

Feature Matrix Version 20.2.1

CANoe DE / CANoe TBE

Products, Editions and Variants at a Glance

Desktop Edition (DE)

CANoe DE is the comprehensive software tool for the development of entire ECU networks as well as individual ECUs and is primarily designed for the automotive sector and related industries.

The comprehensive functions for simulation, testing, analysis and diagnostics support network designers, development and test engineers at OEMs and suppliers.

Test Bench Edition (TBE)

CANoe TBE is available for the execution of tests at test and production stations. The Test Bench Edition enables remote access and execution in a real and virtual environment.

The feature set is identical to CANoe DE.

Server Edition (SE)

Customized Server Editions are available for the Desktop Editions. They enable fully automated execution of configurations in a server-based CI/CT environment and support real and simulated networks.

Further information on our Server Editions can be found on our website.

Variants

The following program variants are available for CANoe DE and CANoe TBE for dedicated applications:

> **/pex**

The **project execution** variant provides a graphical user interface exclusively. Simulation, test cases and results are easily controlled without the need to specifically evaluate the underlying messages.

> **/run**

The **runtime** variant is suitable for users who want to quickly and easily test their ECU in interaction with a specified remaining bus simulation. Configurations cannot be changed, analysis functions are fully available and network nodes can be easily connected and disconnected.

> **/pro**

The **professional** variant is intended for users who want to take advantage of the full range of CANoe functions. Simulation models can be created with CAPL and .NET. Test cases are easy to model with the Test Feature Set.

System Requirements

Component	Recommended	Minimum
CPU	> CPU with x86-64 Instruction Set from Intel or AMD (e. g. Intel Core i9 Raptor-Lake or AMD Ryzen 9 9900)*** > ≥ 16 cores	> CPU with x86-64 Instruction Set from Intel or AMD (e.g. Intel Core i7 or AMD Ryzen 7 9700)*** > ≥ 4 cores
Memory (RAM)	≥ 64 GB	≥ 32 GB
Hard Disk Space	8 GB NVMe	8 GB SSD
Screen Resolution	4K	Full HD
Operating System*	> Windows 10 64-bit (≥ version 1803) > Windows 11 64-bit (≥ version 21H2) > Windows Server 2022 Standard** > Windows Server 2025 Standard** * Not virtualized. Running in a virtual machine is possible but not tested. Operation with Vector hardware may be affected by virtualization (e.g., higher latencies may occur). ** Test Bench Edition only. No other licenses possible. Use only as a single-user computer. No server operation with multiple users possible. *** CPUs with ARM Instruction Set are not supported.	

General Data on the Number of Channels and Supported Bus Systems as Well as Their Network Description Formats

