

CANdelaStudio

User-friendly Tool for Specifying Diagnostic Data

What is CANdelaStudio?

The specification tool CANdelaStudio is a central component of the Vector CANdela solution and supports users in creating and editing a formal vehicle ECU diagnostic specification.

Once a diagnostic specification has been created, it is used for the following process steps and increases thereby the consistency in the entire diagnostic development process:

- > Implementing the diagnostic software
- > Automated conformity tests of the diagnostic software
- > Data supply for the various diagnostic testers in development, manufacturing and the service garage
- > Starting point for test sequences in diagnostic testers in production and the service garage

Overview of Advantages

- > Import and export from/to different exchange formats (ODX, AUTOSAR DEXT, CSV, RTF, HTML, A2L, XML, CDI) simplify reuse and further use of data

- > The user is guided by a templates concept. Despite differences in requirements, the diagnostic data is always described in a similar structure, even for different automotive OEMs. This enables reusability across projects.
- > Consistency checks during input assure high data quality
- > Diagnostics-oriented user interface assure quick results
- > Support of different protocols on different networks (UDS, KWP2000, OBD, WWH-OBD, CAN, CAN FD, LIN, MOST, FlexRay, DoIP)

Functions

In order to handle OEM-specific differences in a single tool, CANdelaStudio supports document templates. A document template corresponds to an OEM-specific diagnostic specification in content. It contains a formal description of all allowable basic services of the ECU and the set of mandatory content that must be implemented for every ECU. Document templates are provided by many automotive OEMs.

The screenshot displays the CANdelaStudio interface for editing Diagnostic IDs (DIDs). The main window shows a list of DIDs with columns for Identifier, Name, Diagnostic Class, Us..., and DID Data. Below this, a detailed view for 'Data of Wheel Speed' is shown, including a table of bit positions and their corresponding data types and descriptions.

Identifier	Name	Diagnostic Class	Us...	DID Data
0x0100	Braking	Dynamic Data	no	Brake Pedal, Brake Pressure, Status Hydraulic Pump, Valve Status FR, Valve Status FL, Valve Status RR, Valve Status RL
0x0107	Supply Voltage ECU	Dynamic Data	yes	Voltage ECU
0x0109	Wheel Type	Variant Coding	no	Wheel type
0x010A	Wheel Speed	Dynamic Data	yes	Wheel Speed FR, Wheel Speed FL, Wheel Speed RR, Wheel Speed RL, Wheel Voltage FR, Wheel Voltage FL, Wheel Voltage RR, Whee...
0x010B	Acceleration Sensor	Dynamic Data	no	Voltage, Acceleration
0x010C	Hydro Unit	Dynamic Data	no	Valve Voltage FR, Valve Voltage FL, Valve Voltage RR, Valve Voltage RL, Valve Status FR, Valve Status FL, Valve Status RR, Valve Status RL
0x010D	Brake Pedal	Dynamic Data	yes	Valve Voltage FR, Valve Voltage FL, Valve Voltage RR, Valve Voltage RL, Valve Status FR, Valve Status FL, Valve Status RR, Valve Status RL
0x010E	Brake Pressure	Dynamic Data	no	Brake Pressure
0x010F	Hydraulic Pump	Dynamic Data	no	Hydraulic Pump Voltage, Status Hydraulic Pump, Hydraulic Pump Performance
0x0111	Inflation Pressure	Dynamic Data	no	Inflation Pressure FR, Inflation Pressure FL, Inflation Pressure RR, Inflation Pressure RL
0x0112	Service Information	Stored Data	no	Remaining Service Brake Fluid Life, Remaining Service Time Left
0x0113	Yaw Rate Sensor	(none)	no	Voltage, Yaw acceleration
0xF189	Software Version	Identification	no	SoftwareVersion
0xF18C	Serial Number	Identification	no	SerialNumber

