a CAN Bus Trace file simply select the corresponding description file either in
  - DBC format plus CAN ID, or
  - ARXML format plus CAN Bus name
- Input files are combined to an AFF file which is shown as an entry in the File Explorer
- Trace file contents are interpreted based on the CAN bus description file, and resulting signals can be used as signals from ordinary measure files





* Notes:
- The Add-On is an ETAS Engineering solution, which needs to be ordered additionally and requires a valid license.
- With MDA V8.7.0 support is limited to trace files in BLF format, CAN or CAN-FD busses, and CAN protocol 2.0 or J1939.

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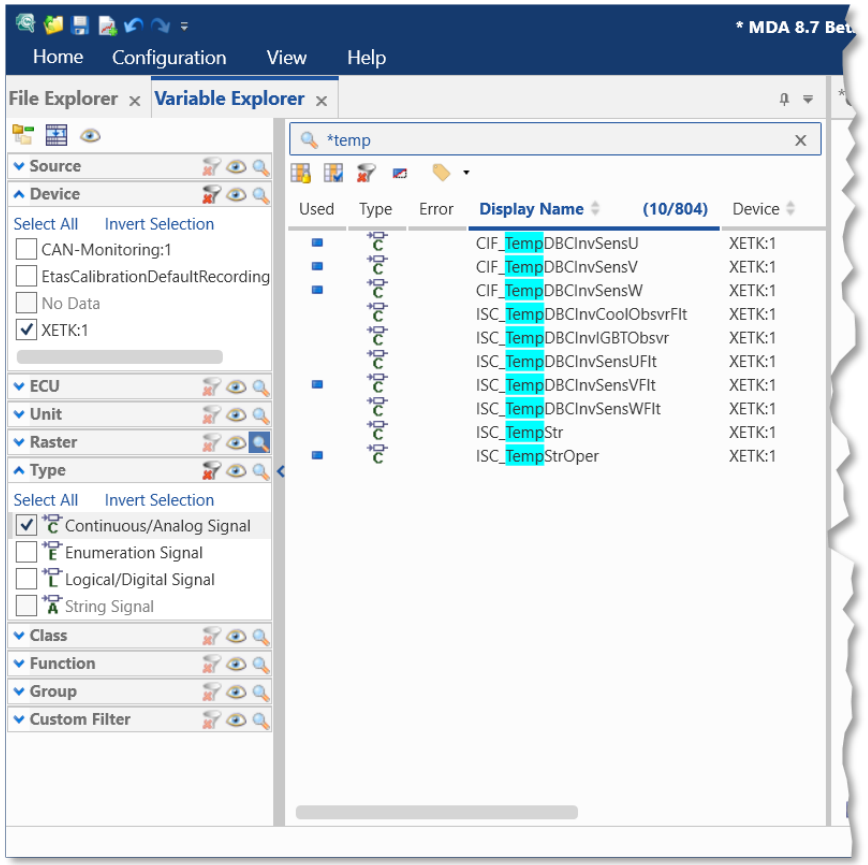
MDA V8 – Functionality Overview

Variable Explorer: Experience the new performance

- The Variable Explorer is a tabular view for selecting signals
- Signal name and meta data are shown in columns
- To reduce the number of listed entries filtering is supported
  - Via the search field for the variable name
  - By means of multiple Filter Categories at the left side
  - For few columns by the funnel icon (e.g Conv. Type)
  - And by the icon to filter used and not used entries
- Which columns are shown is customizable , as well as the columns' order *
- Columns at left can be excluded from scrolling ('Freeze')*
- Signals are assigned to an instrument via drag & drop onto a layer tab, or into an existing instrument

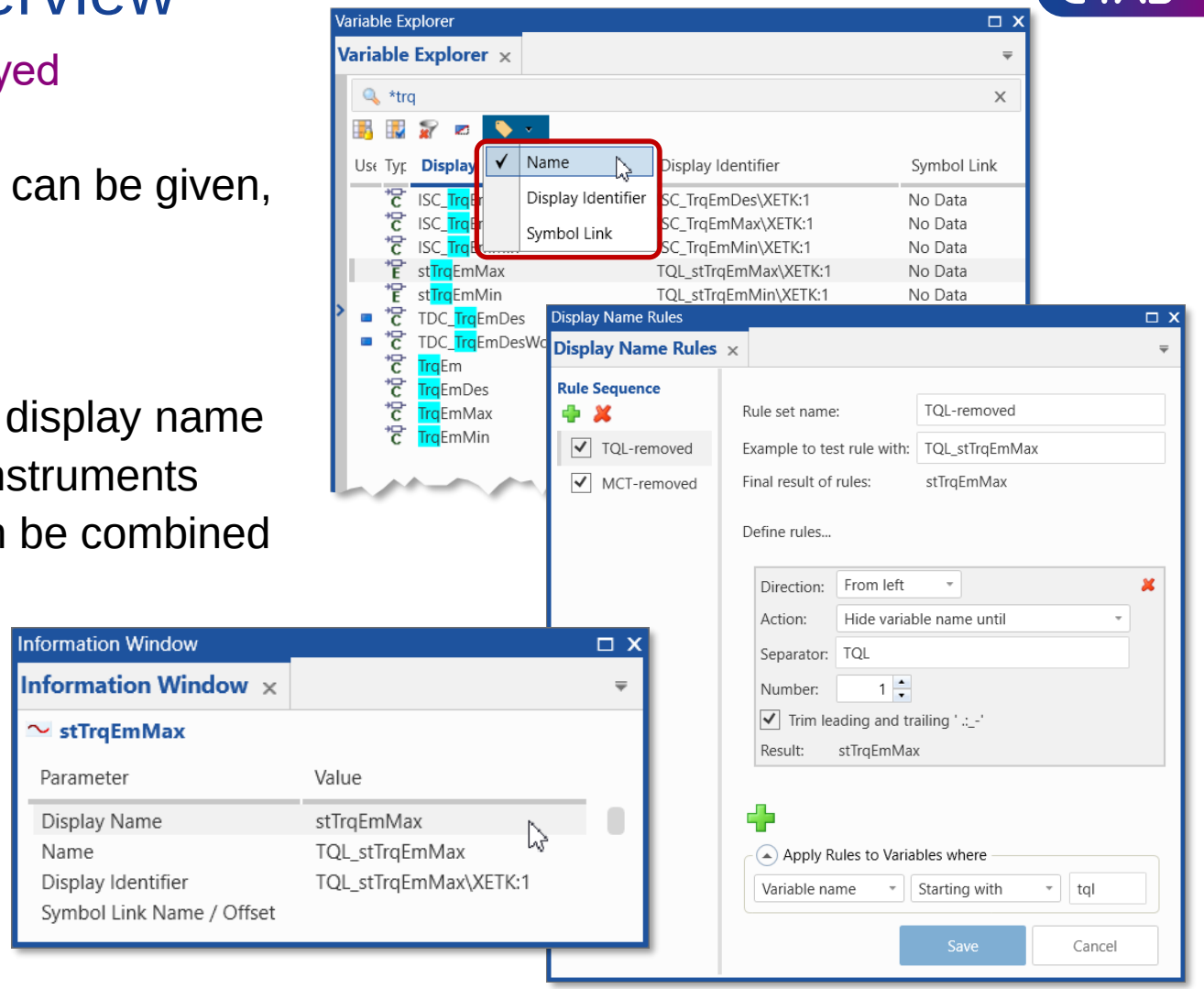


* Notes:
- For a basic introduction see video "Selecting Signals" (#2).
- These settings are persisted in 'settings.user' file, and used when Variable Explorer is opened.

MDA V8 – Functionality Overview

Define how a signal's name shall be displayed

- In an MDF file alternative variable names can be given, like Display Identifier, or Symbol Link
- The name type to be used in MDA's UI can be chosen in the Variable Explorer
- Additionally, MDA V8 allows to shrink the display name to the relevant part to be shown e.g., in instruments
  - An arbitrary number of atomic rules can be combined
  - Multiple Rule Sets can be defined
  - The target group of signals for which the rules shall be applied is definable
- In the Information Window all available names for a signal are listed



MDA V8 – Functionality Overview

Flexible and powerful Calculations

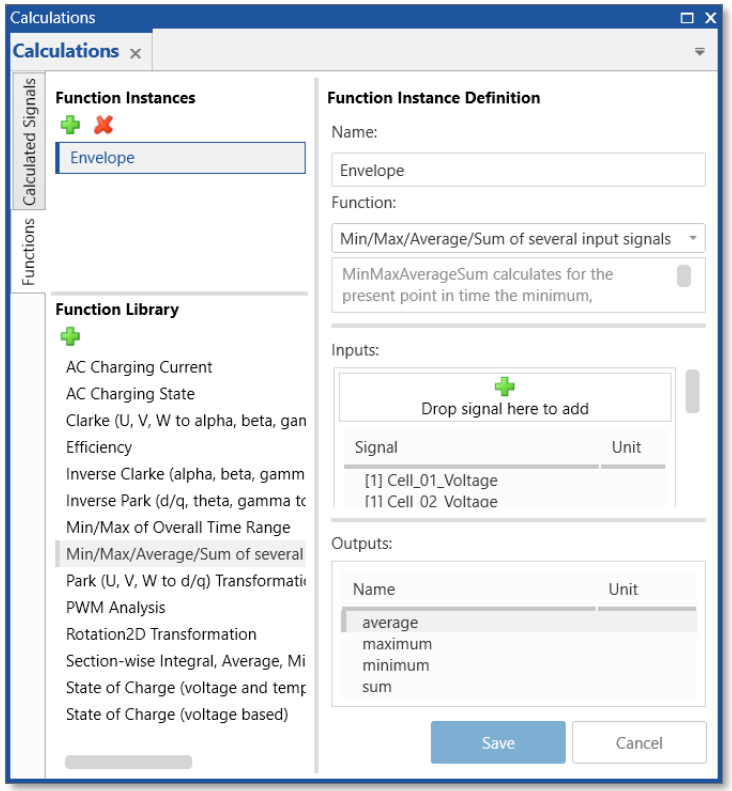
– MDA V8.7 offers three ways to calculate outputs from input signals
– The Calculations docking window is the entry point
– For convenience and flexibility outputs of one method can be used as inputs for any other calculation method

Functions and usage of FMU models

– With MDA already several predefined calculations are delivered
– Just input signals and optionally parameters need to be defined, the actual formula is integral part of the predefined calculation
– Own functions are included by adding FMU files *

Calculated Signals

– Highest flexibility is given by defining Calculated Signals
– Various operators are delivered with MDA
– Output options allow to define output raster and time offset