Several different bus systems can be analyzed and stimulated simultaneously with one configuration. The specific network description files are supported directly.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Number of configurable A429 channels ¹	64r	64	64
Number of configurable AFDX® channels ¹	4r	4	4
Number of configurable CAN channels	255r	255	255
Number of configurable Ethernet channels respectively Ethernet networks ¹	32r	32	32
Number of configurable FlexRay clusters ¹ (with 2 FlexRay channels)	32r	32	32
Number of configurable J1708 channels (J1587) ¹	32r	32	32
Number of configurable K-Line channels ¹	32r	32	32
Number of configurable LIN channels ¹	255r	255	255
Number of configurable V2X channels (IEEE 802.11p and/or 3GPP C-V2X PC5) (Car2x) ¹	32r	32	32
DBC databases (A429, AFDX®, CAN, CAN FD, CANopen, ISO11783, J1708/J1587, J1939) ¹	✓ r	✓	✓
LDF databases (LIN) ¹	✓ r	✓	✓
FIBEX databases (CAN, Ethernet, FlexRay) ¹ Supported format versions: 2.0, 3.x (CAN, FlexRay), 4.0 (Ethernet)	✓ r	✓	✓
Car2x databases (Car2x) ¹	✓ r	✓	✓
CANdb++ Editor (A429, AFDX®, CAN, CAN FD) ¹ Create and display DBC files	✓ r	✓ r	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
AUTOSAR System Descriptions (CAN, CAN FD, CAN XL, Ethernet, FlexRay, LIN) ¹ Supported format versions: 3.x, 4.x	✓ r	✓	✓
AUTOSAR System Descriptions (J1939) ¹ Supported format versions: 4.2.2, 4.3.x	✓ r	✓	✓
AUTOSAR System Description Network Explorer Pro (CAN, CAN FD, FlexRay) ¹ Display and modify AUTOSAR files for CAN and FlexRay	—	✓	✓
AUTOSAR System Description Network Explorer View (CAN, CAN FD, FlexRay) ¹ Display ASR files for CAN and FlexRay	✓	—	—
Import of ASN.1 descriptions into Car2x databases¹	—	—	✓
Car2x Network Explorer¹ Display and configuration of Car2x databases	✓	✓	✓
Car2x Certificate Management in Vector Security Manager¹ Configuration, import, and export of certificates and private keys	—	✓	✓
Car2x Certificate Generator in Vector Security Manager¹ Generation of certificates and private keys	—	—	✓
Vector Aerospace Message Editor (A429, AFDX) ¹ Conversion of Interface Control Document (ICD) files into DBC files. Create and edit AFDX messages, ARINC words and CAN messages according to ARINC 825. Library with standardized ARINC-429 words for selection and export to DBC format.	✓ r	✓	✓

Functions for Bus Analysis and Monitoring

The extensive functions support online analysis. In addition it is also possible to perform offline post-analysis of recorded logging files.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Variable Measurement Setup Central configuration of analysis windows and logging	—	✓	✓
Measurement Setup Import Reuse of Measurement Setups from other CANoe configurations (complete or individual branches)	—	✓	✓
Trace Window Detail, Difference and Statistics views for displaying the time flow of events	—	✓	✓
Statistic Window (AFDX®, CAN, CAN FD, CAN XL, Ethernet, FlexRay, LIN) ¹ Display bus statistics on the node or frame level	—	✓	✓
Bus Statistic Window Display of bus statistics at channel level	✓ r	✓	✓
Trigger (A429, AFDX®, CAN, CAN FD, CAN XL, FlexRay, ISO11783, J1939, LIN) ¹ Control data logging	✓ r	✓	✓
Data Window Momentary display of bus signals and system variables	—	✓	✓
Graphics Window Graphic display of signal responses	—	✓	✓
Video Window Record and play back video files.	✓ ¹⁴	✓	✓
Video Window extension for ADAS (ADAS) ¹ Visualization of ADAS objects	✓ ¹⁴	✓	✓
Oscilloscope Window (Scope) (CAN, CAN FD, CAN XL, FlexRay, LIN, PSI5, SENT, 10BASE-T1S) ^{1, 5} Display of physical bus level and logical interpretation	—	✓	✓
State Tracker Display of system states, discrete values and CAN, CAN FD, CAN XL frames/bursts	—	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
LIN Analysis Feature Set¹ Special CAPL functions for LIN-specific bus analysis	✓ r	✓ r	✓
FlexRay Cluster Monitor¹ Display of statistics and bus activities of a FlexRay cluster	—	✓	✓
Filter in Measurement Setup (A429, AFDX®, CAN, CAN FD, CAN XL, Ethernet, FlexRay, ISO 11783, J1708/J1587, J1939, LIN) ¹ Permanent removal of data in a branch of the Measurement Setup	—	✓	✓
Analysis Filter in the Trace Window Temporary reduction of displayed data	—	✓	✓
Channel Filter Reduce the displayed data	✓ r	✓	✓
Variables Filter Reduce the displayed data	✓ r	✓	✓
Offline Mode Replay a logged measurement	—	✓	✓
Data Export Use the logged data in other programs: *.csv, *.mat (MATLAB), *.mdf, *.pcap, *.pcapng	✓	✓	✓
Protocol Monitor (Ethernet) ¹ Display of connections between endpoints	—	✓	✓
Scene Window (ADAS) ¹ Visualization of ADAS objects	—	✓	✓
Parameter Monitor (J1708/J1587) ¹ Display of all sent parameters in a J1587 network	✓ r	✓	✓
Scanner (CANopen, ISO 11783, J1939) ¹ Display details of network nodes	✓ r	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
GNSS Monitor (ISO 11783, J1939) ¹ Display of position data, additionally a third dimension may be indicated by means of color. The GNSS Monitor can be synchronized with other analysis windows.	✓ r	✓	✓
Car2x Station Manager (Car2x) ¹ Central unit to manage ITS Stations, especially for the assignment of received messages to ITS stations	✓ r	✓	✓
Protocol Analyzer (Car2x, SmartCharging) ¹ Checks protocol-specific contents and displays results	—	✓	✓
Map Window Displays position data. The Map Window can be synchronized with other analysis windows	—	✓	✓
Map Window – Extensions for Car2x (Car2x) ¹ Displays ITS stations and events	—	✓	✓
Car2x Certificate Explorer (Car2x) ¹ Display and export of received and configured certificates	—	✓	✓

