CANoe .MOST
Product Information
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This document presents the CANoe .MOST application areas of analysis, stimulation/simulation, testing and diagnostics and enumerates their individual functions. The document contains a short overview of additional application areas and cross-area functions.

Product information and technical data for CANoe and the LIN and FlexRay options are presented in separate documents.
Introduction to CANoe .MOST

MOST, the bus system for on-board infotainment applications, is available in three variants that are also known as speed grades:

- MOST150 is the latest variant, widely applied by OEMs like VW, Audi, Daimler, Volvo and others.
- MOST50, with twice the bandwidth of MOST25 and electrical transmission, is less commonly used.
- MOST25, was the first speed grade introduced in 2001, which is based on transmission by fiber optic conductors. It has been largely replaced by MOST150.

CANoe Option .MOST gives you a tool for simulating, analyzing and testing of MOST systems, which is independent of the speed grade. This makes it possible to migrate from one speed grade to the next without any significant additional training effort. Proven development and test processes can be preserved.

MOST25 can be used by customers already owning a VN2610 as interface. MOST50 is supported with a third party interface.

![Figure 1: Main windows of Option .MOST](image-url)
The primary application areas of CANoe .MOST are the following:

### Interactive Analyses and Tests

CANoe .MOST supports you in interactive analyses and tests of MOST systems with an easy to operate user interface. In several specialized windows, various aspects of a MOST system are shown in an easy to understand way, and they can also be influenced online as necessary.

### Automation of ECU Tests

The integrated CAPL programming language offers a way to automate many analysis tasks. Besides increasing efficiency in performing analyses, you also attain high reproducibility of results. In addition, you can use these analyses in offline mode and apply them to previously recorded log files.

Beyond these automated analyses, ECU tests can also be automated, which is a special strength of CANoe .MOST. You can use the Test Feature Set to conveniently define test sequences, e.g. sequences for sending MOST messages to stimulate your ECUs. The test sequence then waits for reactions from your ECU, and after evaluating them it automatically generates a report with test results. For individual component tests, the necessary network services are provided which extend to the capability of a remaining bus simulation.

### Simulation

CANoe .MOST also provides you with the infrastructure needed to simulate MOST devices or functions.

Along with creating a complete remaining bus simulation, CANoe .MOST lets you test for proper start-up of a device with individual device tests with little effort.

2 Interactive Analyses and Tests

CANoe .MOST lets you analyze all of the MOST data. Along with receiving the control and asynchronous channels, you can also receive synchronous data and MOST150 Ethernet packets (MEP). In addition, you have access to all hardware and network states such as Light & Lock and Configuration Status.

CANoe .MOST offers you all of the analysis functions that are available in CANalyzer .MOST (see separate product information).

Examples:

- In the Trace Window, you can observe the data sent over the control channel and asynchronous channel in MOST messages. For a clear representation, this data is interpreted with the help of the function catalog. Segmented data transmitted over AMS or the MOST High Protocol can also be displayed with the integrated Combiner. Color highlighting of events based on static properties or dynamic analysis results makes it easier for you to visualize the analysis of communication on the MOST ring. Various search and filter options offered directly in the Trace Window can assist you in efficiently finding the desired information from the displayed data.

- The MOST System Viewer shows the MOST system with its ring structure and gives you an overview of the distribution of function blocks on your ECUs. Along with various statistical information, you can read off the loads of individual devices on the Retry Indicator.

- The MOST FBlock Monitor gives information on the states of ECU applications. The view is built up with each additional piece of information transmitted over the MOST ring, without requiring any configuration effort by the user. But you can also get specific information on application states by setting the relevant notification in your ECU directly from the MOST FBlock Monitor.
Figure 2: Trace Window with structured parameter display and filter configuration

Figure 3: MOST System Viewer shows ring structure with distribution of function blocks and statistical information
To interactively influence the MOST system, you have such options as the following:

> You can use the MOST Interactive Generator to send MOST messages and message sequences. Simply select them from the XML function catalog, set the parameters to the desired values and stimulate the ECU application at the click of a button.

> You can create panels to control your multimedia devices which let you efficiently perform testing tasks or serve as a prototype for user interfaces.

> The MOST Stress window lets you generate bus load on the control and asynchronous channels or load your system with sequences of unlocks.
Figure 5: MOST Interactive Generator based on the function catalog and addressing by the address handler

Figure 6: Stimulation from the Stress Window or from panels
3 Automation of ECU Tests

3.1 Automated Analyses

You can automate analysis of the system with the help of the CAPL programming language. A CAPL node inserted in the Measurement Setup reacts to MOST messages and system events. For example, it can be used to monitor timings or sequences and compute characteristic communication values. You can have a CAPL program show the results in panels, highlight messages in the Trace Window, or write the results to files. Unlike user controlled visual analysis in the Trace Window, this process is always reproducible.