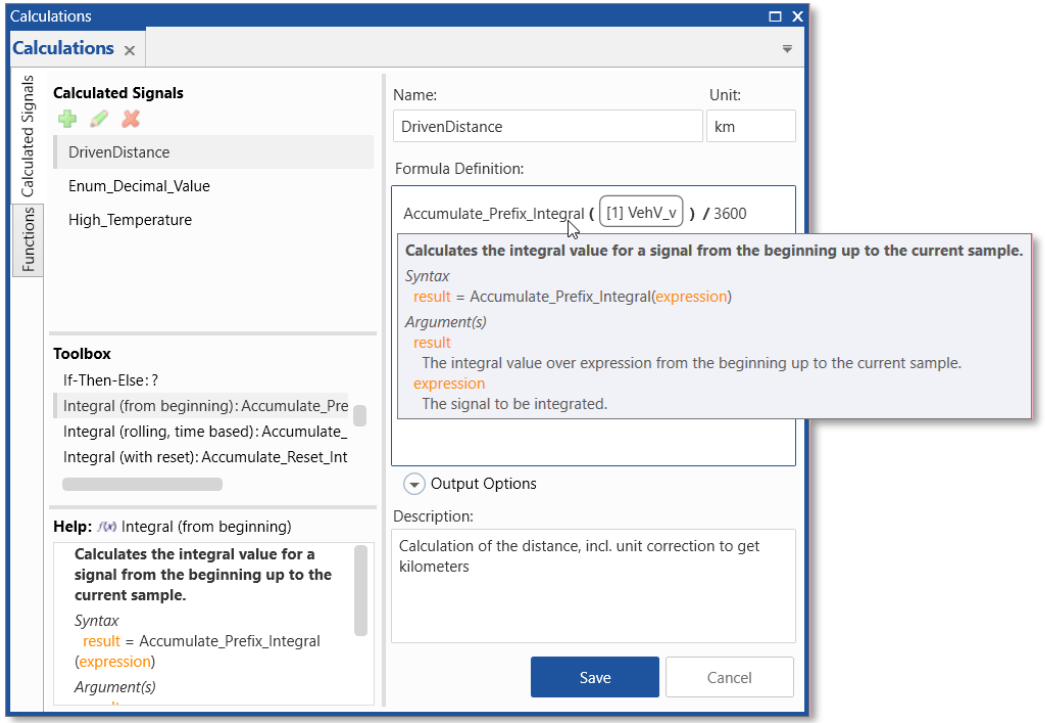


* Note: FMU files must be according to FMI standard V2. FMUs can be created for example with ETAS ASCMO V5.8 or higher.

MDA V8 – Functionality Overview

Various operations allow to define a Calculated Signal for your need

- Calculated signals offer the most flexible access and to define even complex formulas from recorded measure data and calibration values
- A user-friendly Calculated Signals editor supports easy-to-read and -to-understand formulas
- With few steps a new calculated signal is defined, and ready to be used instantly
- MDA's calculation engine ensures high performance
- Copy & paste or import calculated signals from other configurations, and MDA tries to remap input signals
- For toolbox operators a Tooltip and the Help window show a description of the arguments (operators)
- Display in instruments, export into a measure file etc. can be done as for recorded signals

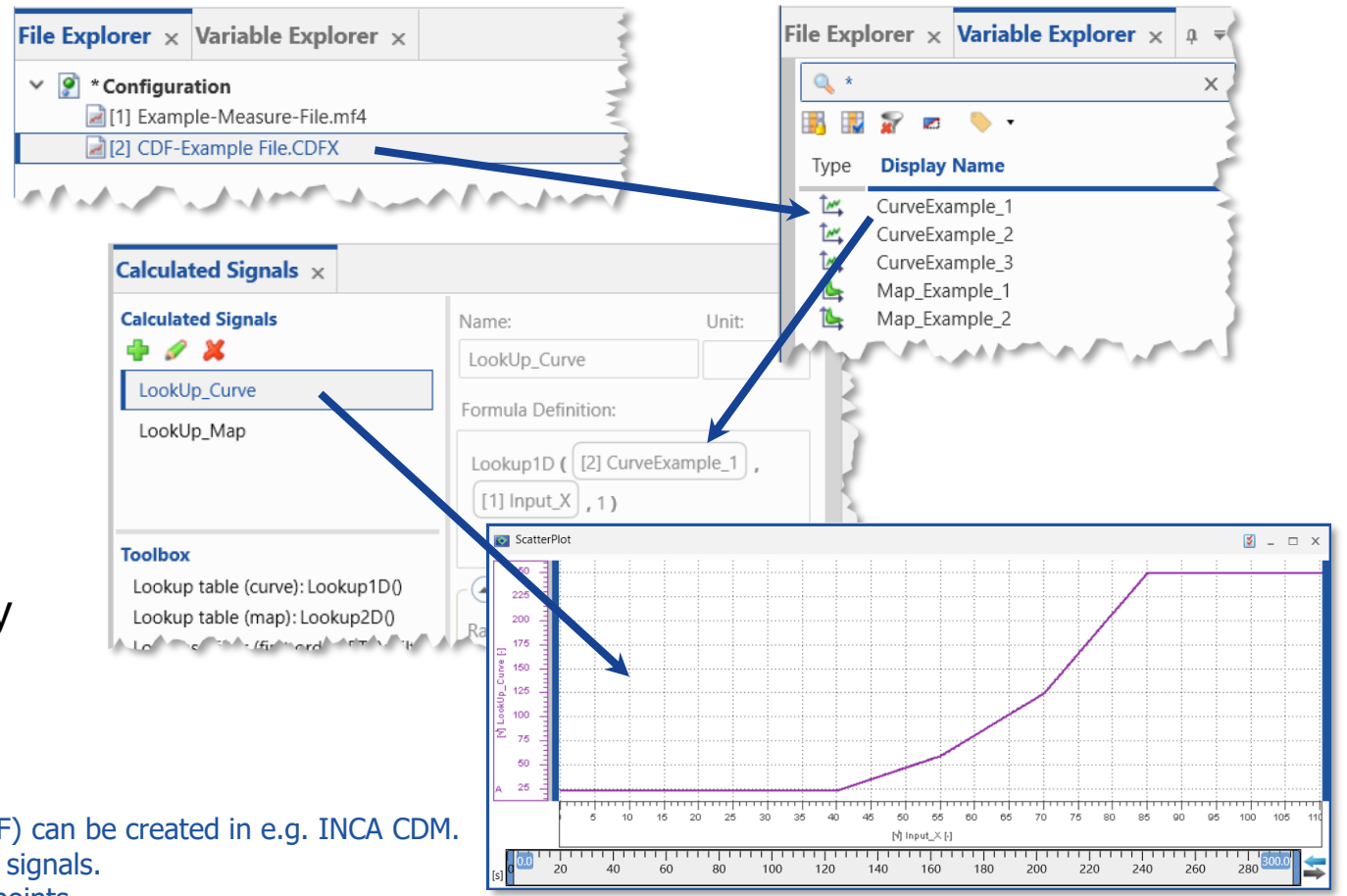


Note: For basic usage see video "Creating Calculated Signals" (#4), more details and examples are given in the Online Help and MDA V8 manual.

MDA V8 – Functionality Overview

Easy definition, usage and update of Look-Up tables

- By adding CDF files* MDA V8 can read the data for look-up tables
- Parameter Values, Curves or Maps provided via a CDF file are listed in the Variable Explorer
- Calculated Signals offer functions for ‘Lookup Table 1D’ (for Curves) and ‘Lookup Table 2D’ (for Maps) with linear or constant interpolation
- Update the data of the CDF file quickly by removing it in the File Explorer and then use CTRL+Z

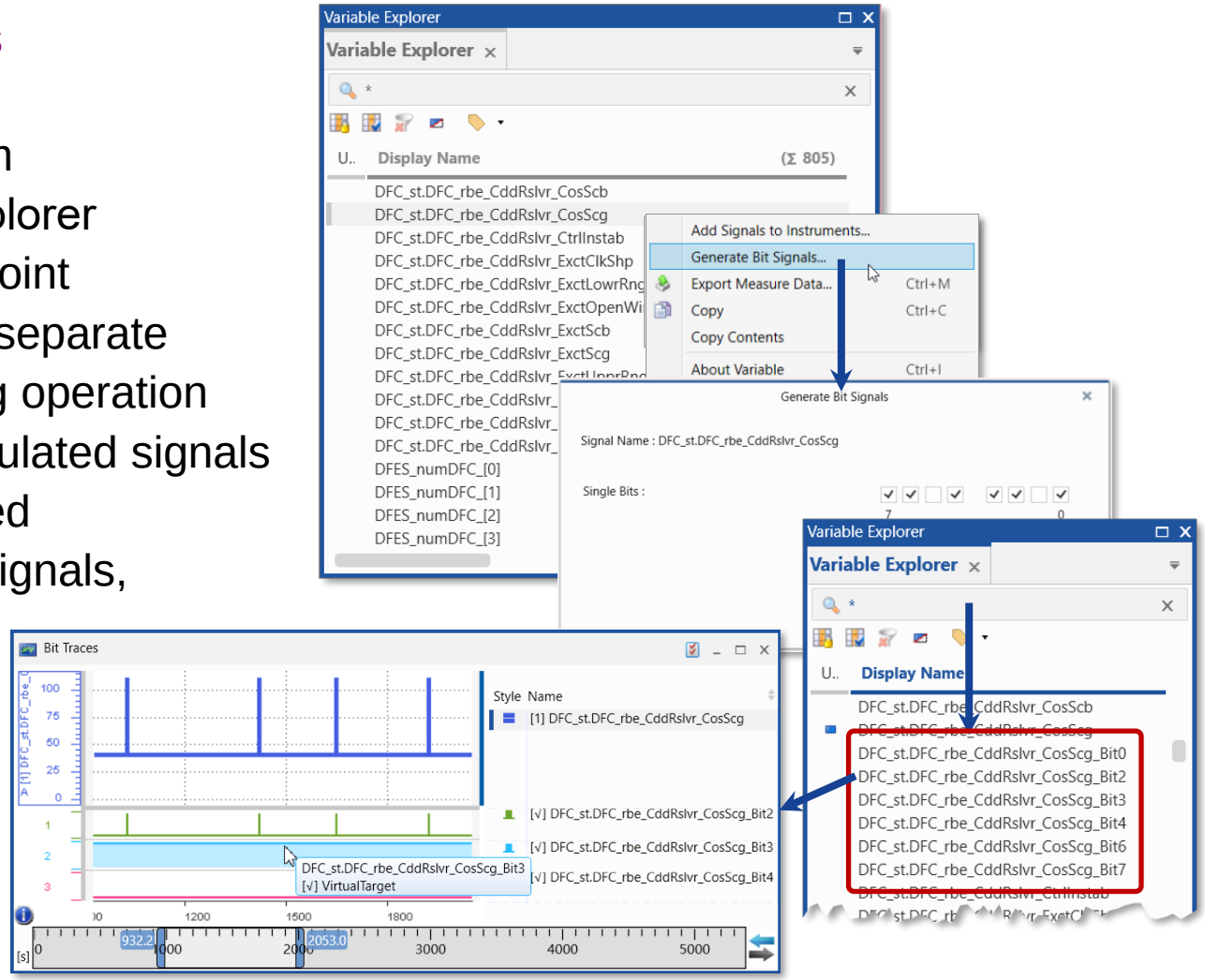


* Notes:
- File according to ASAM standard Calibration Data Format (CDF) can be created in e.g. INCA CDM.
- Calibration Values can be used directly as input for calculated signals.
- Axis values of Curves and Maps must have monotonous axis points.

