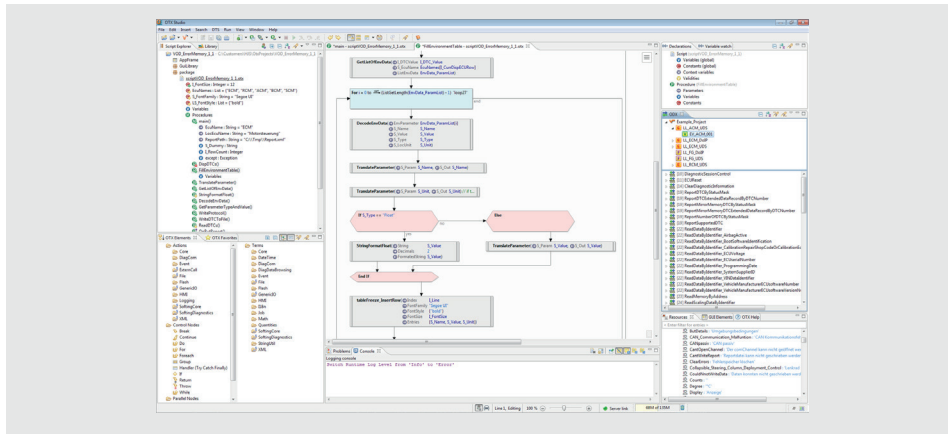


# OTX Studio

Development of Complex Diagnostic Sequences compliant with ISO 13209

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OTX Studio is a development environment for specifying, implementing, debugging and executing complex diagnostic sequences. It was created to address all use cases from the specification to the implementation of diagnostic sequences throughout the entire vehicle life cycle.



## Integrated Development Environment for Diagnostic Sequences

The OTX (**O**pen **T**est sequence **eX**change) standard, compliant with ISO 13209, enables users to describe diagnostic sequences from basic functional tests through to complete tester applications with guided diagnostics.

The possibility to describe, exchange and re-use diagnostic sequences with OTX closes the tool gap between the specification, implementation and postproduction stages of vehicle development and maintenance. Hence, OTX can efficiently address all use cases for the application of diagnostic sequences throughout the entire vehicle life cycle. OTX is therefore a future oriented standard, which successfully addresses diagnostic issues of exponentially increasing vehicle complexity.

Softing's OTX Studio is an Eclipse-based integrated development environment which provides all the necessary functions and tools for easy and effective development of OTX sequences. The tool provides the aids for specification, implementation, debugging and execution of the diagnostic sequences. The available views are use-case oriented and provide a familiar working environment to programming experts as well as to users without programming knowledge. Furthermore the tool OTX Studio offers tools for the creation of HMI interfaces and semi-automated diagnostic validation test cases.

## Areas of Application

- Graphic or modular specification of diagnostic sequences
- Creation and validation of test sequences in ECU development
- Creation of test sequences for EOL testers in Manufacturing
- Guided fault diagnosis for repair shop testers

## Functions

- Creation, debugging and execution of OTX scripts
- Line oriented classical programming
- Flowchart Editor
- Modular – Wizard-based script configuration
- GUI Editor for HMI interfaces
- Test Case Editor for semi-automated creation of diagnostic tests

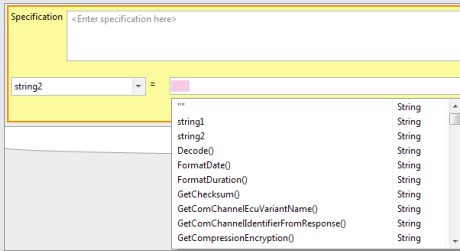
## Benefits

- Easy exchange of sequences between ECU, system and vehicle manufacturers throughout the entire vehicle life cycle
- Diagnostic data is supported in compliance with ODX 2.0.1 as well as 2.2.0
- Long-term protection of investments due to compliance with the international standard ISO 13209



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# AUTHORING



## Easy Creation of Diagnostic Sequences

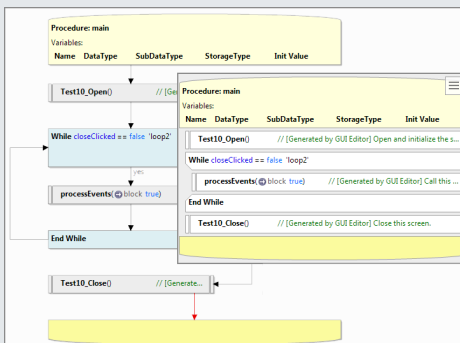
OTX Studio provides all the necessary input assistants which guide the user when working with the product. The user is given support with simple diagnostic sequence creation and timesaving workflows. The input assistant allows users to create diagnostic sequences without having in-depth knowledge of the OTX language elements. Comprehensive project administration with integrated version management for subversions along with a tool that checks for differences in OTX scripts and allows merging, ensures structured overviews and easy file handling even in large projects. The library concept supports users in the modular creation and reuse of their diagnostic sequences. Experienced users can use advanced features of OTX Studio, such

as direct execution of diagnostic sequences and raw data bus access for handling all possible diagnostic scenarios. Integrated debugger allows single step, step over and step into execution, breakpoint setting, variable monitoring and variable content change during the execution.