In offline mode, you can use the same analysis programs to analyze pre-recorded log files. In addition, you can define conditions which immediately interrupt the analysis run when they occur in offline mode. This gives you the option of playing even very large log files and analyzing specific critical situations in the Trace Window at your convenience.

3.2 Functional and Integration Tests

The Test Feature Set (TFS) for MOST lets you implement, execute and evaluate test sequences easily.

- Using CAPL test modules, you can stimulate the MOST ring and wait for reactions from MOST devices, system events or user actions. You define MOST messages using the syntax defined in the MOST specification. Input assistance based on the function catalog supports you here.

- XML test modules serve to configure frequently recurring test patterns, which you can supplement by CAPL programming as necessary. The clear structure of the modules makes it easier for you to automatically generate extensive test suites from your test or system descriptions.

Figure 7: CAPL test script with MOST syntax for describing messages
In both types of test modules, the tool supports you so that you can focus on the development of the actual tests. Reporting is largely automatic. CANoe .MOST monitors many MOST typical requirements in background.

To stimulate or measure reactions, along with the MOST communication, various I/O modules may be used, or laboratory devices can be controlled, e.g. via GPIB.

For individual device tests, CANoe .MOST offers a comprehensive run-time environment for proper start-up and shut-down of the device under test – through its integrated network services, the NetworkMaster and PowerMaster.

4 Simulation

You can create simulations in CAPL, C++ or MATLAB/Simulink and have them run in CANoe .MOST. CANoe .MOST offers complete network services and transport protocols, as well as system management modules (NetworkMaster, PowerMaster and ConnectionMaster) to ensure that you can focus on the development of the application behavior.

You can first use the integrated bus simulator without any real hardware to evaluate initial concepts or test scripts.
5 Other Application Areas

5.1 MOST High Protocol (MHP)

CANoe .MOST offers you extensive MHP support:

- The MHP protocol observer shows you, even in the case of segmented transmissions, a disassembly of the application data in the Trace Window. Moreover, it outputs specific references to protocol violations. In CAPL nodes in the Measurement Setup, you also have access to the outputs of the Protocol Observer; this lets you automate MHP and application analyses.

- The automatic MHP receiver lets you poll extensive ECU data via AMS and receive the response via MHP without having to implement a MHP data sink.

- The MHP modeling library lets you simulate data sources and sinks (DSO & DSI) and feed specific errors into the communication as necessary.

![Figure 9: MHP transmission with disassembled application data](image)

5.2 Access to the Synchronous Channels

CANoe .MOST enables access to the synchronous area of MOST. With this access capability CANoe .MOST covers a whole series of application cases in the area of streaming of multimedia data. This is described in detail in the application note MOST Synchronous Channel Access.

In the case of MOST25, independent of the Synchronous Boundary Control (SBC) that is set, all synchronous channels can be transmitted via USB to the computer, and in the other direction the computer can feed into the ring. In the case of MOST150, selection of the synchronous channels to be transmitted is via the Connection Labels.
6 Cross-area Functions

6.1 Gateway Functionality

CANoe .MOST is also the right tool for your gateway development. Efficient prototyping, analysis of gateway propagation times and testing of signal routing are all possible without difficulty.

Furthermore, option MOST may be combined with any of the options for CAN, LIN, FlexRay and IP. For example, you can select which bus systems to access according to your precise needs.

The time stamps of the events of all buses are precisely synchronized, and so they reference a common time base.

For example, if MOST is combined with CAN, you can view the messages of both bus systems in a Trace Window in chronological order and analyze the interrelationships. With analysis scripts, which then also have simultaneous access to CAN and MOST messages and system states, you can define automated start-up times, measure gateway propagation times or verify the signal routing algorithms of your gateway.

Figure 10: Trace of a gateway measurement

6.2 Diagnostic Functionality

The Diagnostic Feature Set of CANoe .MOST lets you conveniently select, parameterize and execute your ECU’s diagnostic services. Moreover, during your test you can view all of the diagnostic trouble codes (DTCs) in symbolic representation and delete the error memory as necessary. You can also incorporate the same diagnostic sequences in your test contents and automate them with scripts.

These functional features are available to you, regardless of whether diagnostic access to your ECU is via CAN, MOST or Ethernet. For example, since the CAN-MOST gateway is unavailable to you until later phases, you can initially execute the tests directly over MOST and reuse the created CAPL scripts for later diagnostics over CAN. Access by diagnostics over Internet protocol (DoIP) can also be performed via your ECU’s Ethernet port or over the Ethernet channel of MOST150 (MEP).

The Diagnostic Feature Set is simply parameterized by ODX, MDX or the CANdela database (CDD). You can use CANoe.DiVa to have test cases automatically generated from the same diagnostic description to achieve comprehensive test coverage of the diagnostic contents.