MDA V8 – Functionality Overview

Quick and simple way to extract bits signals

- To extract individual bit traces quickly from a combined signal MDA V8's Variable Explorer offers in the context menu a direct entry point
- The desired bit traces are selectable in a separate dialog, and MDA conducts the bit masking operation
- In the background the corresponding calculated signals are created, and can be renamed if desired
- Such bit signals are usable like ordinary signals, i.e., can be assigned to any instrument, used as input for other calculations, and exported into new measure files



Notes:
- Generation of Bit Signals is **not** supported for enumerations, i.e., signals with a verbal computation method.
- For an example see video "Extracting Bits from a Signal" (#16).

MDA V8 – Functionality Overview

Summary of Major Features and Usage Concepts (Based on MDA V8.7.0)

- **Basics**
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  - Measure File Handling, Export of Measure Data, Time Offset, Textual File Formats, CAN Bus Trace Files
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  - Signal Selection, Definition of Display Name, Calculated Signals, Look-Up Tables, Bit Extraction
- **Instruments**
  - Overview of Instruments, Time Navigation & Synchronization, Oscilloscope, Scatter Plot, Table, Event List, Statistical Data, GPS Map View, Battery Instruments
- **Configuration Handling**
  - Configuration Management, Import of Configurations from INCA or MDA V7 (XDA), and MDA V8
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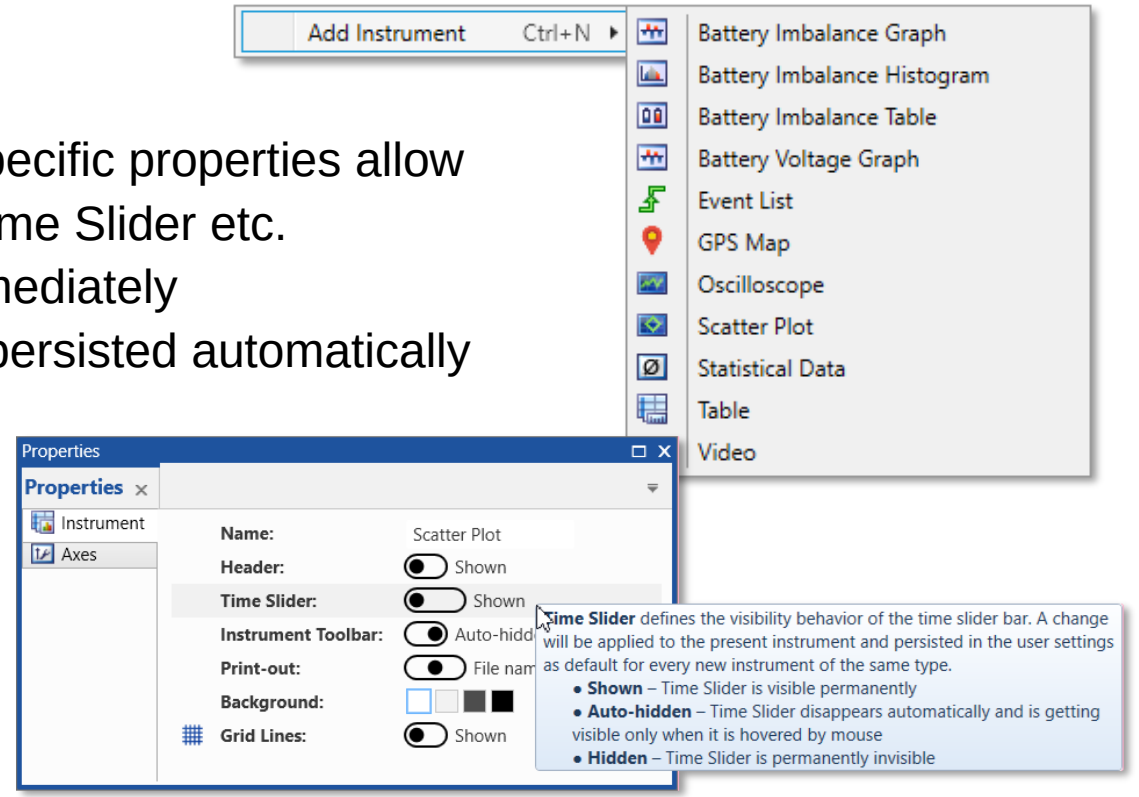
  - INCA & MDA V7, EHANDBOOK-NAVIGATOR, Command Line Tools ‘mdfconvert.exe’ and ‘mdfcombine.exe’

MDA V8 – Functionality Overview

Instrument Box: Get an overview of all possible instruments

- MDA V8 provides different instruments
  i.e., allows different views on the data *
- To use the screen more efficiently, instruments specific properties allow to define e.g., show or hide instrument header, Time Slider etc.
- Changes are applied to the active instrument immediately
- Many properties for instruments and signals are persisted automatically in the file* ‘settings.user’
- Settings are re-used when creating a new instance of the instrument or signal
  (like oscilloscope background color, signal style and curve color, decimals for values etc.)

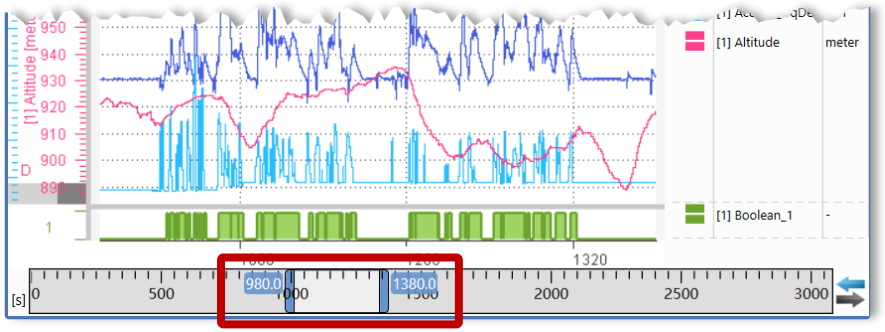


* Notes:
- Video instrument is available as add-on only.
- Properties with default character are listed in the MDA V8 Manual Chapter 1.3 ‘User Settings’.
- File ‘settings_*[version no.]*.user’ is stored here: C:\Users*username* \AppData\Local\ETAS\MDA\8.x \.

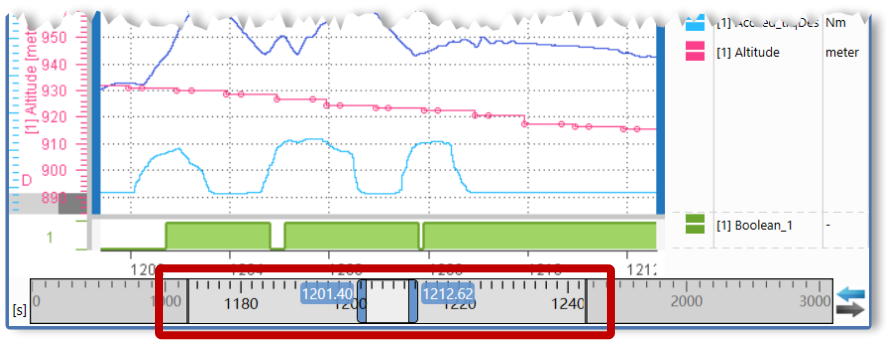
MDA V8 – Functionality Overview

Time Slider: Display relevant time ranges quickly

– At the bottom of an oscilloscope a Time Slider is shown for an overview of the complete time range of all measure files assigned to the present configuration



– Time Slider allows quick navigation through measure data and time range
– Scrolling and zooming*
– Synchronization of instruments via ⇆ icon
– In case of deep zooming the mode switches automatically to Magnifier mode, i.e., for better orientation the visual range is represented on a magnified scale
– For quick navigation in magnifier mode, scrolling of the magnified scale is enabled
– Show/Hide behavior of Time Slider can be defined within the Properties window of each instrument



* Notes:
- For a brief demo see video "Navigating in Instruments" (#3).
- For symmetric zooming use the left mouse button plus CTRL key.

MDA V8 – Functionality Overview

Oscilloscope: One instrument for several views

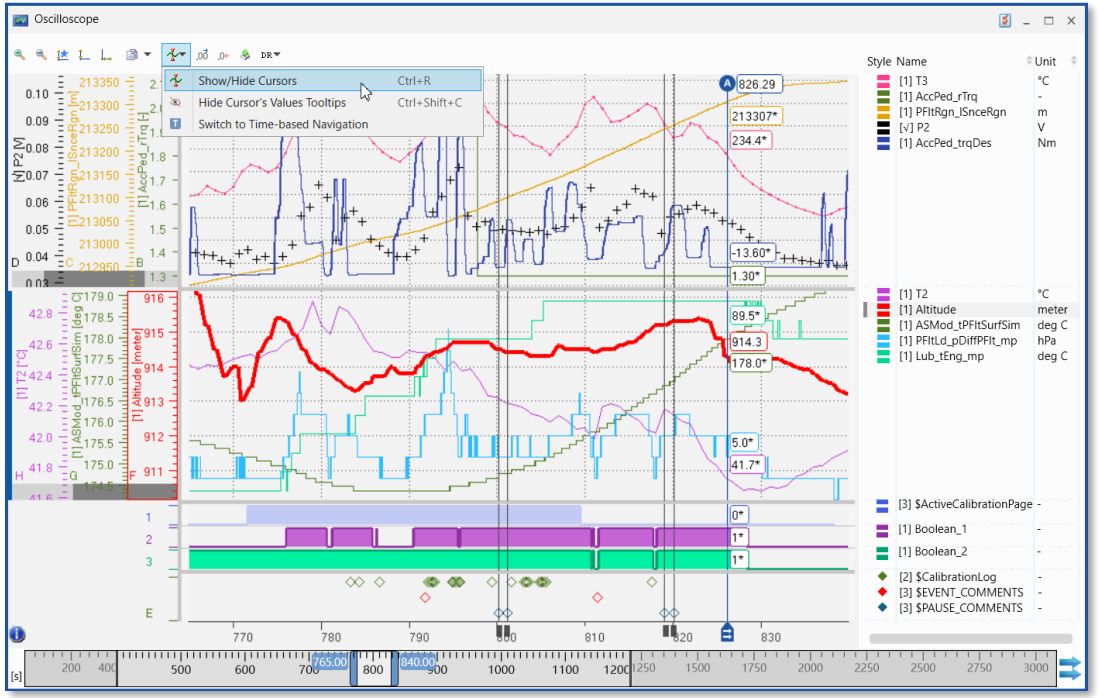
– The oscilloscope of MDA V8.7 offers:
  – Strips for analog or boolean signals
  – One ‘Event Strip’ for event signals
  – Analog signals can share the same axis
  – Axis range adaptations are done directly via mouse or via axes options
  – The color icon allows to set for each signal several settings for display (like color, markers, kind of connection) *
– Via icon bar frequently used actions are accessible e.g., zoom-to-fit, cursors, taking screenshots, or export data

* Notes:
- For scrolling of value axes or the time axis use the left mouse button, plus CTRL key for zooming or right mouse button.
- See the different videos about the oscilloscope instrument and learn more about its possibilities: “Defining Strips and Signal List” (#8), “Settings for Signals and Axes” (#9), and “Using Cursors” (#10).
- Most of these settings are persisted in ‘settings.user’ file, and used when the signal is re-selected for an oscilloscope.