Functions for Stimulation, Simulation and Modeling

Extensive functions are available for stimulating and simulating networks. Interactive generators make it possible to spontaneously stimulate, for example. OEM-specific auxiliary packets also let you automatically generate complete remaining bus simulations. For more in-depth information on available OEM support, please contact Vector sales.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Interactive Generator – A429 (ARINC 429) ¹	✓ r	✓	✓
Interactive Generator – AFDX (ARINC 664 / AFDX®) ¹	✓ r	✓	✓
Interactive Generator – AUTOSAR PDU (AUTOSAR - CAN, CAN FD, CAN XL, Ethernet, FlexRay, LIN) ¹	✓ r	✓	✓
Interactive Generator – CAN (CAN, CAN FD, CANopen, J1939) ¹	✓ r	✓	✓
Interactive Generator – Ethernet (Ethernet) ¹	✓	✓	✓
Interactive Generator – J1587 (J1708/J1587) ¹	✓ r	✓	✓
Signal Generator (A429, CAN, CAN FD, CAN XL, Ethernet (AUTOSAR PDUs), FlexRay, LIN) ¹ Configuration of signal curves	✓ r	✓	✓
Application Panel Interactive stimulation and display of application layer objects	✓	✓	✓
Create/execute graphic command sequences with the Visual Sequencer (A429, CAN, CAN FD, LIN) ¹	—/✓	✓ /✓	✓ /✓
Macros Tool automation	✓ r	✓	✓
Start Value Window Values that are set on measurement start can be preassigned for symbols	✓ r	✓	✓
.NET Snippets Tool automation	✓ r	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
LIN Interactive Scheduler¹ Simulation of a LIN master	✓ r	✓	✓
LIN Node Simulation¹ (Master/Slave)	✓ r	✓ r	✓
LIN Network Management Window¹	✓	✓	✓
Replay Replay a logged measurement in parallel to a running simulation	✓ r	✓	✓
FlexRay Frame Panel¹ Offers an easy way to send out frames	✓ r	✓	✓
FlexRay PDU Panel¹ Offers an easy way to send out frames	✓ r	✓	✓
System Variables Variables with global validity, can be applied to all analysis windows and logging	✓	✓	✓
Symbol Mapping to link symbols	✓ r	✓	✓
Simulation Setup Symbolic display of the network	✓ r	✓ r	✓
Communication Setup	✓ r	✓ r	✓
Access to application layer objects Distributed objects and communication objects	✓	✓	✓
Model design/generation/execution from the network description	—/— /✓	—/— /✓	✓ /✓ /✓
Execute Simulation Models Simulation modes: Real Bus, Simulated Bus (as fast as possible/animated with factor)	✓	✓	✓
Modeling libraries (e.g. transport protocol, interaction layer, network management, OEM-specific extensions)	✓ r	✓ r	✓
Modeling library for SOME/IP node simulation (Ethernet) ¹ Simulation of SOME/IP network nodes	✓ r	✓ r	✓
Modeling library for sensor and object simulation (ADAS) ¹	✓ r	✓ r	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Modeling library for TSN (AVB) node simulation (Ethernet) ¹ Simulation of Stream Talker and Listener including AVTP, RTP, gPTP, clock master and slave	✓ r	✓ r	✓
Modeling library for node simulation (ISO 11783) ¹ Simulate the Virtual Terminal Server/Client, Task Controller Server/Client, File Server Server/Client, Tractor ECU, Aux, TIM Server/Client	✓ r	✓ r	✓
