Diagnostics | Analysis | Tools

Overview of our Diagnostic Tool Chain

Sontheim Overview

We are your close partner with our innovative portfolio of standardized and customer-specific products and comprehensive support capabilities.

Make your decision a one-stop issue. Every part of our systems is developed, engineered and manufactured in our in-house production and development facilities.

We are working closely together with universities and educational institutions of the region and realise important R&D projects.

We are reinvesting into new technologies, doing pioneers' work in the hardware and software development.

Our driven team of motivated and qualified specialists creates specifically tailored solutions for you.

We are happy to support you in every step of your project – especially our project teams and product manager.

We are certified according to international standards like ISO 9001:2008. In addition to that we are an active member in different industry-related organisations. Our products comply to various standards - you will benefit from normised high quality standards.

Overview of Services

Engineering

We support you from the development phase to integration and support. From the idea, through documentation and production and up to test setups, training courses and seminars you get everything from one source.

Fieldbus

We can use our extensive fieldbus expertise in various branches of the automation and automotive industry. Our focus is particularly on CAN, EtherCAT, Profibus and the protocols used in the automotive sector.

Automotive

With our tools and systems in the automotive sector we offer standard-based solutions in the field of diagnostics, measurement and testing. Our modular systems are future-proof and highly performant.

Automation

Whether you need IO modules, Industrial PCs, PLCs, interfaces or the matching software, with Sontheim you get standardized and customized products in highest quality based on current fieldbus technologies.

Hardware-Development

With us you get everything from one source. We develop modular hardware systems - standard or customized - its your choice.

Software-Development

Our software development provides beside diagnostic and analysis tools, protocol stacks, programming interfaces and software for control, operation and configuration of machines.

Diagnostics

MDT - the innovative and comfortable diagnostic tool chain based on ODX for the flexible creation of individual and complex diagnostic and service applications leaves no wish unfulfilled.

Product Development

As an expert in different fieldbus applications, we can provide you with custom-tailored solutions. We are passionate about all aspects of electronics including hardware, software, firmware and the design of complete systems that meet your specific needs. You benefit from our comprehensive know-how as a system provider and the perfect combination of functional hardware, suitable firmware and modular software.

Electronics Manufacturing Services (EMS)

On our two modern production lines, we manufacture electronic components and systems according to your needs and to the highest standards in quality while maintaining your schedule and optimizing for costs. We stand out for our flexibility; we are capable of producing batches from prototype to series and up to nearly 240,000 units per year.

Analysis, diagnostics & tools

Please find the comprehensive diagnostic tool chain with its different components in this section

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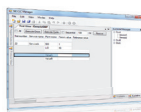
Did you know ...

The MDT is an innovative and comfortable software for creating all kinds of service applications for vehicles up to End-of-Line programming. Another field of application is measuring and analyzing machine data in any machine network, like metering valves, speed or fuel levels. The display options and program procedures are freely configurable. A major advantage is an abstraction of ECU-communication into ODX and an intuitive operating.
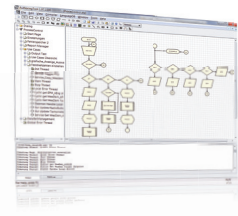
In the area of off-the-highway vehicles MDT is widespread and is used by many large OEMs.
The advantage - own modular diagnostic applications can be developed, integrated and modified quickly.

CANexplorer 4
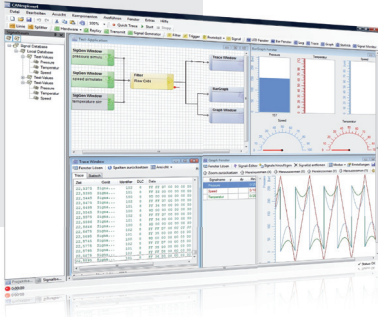
Modular, intuitive, efficient – CANexplorer 4 is a completely new developed fieldbus-analyzing software which represents the huge know-how in working with CAN-networks in complex machines and vehicles. The new generation obtains a significantly enhanced range of functions and an improved handling. This makes the CANexplorer 4 a very intuitive and powerful tool.

Data processing

CANexplorer 4 offers various functions for processing CAN-data, e.g. classical text-based traces, graphs, bar graphs, LEDs, filters and triggers. Generating a test set-up can be carried out by connecting different functional elements via 'Drag & Drop'. This enables the software to consequently display complex processes in a visual and common manner.

Visualization

You can adapt the data visualization by defining triggers and filters. It is also possible to take an active part in the bus communication and generate and transmit messages that are also shown in a visualization. Have your telegrams sent manually, fully automatic or via trigger.

Data abstraction

Use an integrated protocol abstraction for automatically interpreting data to CANopen and J1939. The CAN-data is then available as pre-processed and 'readable' information. Further protocol stacks can easily be added with updates. All proprietary protocols and Raw CAN-data can be processed with a manual symbol editor. This tool is used for defining symbols and translating the payload of a CAN-frame into comprehensible values.