MDA V8 – Functionality Overview

Oscilloscope's cursors: Several modes for efficient analysis

- Cursors are created easily using CTRL+R
- Cursors' behavior can be defined by settings *
  - Cursor movement along time or samples
  - Show or hide signal values *
  - 'Anchoring' the cursor to keep it in the visible range
- When instruments are synchronized, an anchored synchronization cursor indicates the time stamp which is used to align all instruments
- In synchronization mode cursors are created, and moved as done in the master instrument



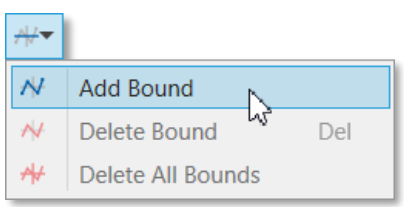
* Notes:

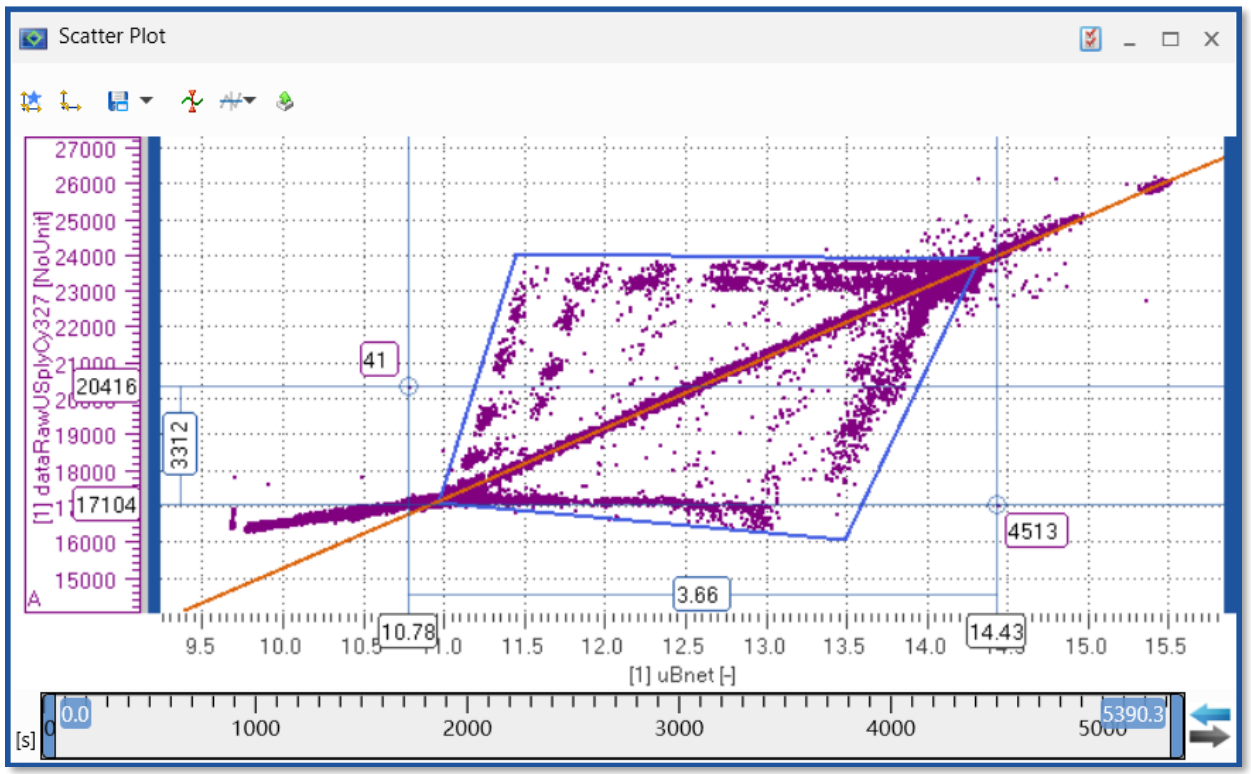
- These settings are persisted in 'settings.user' file, and applied when a new cursor is created.
- Especially for indexed files, the signal values shown are first indexed values (indicated by ~), the indicator disappears when the accurate values are available.
- How to create cursors and define its behavior, see video "Using Cursors" (#10).

MDA V8 – Functionality Overview

Scatter Plot: Fast analysis of sample distribution and signal relation

- To focus on time-independent sample distribution or on signal relation the instrument ‘Scatter Plot’ is provided
- Per strip one signal is drawn across another signal on the x axis
- Cross-hair cursors are supported
- Scatter plot can be time-synchronized with other instruments via Time Slider *
- Border lines can be created graphically



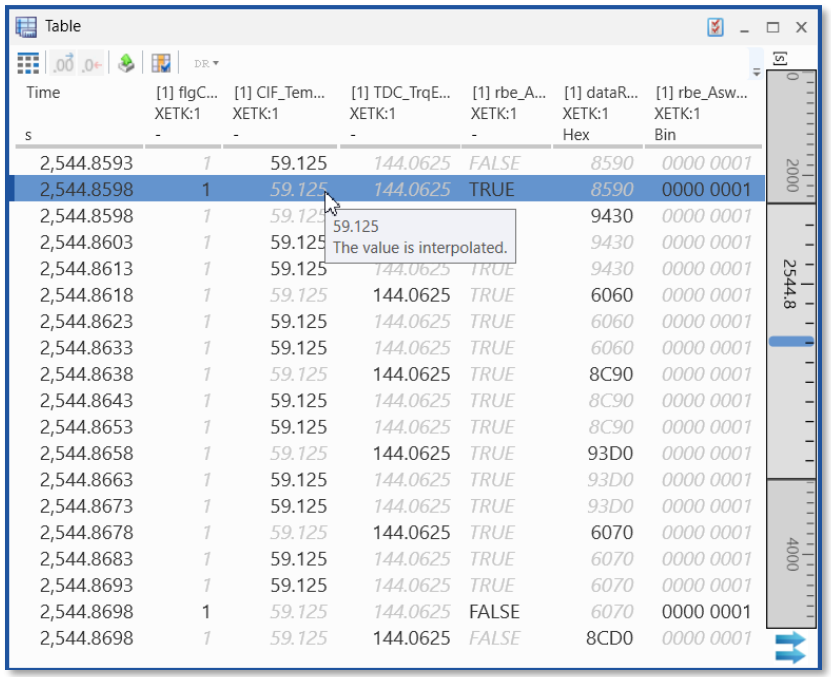


* Notes:
- For a basic introduction see video “Using the Scatter Plot” (#12).
- Scatter Plot does not support synchronization of cursors and configuration of signal settings so far.

MDA V8 – Functionality Overview

Table: User friendly instrument for detailed analysis

– Table instrument of MDA V8 shows accurate data for samples.
  It combines MDA V7's table and measure data refiller (MDR)
– By a simple click onto the 'Fill empty cells' button ( ),
  data is interpolated step-wise to fill cells
  for which no recorded values are available *
– Columns (except time) can be re-ordered via drag&drop
– Decimals for time stamps and signal values can be set *
– Synchronization with other instruments is supported,
  and synchronization time is indicated by a blue line
– Enumerations and Events are displayed as strings
– Invalid sample values are indicated by an '**!**'
– Data can be exported to e.g., TSV (tab separated values) file format for a fast reuse in Excel®

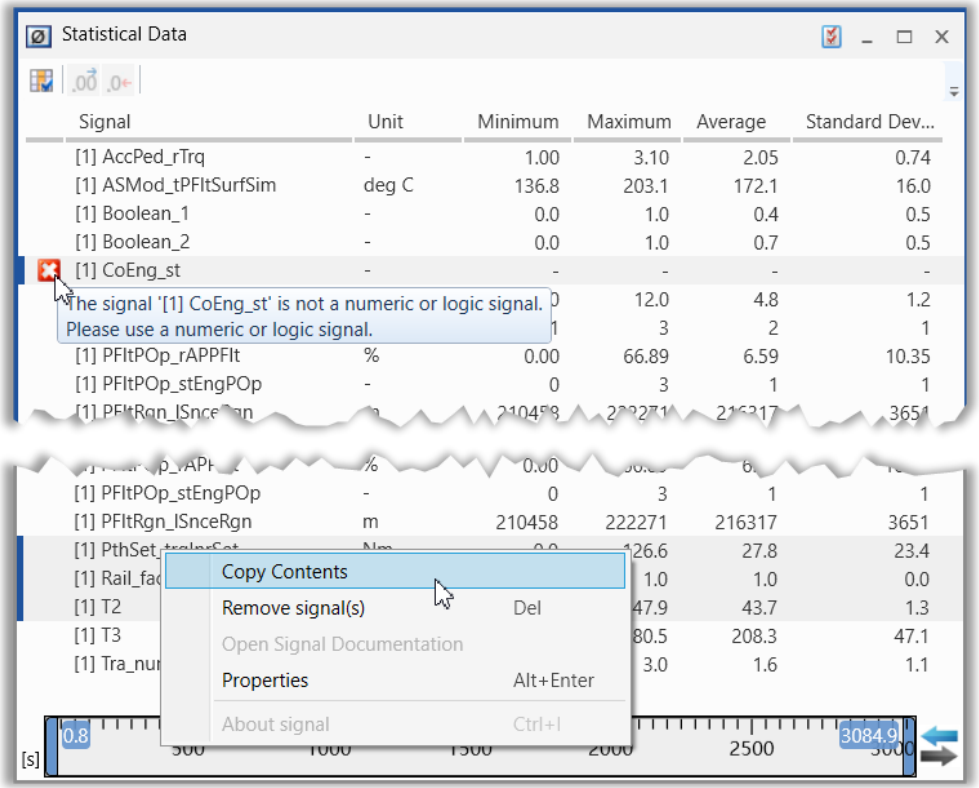


* Notes:
- These settings are persisted in 'settings.user' file, and applied when a new table instrument is created.
- For a brief introduction see video "Using the Table" (#11).