Modeling library for GNSS simulation (ISO 11783, J1939) ¹	✓ r	✓ r	✓
Modeling library for J1939 node simulations with interaction layer (ISO 11783, J1939) ¹	✓ r	✓ r	✓
CANopen¹ node simulation Simulate the object directory, SDO Servers/Clients, network management, PDO communication	✓ r	✓ r	✓
Modeling library for node simulation with interaction layer (Car2x) ¹ Simulation of ITS Stations	✓ r	✓ r	✓
Function library for sending and receiving packets (Car2x) ¹	✓ r	✓ r	✓
Packet Builder (Car2x, Ethernet) ¹ Create and send packets	✓ r	✓	✓
Virtual Terminal (ISO 11783) ¹ Simulate a Virtual Terminal	✓ r	✓	✓
Interactive Task Controller (ISO 11783) ¹ Access the process data	✓ r	✓	✓
File Server (ISO 11783) ¹ Simulation of an FS server	✓ r	✓	✓
GNSS Simulator (ISO 11783, J1939) ¹ Simulation of position data	✓ r	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Scenario Editor Creation of Car2x/V2X and ADAS traffic scenarios, e.g. as basis for simulations utilizing the Car2x interaction layer or the ADAS vCDL API (ADAS, Car2x) ¹	—	✓	✓
MQTT (Client and Broker) Simulation, analysis, monitoring and error injection of devices via the MQTT protocol	✓ r	✓ r	✓
HTTP (Client and Server) Simulation, analysis, monitoring and error injection of devices via the HTTP protocol	✓ r	✓ r	✓
Modbus (Client, Server and Gateway) Simulation and analysis of devices via the Modbus protocol	✓ r	✓ r	✓
gRPC (Client, Unary Requests) Simulation and analysis of devices via the gRPC protocol	✓ r	✓ r	✓
DDS Simulation, analysis and monitoring of devices via the DDS protocol	✓ r	✓ r	✓
SDC Simulation, analysis and monitoring of devices via the SDC protocol	✓ r	✓ r	✓
BT/BLE Central and Peripheral mode (GATT and L2CAP layer), pairing, HCI tracing und injection	✓ r	✓ r	✓
NFC/UWB Reader and Card/Tag mode (ISO 7816 APDU), UCI interface for Initiator and Responder mode	✓ r	✓ r	✓

Extending the Range of Functions for Analysis, Simulation and Testing by Integrated or External Programming Capabilities

CAPL as an internal programming language offers flexible options for extending the range of functionality for extensive analysis and stimulation tasks. Furthermore, the Visual Sequencer is used to graphically create command sequences.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
CAPL programming/execution/debugging	—/✓/—	—/✓/—	✓/✓/✓
Bus access with CAPL functions (A429, AFDX, CAN, CAN FD, CAN XL, Ethernet, FlexRay, ISO11783, J1708/J1587, J1939, LIN) ¹	✓	✓	✓
Create/execute graphic command sequences with the Visual Sequencer	—/✓	—/✓	✓/✓
Bus access with the Visual Sequencer (A429, CAN, CAN FD, LIN) ¹	✓ r	✓	✓
C Library C-API for developing application-specific code	✓ r ²	✓ r ²	✓
.NET programming (C#) For implementing application models and tests.	✓ r	✓ r	✓
Python Programming For implementing application models and test units.	✓ r	✓ r	✓
Ethernet TCP/IP Stack Support (Ethernet) ¹	✓	✓	✓