Byte No.	Bit Pos.	Name	Data Type	Default	Constant	Description
0		Wheel Speed FR	RPM (1 Byte)			
1		Wheel Speed FL	RPM (1 Byte)			
2		Wheel Speed RR	RPM (1 Byte)			
3		Wheel Speed RL	RPM (1 Byte)			
4		Wheel Voltage FR	Voltage (1 Byte)			
5		Wheel Voltage FL	Voltage (1 Byte)			
6		Wheel Voltage RR	Voltage (1 Byte)			
7		Wheel Voltage RL	Voltage (1 Byte)			
8		Direction of rotation	HexDump (1 Byte)			
	0	Direction Of Rotation FR	Direction of rotation (2 Bit)			
	2	Direction Of Rotation FL	Direction of rotation (2 Bit)			
	4	Direction Of Rotation RR	Direction of rotation (2 Bit)			
	6	Direction Of Rotation RL	Direction of rotation (2 Bit)			

CANdelaStudio: DID editing with graphical overview

- > **Compare View:** Shows changes between two versions and saves the results. Many convenient filter, search and extended navigation functions are offered.
- > **Import and export of diagnostic trouble codes (DTCs) in a wide variety of formats**
- > **Different views of diagnostic trouble codes:** From a table-based overview to a view of the validity of DTCs in different variants and a detailed editing view for an individual DTC.

Highlights of Version 15

AUTOSAR

- > Comfortable creation and editing of function inhibitions by events (e.g. window lifter short-circuit to battery). Can also be used for the configuration of the AUTOSAR FIM module.
- > Simplification using DEXT import: data transfer from process partners is now also possible without a CANdela document

Diagnostic Instances

- > Direct and clear display and editing of diagnostic object properties in a subwindow
- > Multiple selection allows convenient modification of several objects
- > Flexible and quick display of many services in the fault memory

Data Types

- > Support for UTF-8 strings
- > Support of array data types larger than 64kB e.g. for image pixel data via UDS or snapshot data of several 100KB

Data Exchange and Reports

ODX

- > Import from ODX (2.2, 2.0.1), as well as export to ODX (2.2, 2.1, 2.0.1)
- > Extensive optional settings in ODX export (e.g. table or service oriented)
- > Partial import of ODX data, e.g. only Layers and Services
- > ODXStudio View for viewing ODX data
- > Intelligent support of Object IDs (OID) and Text IDs (TID)

Reports

- > Diagnostic specification export (RTF, HTML)
- > Service overview export (CSV file)

CANdb and FIBEX

- > Adoption of signals and conversion into data objects and DTCs

AUTOSAR

- > Simple import of signals and conversions from an AUTOSAR System Description
- > Export function for generating the AUTOSAR Diagnostic Extract (DEXT files). The exported files correspond to the "Diagnostic Extract Template" according to AUTOSAR Classic Version 4.2.2 to 4.4.0 or AUTOSAR Adaptive.
- > Automated linking of CANdela objects with corresponding objects in the AUTOSAR System Extract (SYS-EX)

Editions

CANdelaStudio Standard

Providing all important functionalities that are needed for diagnostic specification. The template concept is utilized to automatically link the diagnostic data to be exchanged (e.g. ECU identification, reading and clearing of errors) to the diagnostic services offered.

Target group: All active participants in the diagnostic process should use CANdelaStudio Standard.

CANdelaStudio ViewX

With the well-priced CANdelaStudio ViewX edition the user may view, compare (Diff-function), and export, but not modify diagnostic requirements and diagnostic data.

Target group: Authors of test sequences and users of test systems.

CANdelaStudio Pro

The Pro edition supports additionally multilingual requirements engineering. For this purpose semi-automated translation of diagnostic data is supported, which can be consistently edited in one language in the Standard edition. Additionally expandable dictionaries based on the open TMX standard can be generated and used. Besides Western European languages, Far Eastern languages (e.g. Japanese) are also supported.

Target group: International projects and projects where multilingual specifications are required or helpful.

CANdelaStudio Admin

Additionally diagnostic templates can also be created and modified here.

- > Modify protocol services
- > Definition of the fault memory (structure and properties of single DTCs)
- > Modify diagnostic classes by considering diagnostic interdependencies
- > Translation of template files and editing the translation memory with the help of the TMX Editor.

Target group: Users who are responsible for the global diagnostic concept of a group of ECUs or vehicle model series.

More information: www.vector.com/candelastudio_en