MDA V8 – Functionality Overview

Statistics: Quick access to statistical data even in synchronized mode

- For numeric signals, recorded or calculated ones, basic statistical data can be displayed
- Columns to be displayed can be selected via icon *
- Columns' order can be set using drag & drop *
- Statistical data is based on the time range defined by the Time Slider
- In synchronization mode update of data happens based on the time range set in the synchronization master instrument e.g., an oscilloscope
- To copy contents of all columns of the selected rows and the column header, use the context menu entry 'Copy Contents'



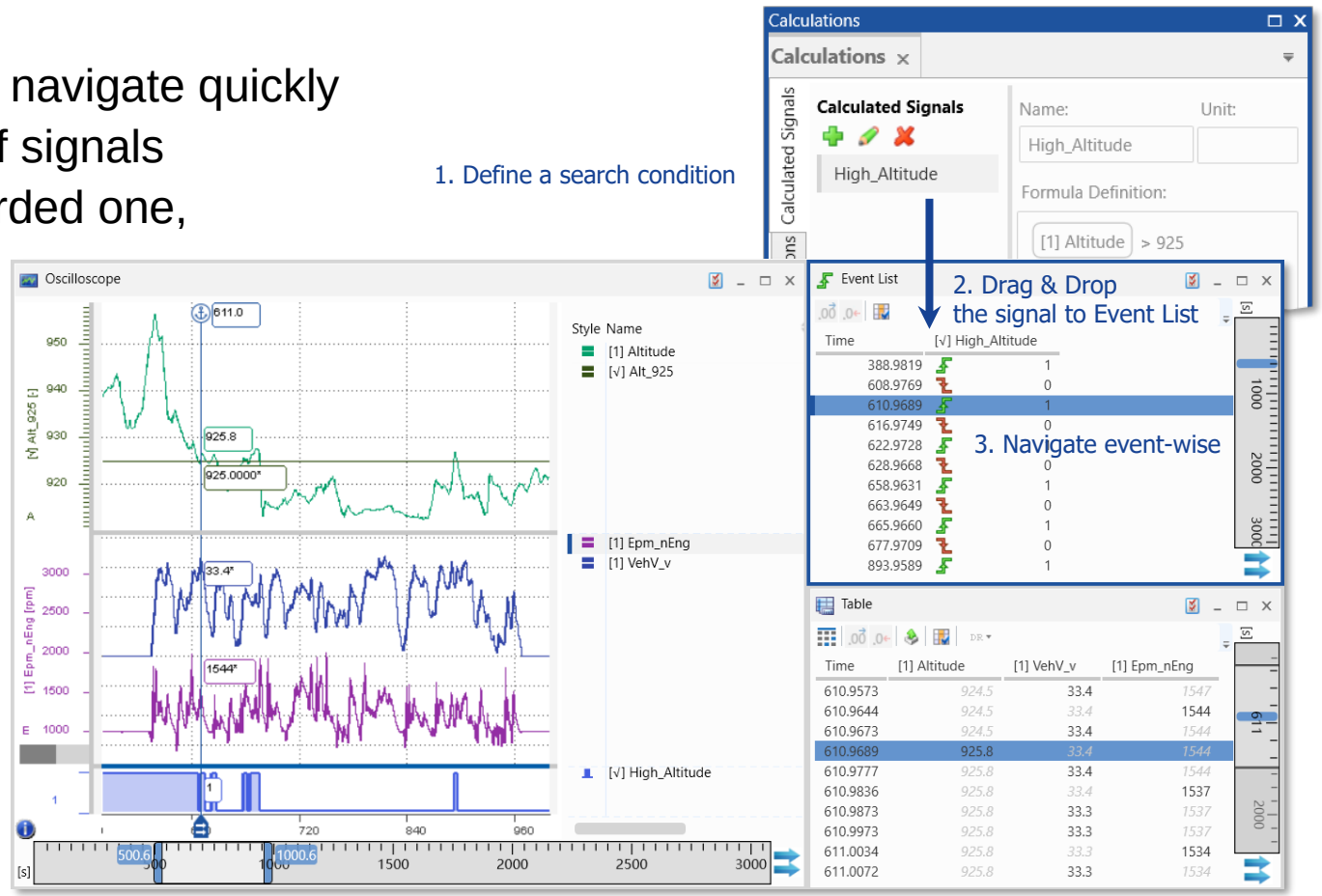
* Note: These settings are persisted in 'settings.user' file, and applied when a new statistics instrument is created.

MDA V8 – Functionality Overview

Event List: Get quickly a complete list of status changes for Boolean signals

- The Event List instrument supports to navigate quickly between events and value changes of signals
- Any signal can be used, either a recorded one, or a calculated signal

- After adding the event / signal to the event list, only time stamps having a status change are listed
- Synchronization with other instruments is supported
- To navigate event-wise just double-click an entry in the Event List view



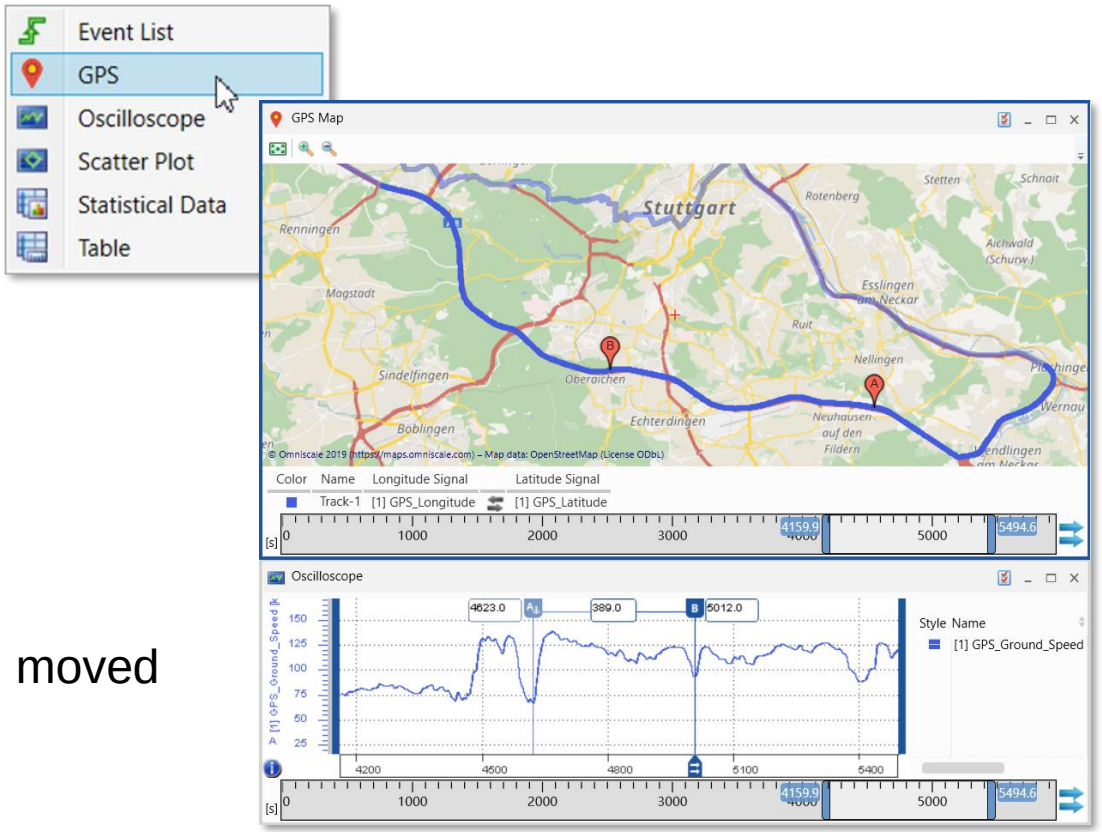
Note: See example in video "Finding Events" (#15).

(Oscilloscope and table for visualization of synchronization only)

MDA V8 – Functionality Overview

GPS view: Visualize directly the track of your test drive

- When longitude and latitude information is available in a measure file, a track can be displayed in map
- The GPS map instrument identifies longitude and latitude automatically by the signal names, alternatively, a manual assignment is possible
- For event signals added to the map markers are displayed along the track
- Zooming and scrolling the map is supported
- Time range can be defined using the time slider
- In synchronization mode cursors are shown and moved synchronously with cursors in other instruments



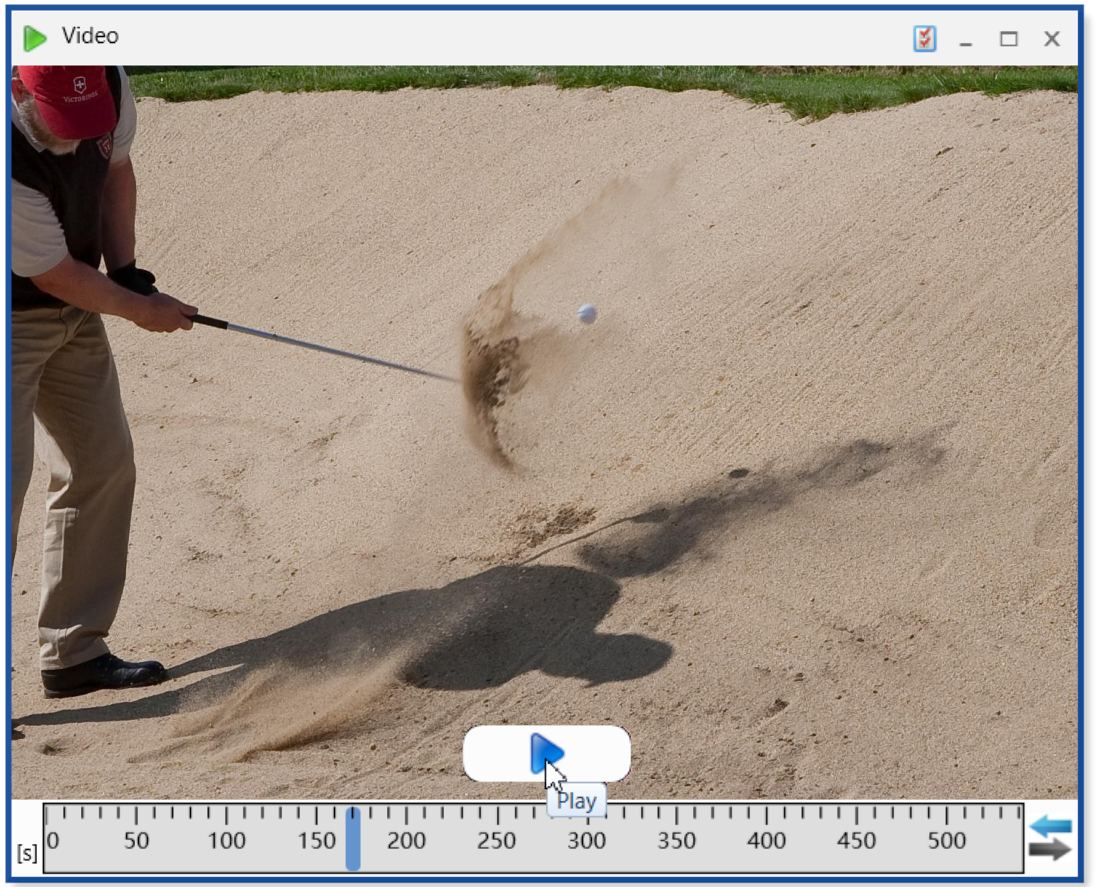
Notes:

- For a basic introduction see video "Using the GPS Map" (#17).
- To display a map URL: maps.omniscale.net of the external map provider Omniscale GmbH must be unblocked.