Parallel processes

CANexplorer 4 obtains a multi-thread support for parallel usage next to other applications running on a PC and the visualization of various modules at the same time.

Features

Input

Signal processing	Transmit	Replay and hardware inputs

Processing

Filter	Protocol filter	Trigger

Visualisation

Log	Graph	Trace	Statistic	...

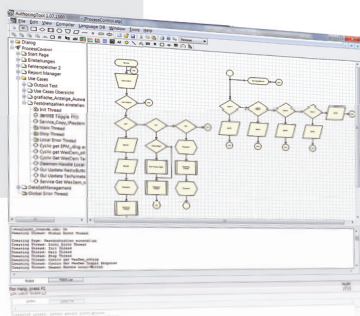| Operating system	Windows 2000 SP4, XP, Vista,7,8 (32 Bit)
CPU	1,6 GHz Intel Pentium
RAM	512 MByte
Graphics	1024 × 768, 16 Mio. colours
Minimum hard disk space	minimum 80 MByte
Supported CAN hardware	CANUSB
	CANfox
	CANUSBlight
	PowerCAN-PCI V1 and V2
	PowerCAN-PC104+
	PowerCAN-PCI104 V2
	Other CAN-hardware available upon enquiry

Features

Receiving and transmitting CAN-messages	Signal generator with different signals (sinus, saw tooth, rectangle)
	Manual transmitting of definable CAN-messages
	Cyclic transmitting of definable CAN-messages
	Transmitting in block mode
Filter	CANexplorer 4 supports filtering for identifier, data bytes, symbols and message types
Trigger	CANexplorer 4 uses pre- and post-trigger
Signal database	Saving of messages in a database as well as visualization via texts and graphic elements for intuitive handling
	Editor for generating and processing of signals (message, multiplexer, key, groups and signal)
	For both data import and export there are various data types supported
Visualisation	Trace, graph, bar-graph, tachometer, symbol-monitor
Data processing	Writing in log-file, replay mode
Protocol support	Raw-CAN, CANopen, J1939, implementation of proprietary protocols upon enquiry
Bus statistic	Overview of transmitted and received messages bus-charge and CAN-levels
Quick trace	Quick monitoring of the CAN-channels without previous creation of a test setup

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Ordering information

MDT Authoring-Tool

The MDT (Modular Diagnostic Tool) is an innovative and comfortable software for creating all kinds of service applications for vehicles up to End-of-Line programming (EoL). Another field of application is measuring and analyzing machine data in any machine network, like metering valves, speed or fuel levels. There are numerous possibilities for visualization and different application flow charts, which enables. A major advantage is an abstraction of ECU-communication into ODX and an intuitive operating of the program without the need for in-depth programming-experience.

Key Features

– Different diagnostic modes depending an experience-level of the user
– Easy adaptation an high flexibility at creating applications due to modular concept
– Pre-defined functions of the program flow blocks
– Different visualisation tools for the user interface
– ODX-editor for creating own ODX-files

Creating an application

Create your diagnostic application in three easy steps:
• Creation of a database via ODX-data and customer-specific data
• Integration of database into your diagnostic project within the MDT Authoring Tool
• Development or modification of your diagnostic project

Intuitive handling

All diagnostic applications and surfaces are created via „Drag&Drop". The vehicle parameters are then visualized via graphs, tachometers, bar graphs etc. The latest release also includes a 3D graph for additional diagnostic perspectives. You can see 3 different layers of your diagnostic values at the same time for a target performance comparison with scan of differences between all values.
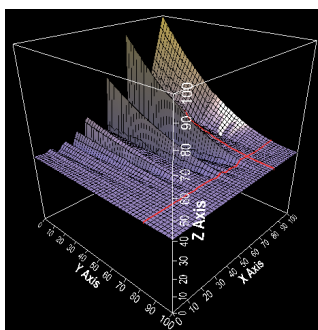
Guided diagnostics

You can access a pool of ECU data without any need for experience with ECU communications. Instead, the user is guided via fault tree to the cause of an error or non-defined status. MDT offers all means for doing in-detail expert diagnostics or guided ones for inexperienced users.

MDT - your personal graphical repair shop

The MDT graphical programming allows service technicians to integrate their field-gained knowledge into the diagnostic application. Again, they don't need programming experiences. This makes the analysis of data and eliminating errors much faster and more intuitive. You can add tool bars, buttons, menus and functions and have them allocated in a way that suits your requirements most. As branding becomes more and more important, you can even adapt it completely according to your Corporate Identity.