Panels for Extending the Graphic User Interface

It is possible to create your own graphic panels that can be used for display, control or stimulation.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Create panels Panels can be created, modified, added and removed.	—	✓	✓
Execute panels Panels can be executed at runtime.	✓	✓	✓
.NET panel elements	✓	✓	✓

Test Support — Test Feature Set

Tests, that are always reproducible, can be executed automatically. Automated report generation and integration of special test hardware is also supported.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Visual Sequencer Graphically create test sequences	—	✓	✓
Bus access with the Visual Sequencer (A429, CAN, CAN FD, LIN) ¹	✓ r	✓	✓
LIN Stress Interactive Generator ¹ Send frames and errors	—	✓	✓
LIN Disturbance ¹ Disturb the LIN bus traffic	—	✓	✓
LIN Stress Feature Set ¹ (CAPL) Stimulation with different protocol errors	✓	✓	✓
Integrated LIN Slave Conformance Tests ¹	✓ r	✓ r	✓
Test Setup for Test Units Organize and configure test units	✓ r	✓ r	✓
Test Trace Observe and analyze tests during the test run	✓ r	✓ r	✓
Test Setup for Test Modules Organize and configure test modules	✓ r	✓ r	✓
Test Feature Set (TFS), Test Service Library (TSL) Reproducibly execute (semi-)automated tests	✓ r	✓ r	✓
Test Report Viewer format (*.vtestreport)	✓ r	✓ r	✓
J1939 Compliance Test Unit (J1939) ¹ Automatic execution of J1939 conformance tests defined in SAE J1939-82 (2015)	✓ r	✓ r	✓
REQM/TDM Integration Interface to the requirements system	✓ r	✓ r	✓
VIO System support	✓	✓	✓
VT System support	✓	✓	✓

Transport Protocol Support, Diagnostic Support, Supported Protocols — Diagnostic Feature Set (CAN, Ethernet, FlexRay, LIN)

All phases of the development and use of diagnostics in ECUs are supported – both via standard description files (CDD, ODX, MDX) and via basic diagnostics.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
TP Observer (CAN, CAN FD) ¹ TP observer according to ISO 15765-2	—	✓	✓
TP Observer (Ethernet) ¹ TP observer supporting IP (incl. fragmentation) and TCP	—	✓	✓
AVTP Observer (Ethernet) ¹ In conjunction with the Media Stream Control for audio and video output, currently supporting AAF and CVF protocols	—	✓	✓
TP Observer (FlexRay) ¹ TP observer according to ISO 10681-2, AUTOSAR FlexRay and BMW FlexRay	—	✓	✓
TP Observer (ISO 11783, J1939) ¹ TP observer according to BAM, CMDT and Fast Packet	—	✓	✓
Support of DoIP (Diagnostics over internet protocol, also encrypted via TLS), HSFZ (High-Speed-Fahrzeugzugang) and DoSoAd (Diagnostics over AUTOSAR Socket Adaptor)	✓ r	✓	✓
K-Line For Vector hardware with LINpiggy	✓ r	✓	✓
Diagnostic Protocols (KWP2000, UDS)	✓	✓	✓
Diagnostic Observer ⁴ Symbolically interpret diagnostic messages	—	✓	✓
Diagnostic Tester ⁴ Consists of Diagnostic Console, Diagnostic Session Control and Fault Memory Window	—	✓	✓
Diagnostic Simulation	✓ r	✓ r	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Diagnostic Window⁸ Consists of the diagnostic features Diagnostic Console, ECU Control, Fault Memory and Variant Coding	—	✓	✓
Diagnostic Parameters Window⁸	✓	✓	✓
Integrated OBD-II tester⁴	—	✓	✓
Diagnostics with CAPL¹	✓ r	✓ r	✓
Basic Diagnostics Diagnostic support without description file	✓ r	✓	✓
ODXStudio View and CANdelaStudio View¹ Display diagnostic description files (ODX/PDX/CDD)	—	✓	✓
VDS Library .NET diagnostic scripting for CANoe, CANape and Indigo	✓	✓	✓
Option DiVa^{4, 5} (DiVa — Diagnostics Integration and Validation) Generates test modules or test units automatically from a diagnostic description and add the corresponding DiVa project to a CANoe configuration	✓ r	✓ r	✓
DTC Monitor (ISO 11783, J1939) ¹ Display error codes	✓ r	✓	✓
Diagnostic memory access (ISO 11783, J1939) ¹	✓ r	✓	✓
OBD Inspection and Maintenance Monitor (J1939) ¹ Emissions-related diagnostic functionalities	✓ r	✓	✓
DC Monitor (J1708/J1587) ¹ Evaluate transmitted error codes (DC)	✓ r	✓	✓