### Benefits

- Easy to use OTX development environment for experienced and first time users
- OTX code assistant
- Project administration
- Direct execution of the diagnostic services
- Raw data bus access

# VIEW MODES



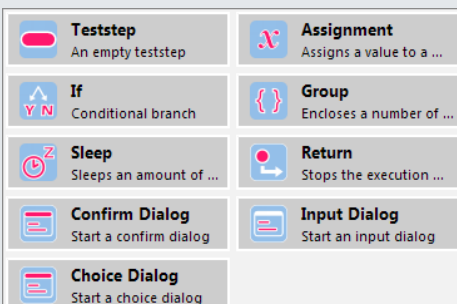
## Different Views for Different Users

For vehicle troubleshooting and validation experts it is important to concentrate on diagnostic tasks and logical flows, and leave the implementation of the required diagnostic scripts to the programming experts. However, diagnostic scripts implemented by the programming experts need to be checked and validated by the vehicle experts on an abstraction level understandable to them. OTX Studio offers use case oriented views as well as views corresponding to users' individual preferences, thus making the work of specific user groups more efficient and simpler.

### Benefits

- OTX sequences can be created with flow-chart or line editor
- Different users can choose their preferred workstyle

# OTX WIZARD



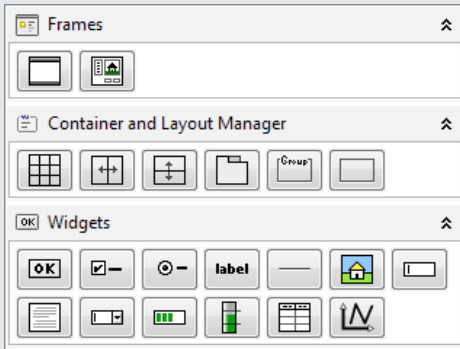
## Configuring instead of Programming

In the OTX Wizard (convenient) mode, the user can easily create OTX scripts with pre-programmed standard or custom (library) OTX modules simply by configuring them instead of programming. OTX-Wizard-based configuration saves time and allows maximum re-use of OTX modules. Even without in-depth OTX knowledge, the user can focus on the logical flow, rather than programming, and still create quite complex OTX scripts. Since the OTX Wizard is actually an OTX code generator, the resulting code can be edited and modified in expert mode.

### Benefits

- Re-use of the existing OTX scripts and libraries
- Configuring instead of programming

## GUI EDITOR



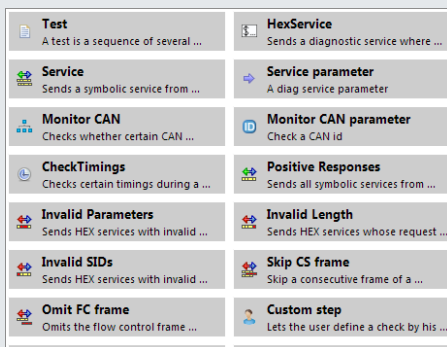
### Easy Creation of the HMI Interfaces

The OTX Studio's GUI Editor extension supports the designing of the entire HMI interface as well as the simple connection of the GUI elements (widgets) to the corresponding OTX script variables. OTX function libraries can be defined to allow the re-use of generic OTX procedures, with no limitation to the number of these libraries. Application developers can easily create complex interactive GUI interfaces which guide the user through the required diagnostic steps or display the vehicle data.

#### Benefits

- Easy creation of the HMI interfaces
- Various, commonly used widgets (buttons, checkboxes, labels, tables, graphs...)
- Automatic creation of the GUI loop for the OTX script

## TEST CASE EDITOR



Such comprehensive validation is typically required for acceptance and regression tests. For this purpose all available diagnostic services along with their various parametrizations have to be systematically tested and documented. Tests created with the Test Case Editor are based on pre-configured OTX scripts, which are parametrized accordingly, and used for the creation of automated, OTX script based validation tests.

The created tests can contain:

- validation of positive and negative ECU responses;
- validation of communication parameters;
- response pattern matching;
- robustness check of the diagnostic implementation.

The test results can be presented in XML or HTML format. For the test campaigns, test run statistics can be displayed.