MDT Authoring Tool — Technical data

Minimum system requirements of a service device	Intel Pentium III, 750 MHz or higher 256 MB RAM Minimum resolution of 800×600 USB 1.1 or higher
Minimum system requirements of a device for creating service applications	Intel Pentium IV, 2 GHz or higher, 512 MB RAM
Operating systems	Windows 2000, XP, Vista, 7 & 8
Supported CAN-interfaces	COMfalcon, COMhawk, CANUSB, CANfox, wifiCAN, CA-NUSBlight, PowerCAN-PCI V1 und V2, PowerCAN-PC104+, PowerCAN-PCI104 V2
General program structure	Graphical program flow editor for internal data management of a diagnostic page, graphical user interface designer (GUI designer)
Supported standards	CANopen, SAE J2534, SAE J1939, ISO 15765 (KWP2000 on CAN) ODX 2.0.1 Access to Lotus Notes and other databases
Hardware drivers	Windows 2000, XP, Vista, 7 & 8

Convenient multi-user administration

Take advantage of expiring access rights and give time-related permission for function elements to service personnel or contractors. For example, you will be able to define via voucher that a technician gets a timely limited access to ECU flashing applications in addition to the standard diagnostics. That puts you in a position to have situative adaptations and different billing models. In addition to that every user can get updates for applications via FTP that you can configure on your own. The whole process can be fully automatic. Our RP1210B is an interface for abstracting hardware in order to connect a CAN-interface to the vehicle network.

### Support of standard und proprietary protocols

Das MDT supports numerous international protocol layers like CANopen, SAE J2534, SAE J1939, ISO 15765 (KWP2000 on CAN) as well as proprietary and customer-specific protocols. The range of your MDT can therefore be adapted to your individual applications and processes. Finally, we have a broad knowledge in the implementation of third-party protocols.

MDT in action

Specific user-interface

Classical interface with guided diagnostic session
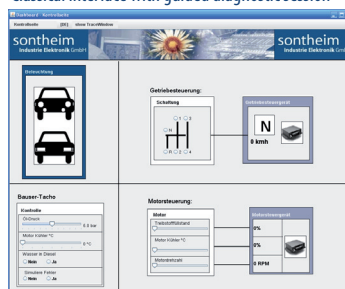
Different means of visualisation

Ordering information

Art.-No.	Description
V940800000	MDT Authoring Tool
V940801000	MDT Authoring Tool maintenance contract
V940802000	MDT runtime license

MDT Service Cloud

– Easy exchange of diagnostic application data (upload and downloads)
– Maintenance of session logs, vehicle record information, HEX files, reports, etc.
– Including server hosting
– High data security through HTTPS logging and SSL/TLS encryption
– Direct connection to the ERP system

Possible usecases

– Remote diagnostics
– Maintenance and integration
– License management
– etc.

The MDT Service Cloud enables a comfortable monitoring and maintenance of diagnostic data. Updates of the diagnostic application can be downloaded and installed via update tool worldwide. Moreover data can also be exchanged and analyzed specifically out of the diagnostic application.

Fast data exchange and update tool

The MDT Service Cloud enables an interactive data exchange of your diagnostic application at any time and from any location. It was implemented for an easier and more effective diagnostic analysis in the Modular Diagnostic Tool (MDT). An Update Tool enables updates of the diagnostic application which can be downloaded and installed. In addition, out of the diagnostic application itself, data can specifically be up- or downloaded. Thus, for example, session logs, vehicle record information, reports, HEX files, etc. can be loaded or saved in the cloud. The transmitted data formats and contents are freely definable.

Automated interface for ERP system

The MDT Service Cloud is a prefabricated system and can be linked directly with the internal ERP system of your company and be adapted and integrated to the requirements of the customer. Thus the required maintenance is significantly reduced and all data exchange and updates can be managed directly from the ERP system. This relieves the administrative burden and allows, among other things a centralized license management and automated processes. Furthermore, the administration of the diagnostic information can also be done manually using an FTP server.

Server hosting for local and in-house infrastructure

Sontheim offers a server hosting, thus there is no additional effort for the user of MDT Service Cloud. This infrastructure can also be used locally or internally to exchange and manage for example data of test rigs or end of line programming.

High data security through HTTPS and SSL/TLS encryption

The safe way to the Internet can lead only through a secured and authenticated connection. Therefore HTTPS logging and encrypted data transfer using a SSL/TLS certificate are used for the MDT Service Cloud. Using the digital certificate the reliability of the server and the connection is ensured. In addition to the encryption also an authentication (user and password) of the client excludes an access by third parties.
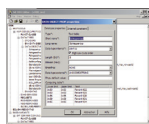
Schematic overview of the MDT Service Cloud

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ERP-System  <-->  MDT Service Cloud  <-->  Update Tool