Extension of Functional Range by Integration of Other Interfaces or Additional Options

The combination with different systems is supported. This makes it possible to perform such tasks as driving auxiliary measurement hardware, or integrating MATLAB/Simulink models in the simulation.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
CAPL DLL Implement your own functions in C	✓ r	✓ r	✓
Distributed Mode Realtime extension for extended latency and jitter requirements	✓ r	✓ r	✓
ERT – Extended Real Time Improves latency, and determinism of CANoe and CANape with supported hardware	✓ r	✓ r	✓
I/O hardware interface Link analog/digital measurement hardware from third-party suppliers	✓	✓	✓
GPIB support Access to external measuring instruments	✓	✓	✓
IOpiggy support	✓	✓	✓
COM Interface Automation interface for remote control	✓	✓	✓
FDX (Fast Data Exchange) UDP/IP based protocol for fast data exchange with external systems	✓	✓	✓
MATLAB Integration and Model Viewer Integrate Simulink models in the simulation	✓ r	✓ r	✓
LabVIEW Interface Data exchange with LabVIEW via shared network variables/COM/FDX	✓ r	✓ r	✓
Functional Mock-up Interface (FMI) Integration and Export of FMU files. Supported versions: FMI 1.0 and FMI 2.0	✓ r	✓ r	✓
CarMaker Interface Data exchange with CarMaker	✓ r	✓ r	✓
Option Scope⁵ (CAN, CAN FD, CAN XL, FlexRay, LIN, PSI5, SENT, 10BASE-T1S) ¹ Integration of USB oscilloscope hardware from PicoTech	—	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Option Sensor ⁵ Simulation of sensors and ECUs plus Test Feature Set integration	✓	✓	✓
Option AMD/XCP ⁵ Read or write to memory locations in the ECU and analysis of ECUs	✓ r	✓	✓
Option SmartCharging Analysis, simulation and testing of the communication between electric vehicle and charging station	✓ r	✓ r	✓
GNSS Visualize and log the vehicle's position	✓ ¹⁵	✓	✓
TCP/IP socket access in CAPL	✓ r	✓ r	✓
RS232 access in CAPL	✓	✓	✓
SIL Kit Framework for coupling different simulation tools	✓ r	✓ r	✓

CANoe Option AMD/XCP

Option AMD/XCP is used to access internal ECU parameters by write or read access. The ECU parameters are represented as system variables and can therefore be used in all analysis windows as well as in testing.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
XCP/CCP Window for configuration	—	✓	✓
XCP/CCP Window for controlling XCP connections and measuring values	—	✓	✓
Online access to internal ECU values in RAM over XCP on CAN/CAN FD, XCP on Ethernet (TCP and UDP), XCP on FlexRay, XCP on LIN and CCP (For CCP/XCP on CAN, XCP on FlexRay and XCP on LIN the respective bus options are required)	✓ r	✓	✓
Measurement methods: DAQ, Fast Polling, Polling, on connect, Single Shot Upload over CAPL	✓ r	✓	✓
Measuring with ECU time stamp for DAQ	✓	✓	✓
Writing of variables in ECU RAM via download	✓	✓	✓
Writing of variables in ECU RAM via STIM over XCP on CAN/CAN FD and Ethernet	✓ r	✓	✓
Supports ASAM MCD-2 MC (A2L) databases up to version 1.71	✓ r	✓	✓