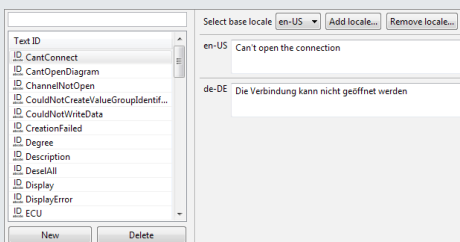
#### Benefits

- Creation of ECU diagnostic tests
- Checking positive, negative and invalid responses
- Checking timing parameters
- Embedding the OTX scripts for special tests
- Comprehensive reporting
- Test run statistics

### Automated Test and Validation

The OTX Studio's Test Case Editor extension provides a number of functions to create tests for the comprehensive and automated validation of ECU diagnostic services.

## LOCALIZATION



### Localization of the OTX Scripts

For easy localization of the OTX scripts, OTX Studio provides automatic string externalization, which helps the user to easily collect all strings that have to be translated. The collected strings and their translation keys can be edited with the editor that is part of the admin extension. The strings and keys can be exported into or imported from the XLIFF file, which is the standard format for exchange with translation agencies.

The OTX scripts created can be tested with individual localization settings independent of the test system's local settings.

#### Benefits

- Automatic externalization of strings from OTX code
- Easy translation of the texts
- Import and export of XLIFF files

## Technical Data

<b>OTX Extensions</b>	Diagnostics (ISO13209-3): DiagCom, DiagDataBrowsing, Flash, Job, Quantities User interface (ISO13209-3): HMI, I18N Miscellaneous (ISO13209-3): DateTime, Event, Logging, Math, StringUtil Extended (Softing): ExternCall (DLL), DiagCom, File, XML, Trace
<b>Onboard Checker</b>	Verification of OTX compliance and type compatibility
<b>Debugging Functions</b>	Watch view: display of OTX variables, break points: interruption of sequences at a defined point, online change of OTX variables during a debugging session
<b>Based on DTS Base System</b>	See separate data sheet: Diagnostic Tool Set 8 – System Overview
<b>Standard Compliance</b>	ISO 13209 Open Test sequence eXchange format (OTX) version 1.0.0 ISO 22901-1/ASAM MCD-2D, ODX V2.0.1. and V2.2.0 (DTS Base System) ISO 22900-3/ASAM MCD-3D, V3.0.0 (DTS Base System)

## Order Numbers

<b>OTX1L+STUDIO</b>	OTX Studio including OTX RT, DTS Base System, OTX editor, compiler, debugger and file differ
<b>OTX1L-ADMIN</b>	Extension package with version control, OTX variant editor, XLIFF export and import
<b>OTX1L-GUI</b>	Add-on for design of graphical interfaces that can be linked to OTX scripts
<b>OTX1L-TCE</b>	Add-on for semi-automated diagnostic protocol and ECU validation tests based on ODX
<b>OTX1L-WIZARD</b>	Wizard-based tool extension for convenient and modular creation of OTX scripts
<b>OTX1L-SIGCREATE</b>	Add-on for creating certificates and signing OTX scripts
<b>OTX1L-SIGCHECK</b>	Add-on for signature checking during runtime in the OTX RT runtime environment
<b>OTX1L-API-RT<sup>(1)</sup></b>	License for accessing the API of the OTX RT runtime integrated in OTX Studio with user applications
<b>OTX1L+RT<sup>(2)</sup></b>	Single license for stand-alone OTX runtime environment including API access (OTX1L-API-RT)
<b>OTX1L-API-DK</b>	API Developer Kit for application development including API documentation and programming examples for OTX Studio, DTS-COS, DTS Automation or DTS Monaco
<b>OTX1S-DK-START</b>	Start package for OTX Runtime API developer kit with max. 20 h instruction and application support by telephone/ e-mail/ web conference or in person at Softing in Haar incl. one-on-one handover and documentation briefing
<b>DTS8S-CRYPT-SETUP</b>	Initial setup for OEM-specific encryption of runtime data (one-off costs per OEM)
<b>DTS8L-CRYPT-[OEM]</b>	Reading and writing OEM-specific encrypted runtime data (requires one-off DTS8S-CRYPT-SETUP)
<b>OTX1L-MSP<sup>(3)</sup></b>	Maintenance and support package including support and regular software upgrades
<b>OTX1L-UPG</b>	Upgrade package for customers without maintenance and support agreement
<b>S-DONGLE</b>	Micro USB license dongle, as an alternative to licensing on a hardware interface

<sup>1,2</sup> OTX1L-API-DK and OTX1S-DK-START must be ordered with each first user license

<sup>3</sup> Maintenance package does not include major upgrades (e.g. upgrade to a new software generation)