Product Information CANoe.MOST
Table of Contents

1 Introduction to CANoe.MOST ................................................................. 3
2 Interactive Analyses and Tests ............................................................... 4
3 Automation of ECU Tests ........................................................................ 7
3.1 Automated Analyses ............................................................................ 7
3.2 Functional and Integration Tests .......................................................... 7
4 Simulation ............................................................................................... 9
5 Other Application Areas .......................................................................... 9
5.1 MOST High Protocol (MHP) ................................................................. 9
5.2 Compliance Tests ................................................................................ 9
5.3 Access to the Synchronous Channels ..................................................... 10
6 Cross-area Functions .............................................................................. 10
6.1 Gateway Functionality ......................................................................... 10
6.2 Diagnostic Functionality ...................................................................... 10
7 Miscellaneous ........................................................................................ 11
7.1 Feature Matrix .................................................................................... 11
7.2 Services ............................................................................................... 11

Documentation Note

Valid for CANoe.MOST 8.0

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 about 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.
1 Introduction to CANoe.MOST

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

- MOST25, which is based on transmission by fiber optic conductors, has been implemented in over 100 production models since its introduction in 2001.
- MOST50, with twice the bandwidth and electrical transmission, has also been in production for years now, and additional vehicles are in planning.
- MOST150 will be introduced to production cars shortly at German OEMs VW, Audi and Daimler.

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.

![Figure 1: Main windows of option MOST](image)

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, filter configuration and commented message
Figure 3: MOST System Viewer shows ring structure with distribution of function blocks and statistical information.

Figure 4: MOST FBlock Monitor as shadow of the Audio Disk Player.
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 press 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.

![MOST Interactive Generator](image)

*Figure 5: MOST Interactive Generator based on the function catalog and addressing by the address handler*
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.
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 runtime 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.

![MHP transmission with disassembled application data and protocol violations](image)

5.2 Compliance Tests
To test for MOST25 compliance, Core Compliance Tests are available to users with a maintenance contract.

At this time, Core Compliance Tests have been implemented for MOST specification versions 2V2, 2V3 and 2V4. The so-called “source and sink” tests are supplied with the purpose of better transparency, and they offer a simpler option for making adaptations in source code.

Moreover, Profile Compliance Tests are also available for connection management.

For more detailed information on the current availability of other tests or on the latest errata sheets, please contact the product manager at: MOST@vector.com
5.3 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 PC, and in the other direction the PC 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 clear 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.
7 Miscellaneous

7.1 Feature Matrix

Note: User operation and the range of features offered are largely uniform for MOST25, MOST50 and MOST150, but they may deviate from one another in certain details.

<table>
<thead>
<tr>
<th>MOST feature</th>
<th>MOST25</th>
<th>MOST50</th>
<th>MOST150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control channel</td>
<td>Node/Spy</td>
<td>Node/Spy</td>
<td>Node/Spy</td>
</tr>
<tr>
<td>CMS</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>AMS</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Asynchronous channel</td>
<td>Node/Spy</td>
<td>Node/Spy</td>
<td>Node/Spy</td>
</tr>
<tr>
<td>Raw packets</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>MOST High Protocol (MHP)</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Ethernet channel (MEP)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>Node/Spy</td>
</tr>
<tr>
<td>System States (Light, Lock, System Lock, etc.)</td>
<td>yes¹</td>
<td>yes</td>
<td>yes¹</td>
</tr>
<tr>
<td>Electrical Control Line (ECL)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>yes</td>
</tr>
<tr>
<td>Audio/Synchronous channels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allocation Table</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>LineIn/LineOut</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>S/PDIF in/Out</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Streaming from/to PC</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Isochronous channels</td>
<td>n.a.</td>
<td>n.a.</td>
<td>no</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus load: control channel</td>
<td>100%</td>
<td>yes²</td>
<td>yes</td>
</tr>
<tr>
<td>Bus load: asynchronous channel</td>
<td>100%</td>
<td>yes²</td>
<td>yes</td>
</tr>
<tr>
<td>Bus load: Ethernet channel</td>
<td>n.a.</td>
<td>n.a.</td>
<td>yes</td>
</tr>
<tr>
<td>Unlock generator</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Bypass toggle</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Buffer blocking</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Logging</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control channel, asynchronous channel, Ethernet, system states</td>
<td>BLF, ASC, IMG³, OP², CCO³, CC³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronous channels</td>
<td>BIN, WAV</td>
<td>no</td>
<td>BIN, WAV</td>
</tr>
<tr>
<td>Hardware interface</td>
<td>VN2610</td>
<td>MOCCA compact</td>
<td>VN2640</td>
</tr>
</tbody>
</table>

¹ Precise Stable Lock and Critical Unlock is defined in VN2610 and VN2640
² Using CAPL programs with limited bus load generation via the hardware interface
³ Does not contain all channels; for more precise information refer to owner of the proprietary format

7.2 Services

Our [projects and services experts](#) can quote you customer-specific solutions for CANoe.MOST.
Get more Information!

Visit our Website for:
> News
> Products
> Demo Software
> Support
> Training Classes
> Addresses

www.vector.com