MDA V8 – Functionality Overview

Video instrument: Watch and synchronize video recordings with measurement data

- A basic Video instrument is available* to display videos which were recorded using INCA's video add-on
- INCA creates an additional signal named 'VIDEO_TIMECODE'
- Just add the 'VIDEO_TIMECODE' signal to MDA's video instrument
- Play / Stop button to display the video
- Navigation and Synchronization with other instruments via Time Slider Bar

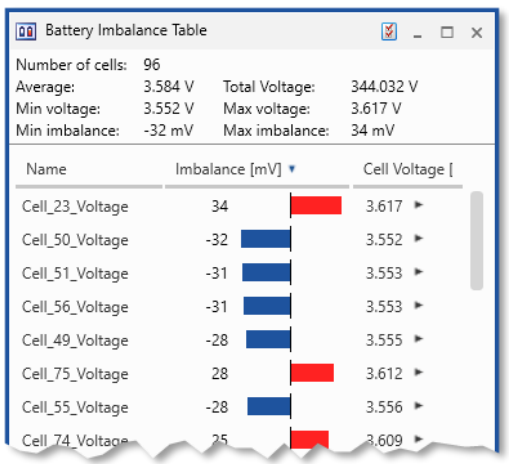


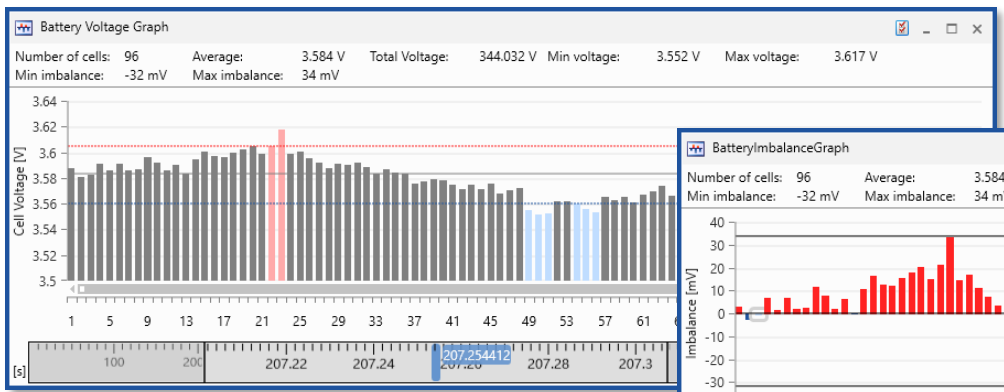
* Notes:
- The Video instrument is an ETAS Engineering solution and requires a valid license, which is combined with the license for INCA's Video add-on.
- Keyboard support for Video instrument will follow in a future MDA version.
- Ball came to rest close to the hole, and player could tap in for Par.

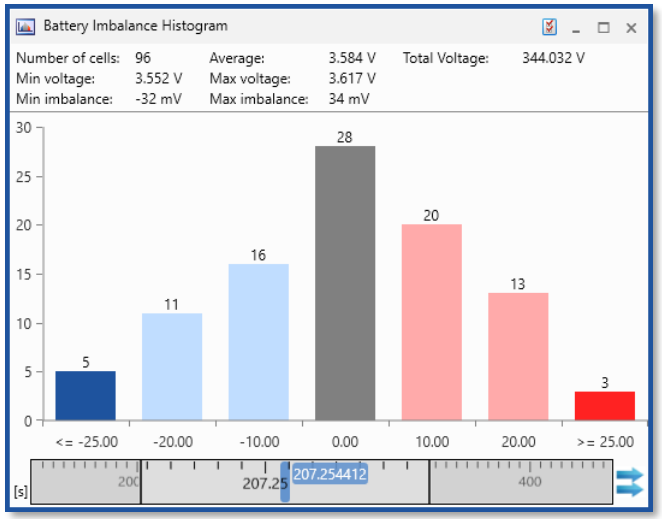
MDA V8 – Functionality Overview

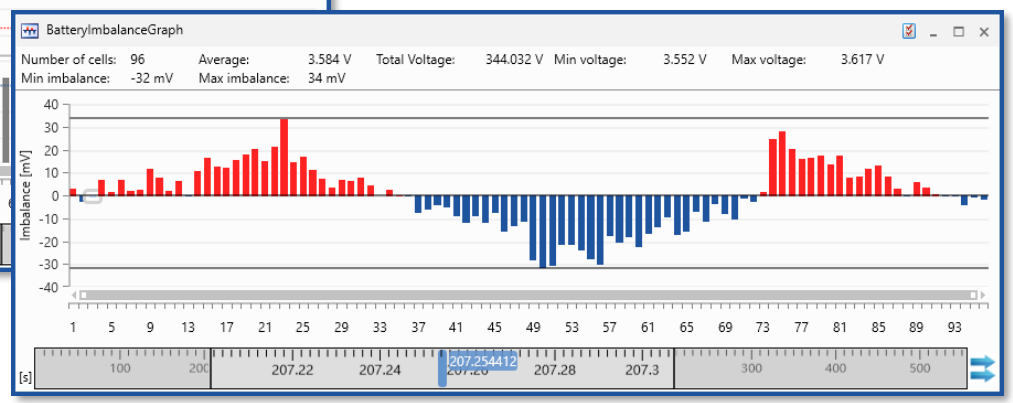
Battery instruments: Different perspectives to understand quickly the battery system

- Battery Cell Imbalance * values can be displayed:
  - A table to identify the cells with the most extreme imbalance values
  - Graphs to get an overview of all cell imbalance / voltage values
  - A histogram to determine the statistical distribution of the cells
- All instruments represent the state at one point in time
- Time can be synchronized to the active cursor in an oscilloscope









MDA V8 – Functionality Overview

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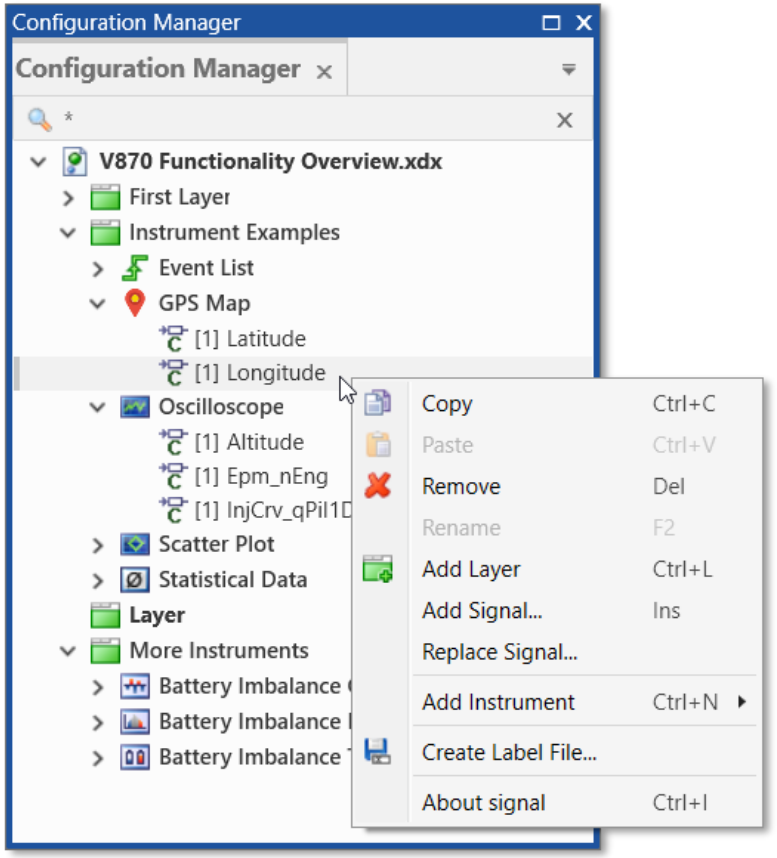
MDA V8 – Functionality Overview

Configuration Manager: Get quickly an overview of your configuration

- The Configuration Manager shows a hierarchical representation of the configuration i.e., layers, instruments, and signals
- A variety of operations allows to handle the configuration's objects
- Search functionality (CTRL+F) for all kind of objects
- Within a configuration drag & drop of signals or instruments
- Copy & Paste of layers, instruments, and signals even across configurations within one MDA V8 session
- Renaming and removing of layer and instruments
- Adding of new layers and empty instruments
- Replacing signals by other signals (individually or globally)
- Clean-up for signals in no-match state from configuration node
- Creation of LAB files for reuse in INCA or the Variable Explorer

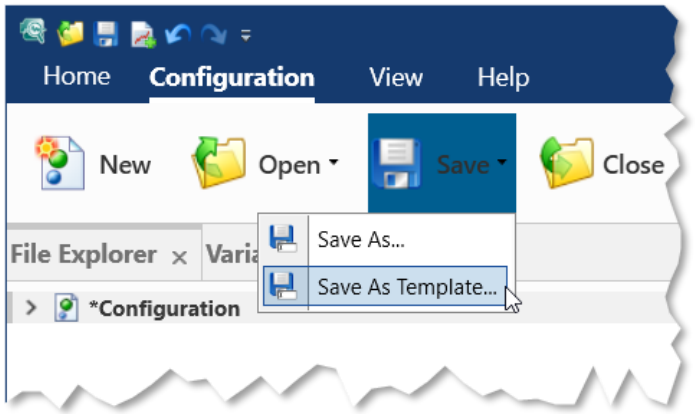


Note: Some basic aspects are demonstrated in video "Import and Layer Handling" (#6).

MDA V8 – Functionality Overview

Configuration Template to easily reuse a configuration with different measure files

– By means of a ‘Template Configuration’ the same configuration setup can be re-used for analyzing new measure files



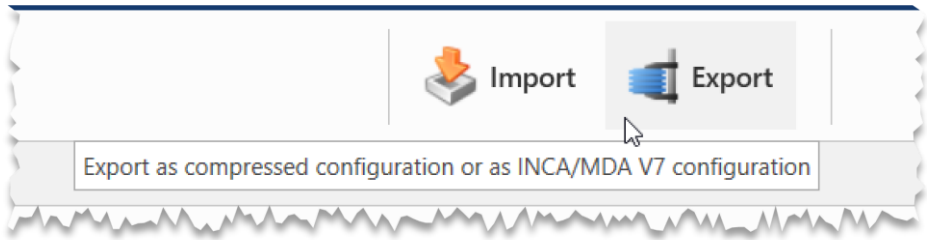
– From any configuration a template file (XDT) can be created via the new entry ‘Save As Template…’ of the Save icon
– The same template file can be opened multiple times * to create an instance of a new individual configuration (XDX)
– When a Template is opened no time is consumed for loading of the formerly assigned file(s), instead new files can be added directly, and used to replace a former file in the Add or Replace dialog
– To modify an existing template, open it, modify it (if needed after having added a measure file), and then save it as template, thereby optionally the existing template can be over-written

* Note: From ordinary configuration in XDX format only one instance can be opened in one MDA session.

MDA V8 – Functionality Overview

Export: Provide your complete analysis to a colleague

– Exchanging and archiving of configurations is easy
– Just use the Export button and select a target format



ZDX Format

– ZDX format is ideal to store a setup completely
– The zipped file includes the configuration itself, all kind of files, and all calculations *
– Hint: The combination of MDA log files (Zip&Send) plus the ZDX file are very helpful for reproducing problems at ETAS

XDA Format

– The Export to XDA format from MDA V8.7 is intended to provide the most relevant configuration objects in a format which can be imported by older MDA versions *
– A message about not exported objects appears in the status bar of MDA V8

* Notes:
- Included into ZDX files are measurement, label, and CDF files. Not included are FMU files and INI files for support of textual ASCII file formats.
- Export to XDA is limited to oscilloscopes, scatter plot and table instruments. Other instruments or objects (like calculations) are not supported.
- Import of XDA files is possible since MDA V8.4.1, but depending on the actual MDA version not all instruments or settings might be imported.