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Support of scalar CCP/XCP data types (UBYTE, SBYTE, UWORD, SWORD, ULONG, SLONG, UINT64, SINT64, FLOAT32_IEEE, FLOAT64_IEEE)	✓	✓	✓
Complex CCP/XCP data types: multi-dimensional arrays, STRING, CURVE, MAP, STRUCTURE (supported axis types: COM_AXIS, SHARED_AXIS, FIX_AXIS)	✓	✓	✓
Secure access via Seed & Key (DLL and SKB format)	✓	✓	✓
Parallel access to multiple ECUs	✓	✓	✓
Address Update for ECU symbols from Linker Map file	✓	✓	✓
Address Update for ECU symbols from the ECU at runtime (generic measurement)	✓	✓	✓

Option For EtherCAT

With the Option For EtherCAT it is possible to use EtherCAT compliant EtherCAT MainDevices or SubDevices. This makes it possible to integrate EtherCAT SubDevices from other manufacturers into a project or test system.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
ETG (EtherCAT Technology Group) compliant EtherCAT MainDevice (2 MainDevice instances / EtherCAT networks can be operated in parallel)	✓	✓	✓
Configuration of EtherCAT networks	—	✓	✓
Support of EtherCAT SubDevice Information Files (.esi) and Network Information and Variable Description Files (.eni)	✓	✓	✓
Diagnostics of EtherCAT networks	✓	✓	✓
Access to input and output PDOs of the EtherCAT SubDevices via system variables	✓	✓	✓
Parallel operation of EtherCAT networks and VT System	✓	✓	✓

Option Scope

Option Scope is an integrated oscilloscope solution based on an USB oscilloscope hardware. With bus-specific trigger conditions and the integrated time synchronization, you can find the cause of protocol errors much faster than with any traditional oscilloscope.

Funktion	CANoe DE /run /pro & TBE			
	CAN	CAN FD	LIN	FlexRay
Automatic configuration of sampling rate and acquisition time (according to baudrate)	✓	✓	✓	✓
Bit-accurate decode of bus signal	✓	✓	✓	✓
Complete decode of protocol errors (e.g. CAN, CAN FD, CAN XL, 10BASE-T1S Error Frames)	✓	✓	✓	—
Trigger conditions for frames and protocol errors	✓	✓	✓	✓
Trigger modes "single" and "repeat"	✓	✓	✓	✓
Full import/export of scope measurements for offline analysis	✓	✓	✓	✓
Export of scope measurement data to ASCII (CSV) or MATLAB format (MAT)	✓	✓	✓	✓
CAPL interface for automatic scope test including report creation (available with CANoe Test Feature Set)	✓	✓	✓	✓
Eye diagram analysis with bitmasks defined via CAPL (available with CANoe Test Feature Set)	✓	✓	✓	✓
CAPL measurement functions for bus signal voltage and time difference (e.g. bit time) (available with CANoe Test Feature Set)	✓	✓	—	—
Serial bitmask analysis with definable analysis ranges	✓	✓	✓	✓
Complete edge analysis for rising and falling edges	✓	✓	✓	✓
CAPL-controlled configuration of the oscilloscopes	✓	✓	✓	✓

Option Sensor

The Option Sensor enables a variety of applications related to the analysis, simulation and testing of sensors and control units. Among other things it is possible to:

- > Record and analyze the communication between ECUs and sensors.
- > Simulate sensors in order to test the functions of an ECU.
- > Simulate ECUs to test sensors.

Option Sensor is not required for I2C, SPI and UART.