MDA V8 – Functionality Overview

Import: Reuse objects from another MDA V8 configuration

– Import is possible for file formats XDX, ZDX or XDA

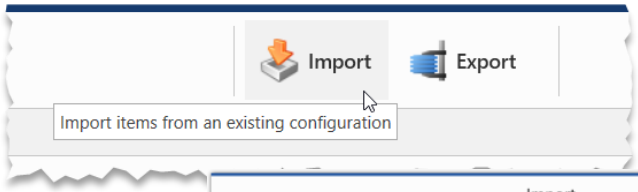
XDX Format

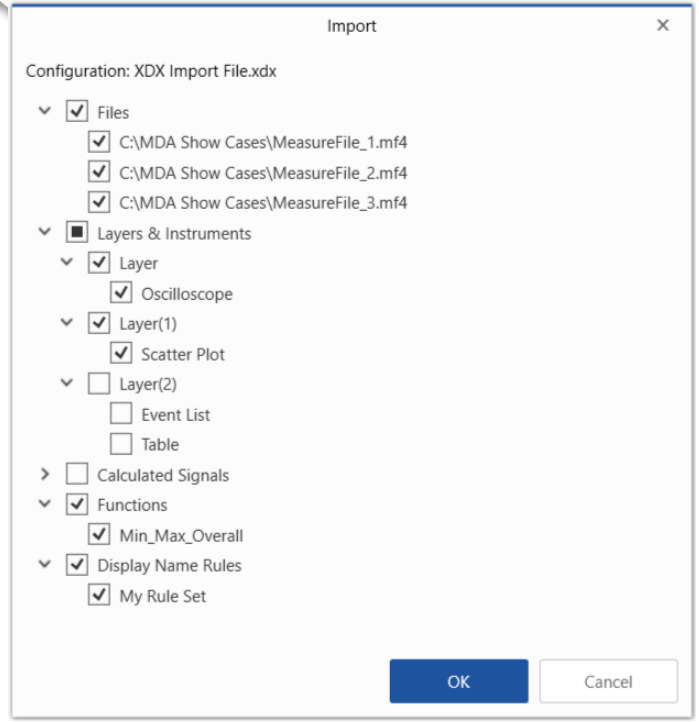
– In the Import dialog all objects are listed and the desired ones can be selected

– If imported objects (like instruments) are referencing to one file only, and the target configuration has only one file loaded, MDA tries to conduct a remapping

ZDX Format

– When importing an ZDX file just select a folder for unzipping the file, afterwards the configuration is opened automatically





* Notes:

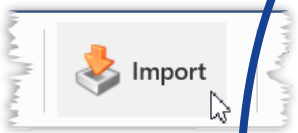
- Only compatible XDX configurations can be imported, i.e., created with the same or an older MDA version. This will change soon with an upcoming MDA V8.7 Service Pack version.
- If objects with the same names exist already, the name of the imported object is incremented.
- Messages about potential issues or limitations during import are shown in the Status Bar of MDA V8.

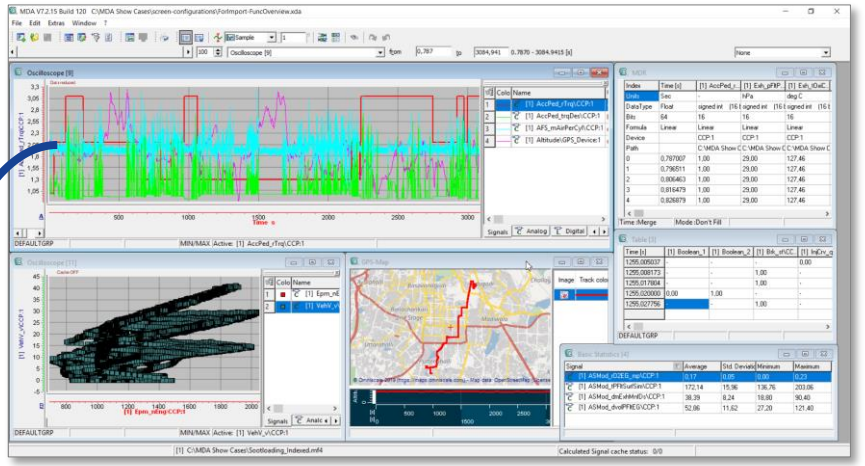
MDA V8 – Functionality Overview

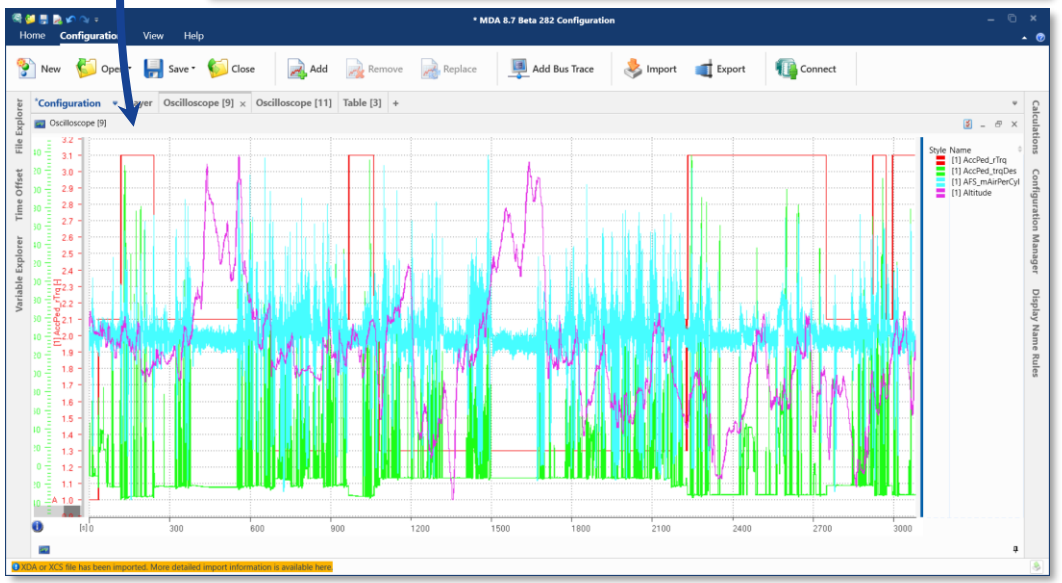
Migration of Configurations: Import of XDA files

XDA Format *

- Import is possible of files created with INCA, MDA V7.x or MDA V8.7
- Supported are oscilloscopes, scatter plots and table instruments
- When importing an XDA file from MDA V7.x / V8.7 for each instrument an individual layer is created
- XDA file import from INCA V7 adds all instruments on the same layer
- Calculated Signals are imported (from XDA or XCS files) except e.g., not supported functions







* Notes:

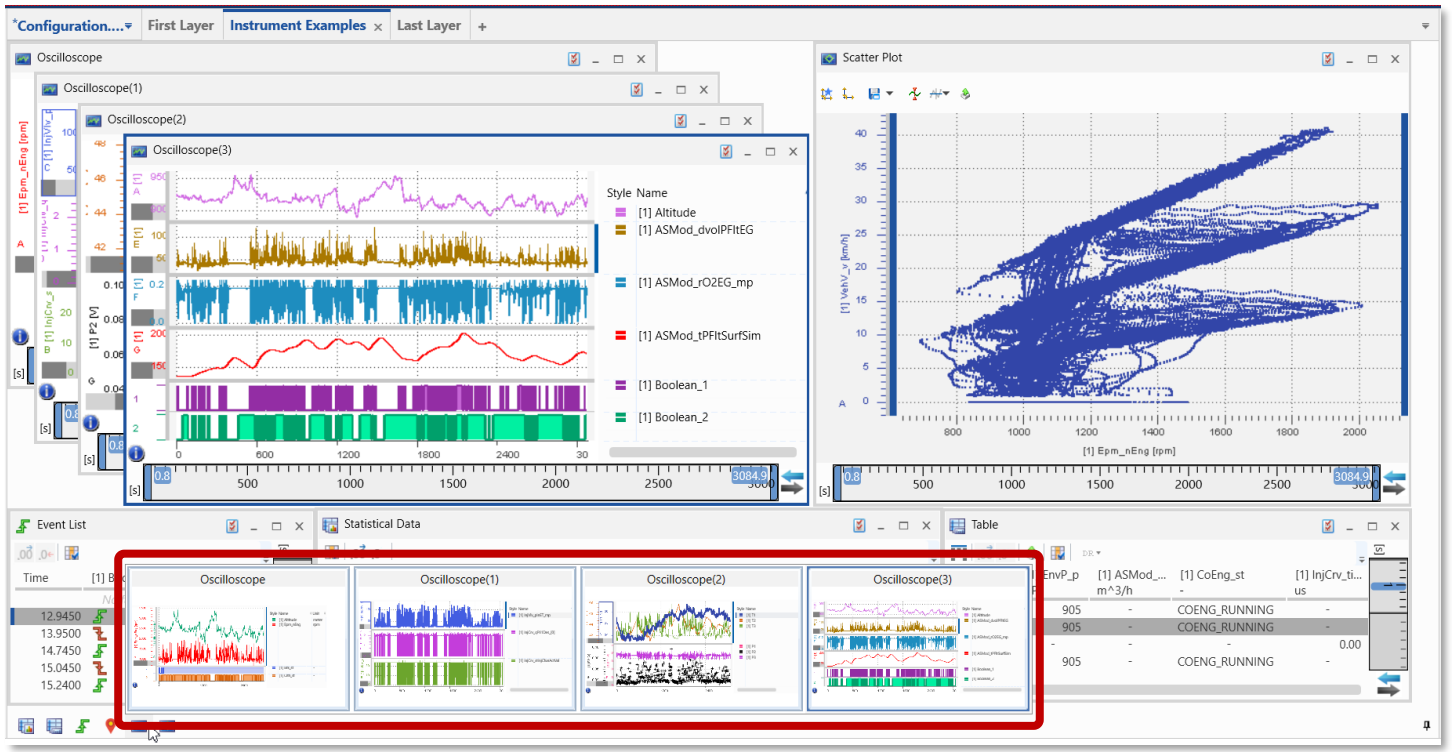
- For a brief demo see video "Import and Layer Handling " (#6).
- Since MDA V8.7 configurations can be exported partially to XDA format.
- Import of XDA contents depends on the capabilities of the importing MDA version. Messages in the Status Bar inform about issues or limitations during the import.