Feature	CANoe DE				
	PSI5	SENT	SPI	I2C	UART
Sensor configuration dialog for uniform configuration of sensor communication	✓	✓	✓	✓	✓
Analysis of sensor communication with the CANoe analysis windows	✓	✓	✓	✓	✓
Sensor simulation	✓	✓	✓	✓	✓
Sensor simulation via BLF logging file	✓	✓	—	—	—
Simulation of the control unit side of sensor communication	✓	✓	✓	✓	✓
CAPL API to realize continuous data flows	✓	✓	✓	✓	✓
Serial hardware module VT2710	✓	✓	✓	✓	✓
Piggyback for VT2710: 4 PSI5 or 4 SENT channels	✓	✓	—	—	—
SENSORPiggy SENT for VN1640A and VN1500 family	—	✓	—	—	—
Support for LVDS and RS-485	—	—	—	—	✓
SENSORPiggy UART for VN1670 and VN1150	—	—	—	—	✓

Option SmartCharging

Option SmartCharging simulates the communication behavior of electric vehicles (EV), charging stations (EVSE) or charging station management systems (CSMS). This provides a flexible counterpart for ensuring functionality during the development of charging ECUs and backends. The standards DIN 70121, ISO/IEC 15118 (both require Option Ethernet), GB/T 27930 (requires Option J1939), CHAdeMO and OCCP are supported.

Feature	CANoe DE & TBE		
	/pex	/run	/pro
Analysis of communication between e-vehicle and charging station Interpretation of messages in the Trace Window	—	✓	✓
Simulation of electric vehicle (EV) and charging station (EVSE)	✓	✓ r	✓
Automatic or manual sending and receiving of messages possible (DIN 70121 / ISO 15118)	✓	✓ r	✓
Support of SLAC and V2G protocols (DIN 70121 / ISO 15118)	✓	✓	✓
Monitoring function (DIN 70121 / ISO 15118) Output of selected message contents in system variables	✓	✓ r	✓
Transport Layer Security (TLS) via Security Manager (ISO 15118 PnC) TLS communication with automatic encryption/decryption and support for Public Key Infrastructure (PKI) and certificate management	✓	✓	✓

Standalone

Option	CANoe DE & TBE	
	Basic	Extended
A429	—	✓
ADAS	—	✓
AFDX	—	—
AMD/XCP	✓	✓
CAN	✓	✓
CANopen	✓	✓
Car2x	—	✓
Connectivity	✓	✓
DDS	—	✓
DiVa	—	✓
Ethernet	—	✓
Basic Ethernet	—	✓
FlexRay	—	✓
For EtherCAT*	—	—
ISO11783	✓	✓
J1587	✓	✓
J1939	✓	✓
LIN	✓	✓
Scope	—	—
SDC	✓	✓
Sensor	✓	✓
SmartCharging	—	✓

*The license for Option For EtherCAT must be activated additionally if required.

Legend

Symbol	Description	Symbol	Description
✓	(several times) available	7	With restricted hardware assortment (see Distributed Mode: Configuration Requirements). VN8900: only IOpiggy is supported.
r	Runtime only (the configuration cannot be changed)	8	The actual functional range depends on your product variant.
—	Not available	9	This feature is not supported by VN8900.
1	This function requires the noted bus system extension or additional options. All bus system extensions are individually available and may be used in any combination. Additional CAN bus based options such as CANopen or J1939, require the bus option for CAN.	10	—
2	Due to restricted debugging possibilities Distributed Mode should be used as a runtime environment for additional DLLs but not for developing them.	11	Only BLF is supported.
3	VN8900: only NI adapters are supported.	12	VN8900: via USB adapter.
4	The Diagnostic Feature Set is based on the CANdela diagnostic process and requires CANdela description files (CDD) or ODX files.	13	The standalone mode has the same restrictions as the used product variant.
5	Additional product that is not included in the standard delivery.	14	Runtime only (Video sources and recordings can be configured, Video Window not available)
6	Only available in the send branch (not in the Measurement Setup).	15	Runtime only (GNSS receivers can be configured, Map Window not available)