MDA V8 – Functionality Overview

Layer Preview: Navigate quickly between different instruments

– On each layer instrument type symbols are shown in the task bar

– A preview allows to identify and to navigate quickly between the existing instruments
– The currently active instrument is highlighted by a blue frame
– A click on an instrument preview brings it to the front and into the visible area
– To navigate quickly via keyboard between instruments, layers, or configurations use CTRL+TAB



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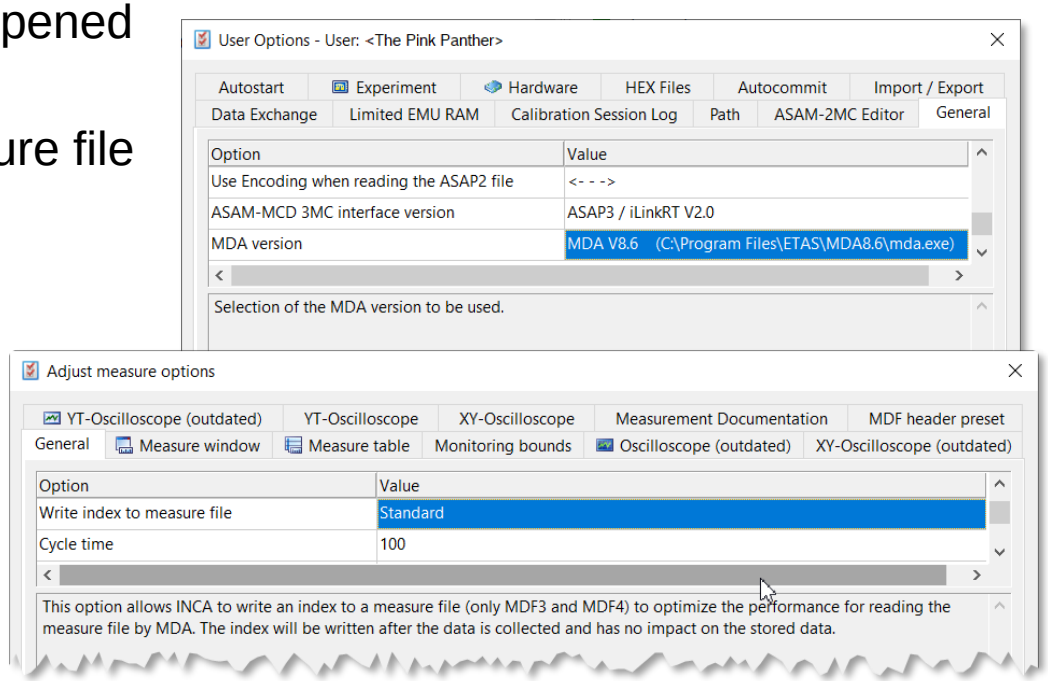
MDA V8 – Functionality Overview

Handling in combination with INCA V7.x and MDA V7.x

- Usage of MDA V8.7 requires a valid license, which is covered by an INCA V7.5 or MDA V8.7 license
- A user option in INCA defines the MDA version to be opened (User Options → General)
  - MDA V8.x will start and load the just recorded measure file
  - Depending on the INCA user settings an XDA file is generated and imported into MDA V8
  - If MDA V8 is already open, the measure file of the active configuration will be replaced
- For performance reasons it is recommended to activate in INCA V7 ‘Standard’ indexing (User Options → Experiment → Measure → General)

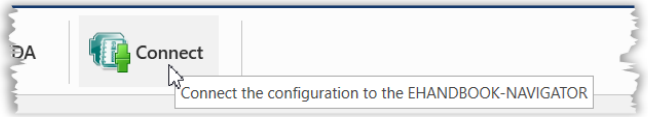


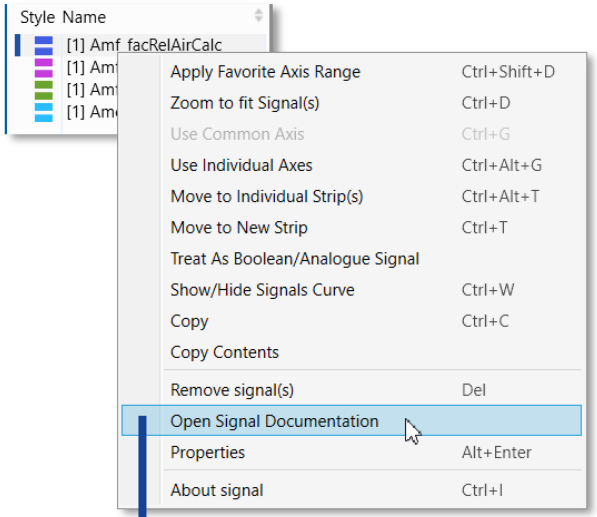
* Notes:
- Snapshot Recording requires a combination of MDA V8.4.1 (or higher) and INCA V7.3.0 (or higher) and recording in MDF V4.x file format
- MDA V8.x and MDA V7.x can be installed and used in parallel without any negative effects

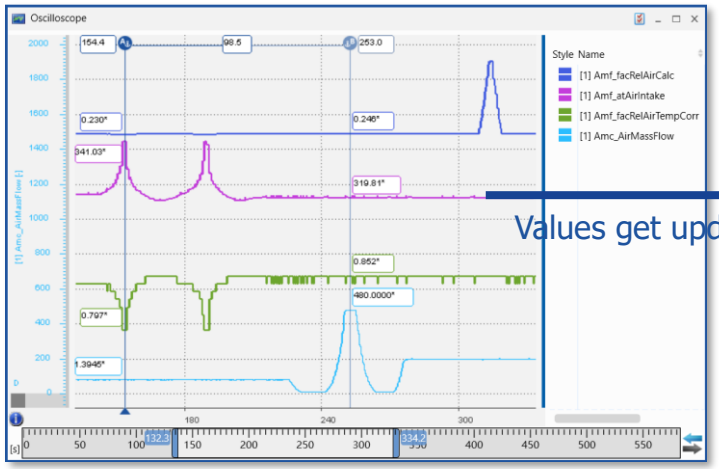
MDA V8 – Functionality Overview

Combined usage of MDA V8 and EHANDBOOK-NAVIGATOR

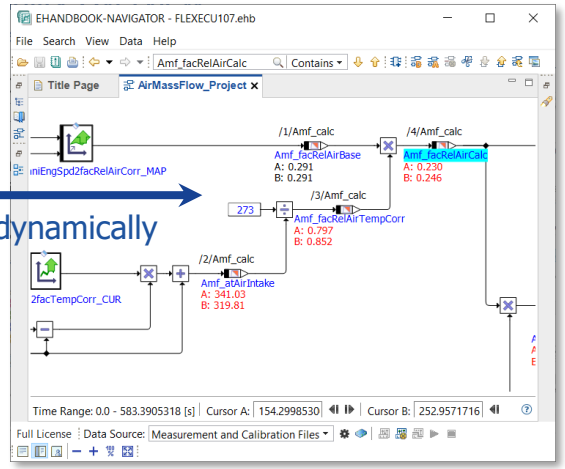
- MDA V8 can be connected with interactive documentation tool EHANDBOOK-NAVIGATOR (V7.x required, V11.x preferred)
- When being connected with a valid documentation container file (EHB)
  - a search for a signal can be triggered from MDA
  - measure data can be displayed in interactive models and function overviews shown in EHANDBOOK-NAVIGATOR
  - a cursor movement in MDA updates automatically values in EHB-NAV

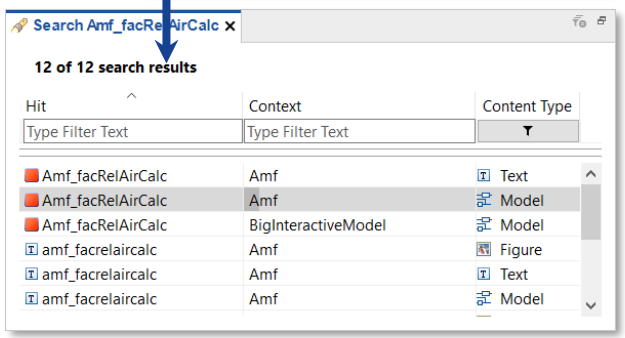






Values get updated dynamically





MDA V8 – Functionality Overview

Command line tool for data conversion and extraction

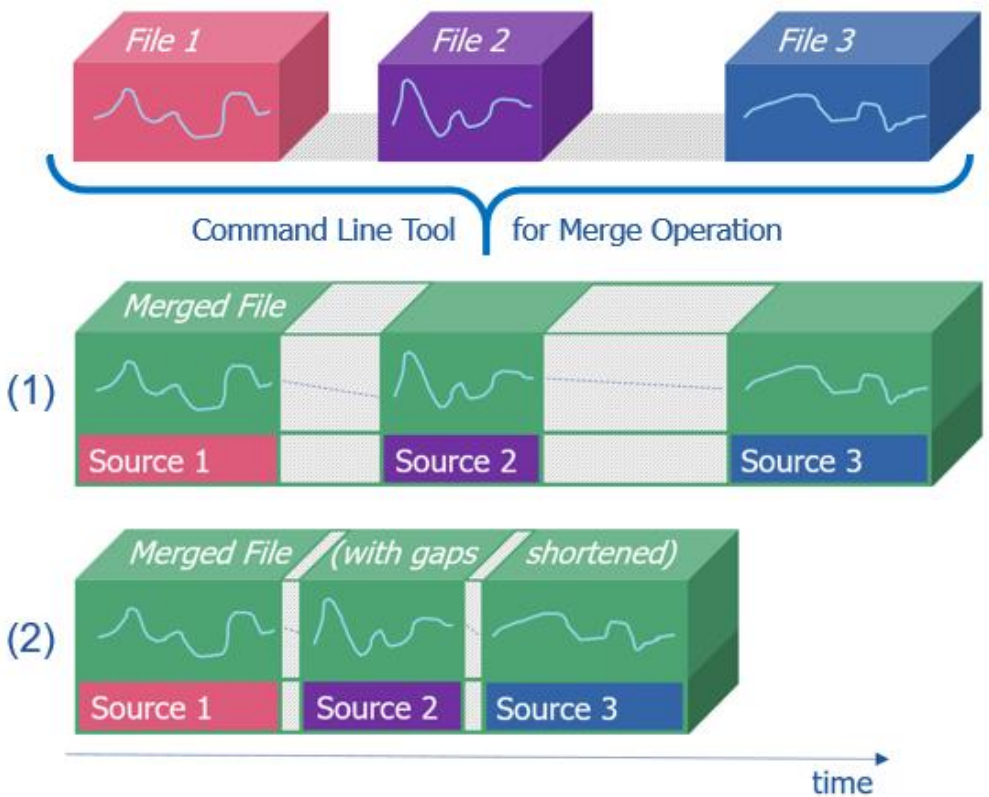
- Together with MDA V8 ‘mdfconvert.exe’ tool is installed, which can be used independently from MDA V8 for
  - format conversion
  - extraction of subsets of signals
  - extraction of a time range
  - resampling to equidistant time stamps
- ‘mdfconvert.exe’ can be integrated easily into scripting solutions
- Supported file formats are:
  - any MDF format version
  - any textual file format supported in MDA V8 incl. customer specific textual file formats *

* Notes:
- Numeric data and enumerations are supported completely, for MDF V3.x also data type strings.
- For MDF V4 signals of data type EVENT an option enables to post-add the events to the newly generated file.
- More details about customer specific textual file formats are given on page 18.
- All textual file formats have one merged time channel only, except DXL (ASCII Multi Rate V4.0) format which supports different time channel groups.

MDA V8 – Functionality Overview

Command line tool for merging of comparable MDF files

- Another command line tool delivered with MDA V8 allows to ‘Merge’ multiple measure files into one combined measure file
- ‘Merge’ means: the contents of the separate files are sorted by time, thereby signals having the same name and setup (device, raster, data type, etc.) but from separate files, result in one combined signal
- An option enables chronological or user-defined order
- Parameters allow to define how time gaps at connection points are treated:
  (1) original duration of gaps is kept,
  (2) gaps are shortened to a defined duration



Notes:
- The video “Merging of Measure Files” (#20) shows how to use the command line tool.
- Only measure files in MDF format which are not over-lapping can be merged.
- Event signals are excluded when merging measure files.

Thank you
for using MDA V8.7