Development
Aftersales
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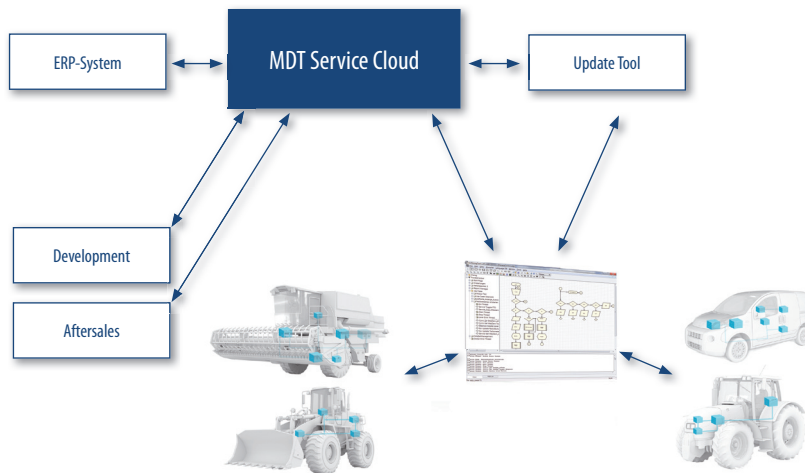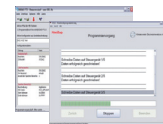
Overview of the MDT toolchain
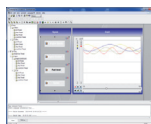
**MDT Authoring System
SiE Setup Tool
MDT Service Cloud**

**CLC Manager &
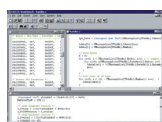ODX-Editor**

CANexplorer 4

**Flash-Tools &
End-of-Line (EOL)**
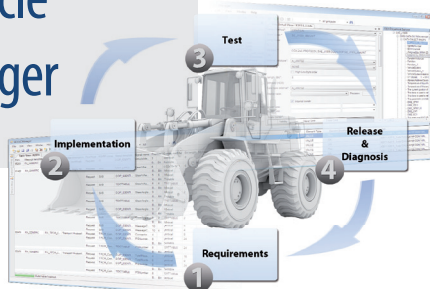
**Protocol-
Stacks**

**ECU Flash- &
Bootloader**

Multithread API

VCI/CAN-Interfaces

Ordering information

Art.-No.	Description
V940810010	MDT Cloud SiE Server
V940810020	MDT Cloud Customer Server
V940810030	MDT Cloud Lizence

CLC-M Communication Lifecycle Manager

CLC-Manager is a development environment for the management of fieldbus-based data. The data format is based on ODX. All functions within the development of applications are covered, starting with the organization of ECU-data, going on to monitoring the physical and logical connections between different ECUs. This way, it is possible to organize, edit and handle the complete lifecycle of communication data.

Data lifecycle

CLC-Manager focusses on a comprehensive visualization and editing of all communication-related processes and definitions in ECUs. The goal is to achieve an acceleration of ECU development as well as a simple and reproducible working with ECU communication data. There are four main areas covered by the software:
- Definition of requirements
- Implementation of data and processes
- Test and evaluation
- Releases and export into diagnostic applications

Requirements

Both a vague definition of the communication interfaces and the vehicle / machine structure are listed in this section. Such a pool of information is kept in a format that is independent from any protocol. It is therefore a data collection for later editing or already a bibliography of device and process data.

Implementation

The implementation section contains all components for ECU software developers and diagnostic authors. There is a project view integrated for editing ODX-files, style sheets and test environments as well as verifying sources. The protocol and vehicle view enables a convenient handling of ECUs and their corresponding communication.

CLC-Manager offers different layers for a better overview and clear picture of the superior and inferior objects in the ECU communication. In addition to that it is also possible to work on software versions, protocols, busses and tasks. A detail and table view provides search fields, navigation tools, copy and paste and other functions for making the work at ECUs convenient and avoiding mistakes.
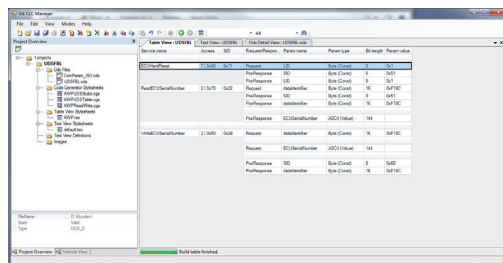
Test

There is a test view integrated for testing the created communication services on the fieldbus. It is also used for verifying specifications and protocols. The user can arrange the test view and content in a way that suits his own setups. Similar to the MDT, the CLC-Manager can be adapted according to individual requirements.

CLC-Manager — Technical data

Minimum system requirements	2 GHz or higher 1 GB RAM Min. resolution of 800×600
Recommended system requirements	3 GHz or higher 2 GB RAM
Supported operating systems	available for Windows XP, Vista & 7
Supported CAN-interfaces	CANUSB, CANfox, CANUSBlight, PowerCAN-PCI V1 and V2, PowerCAN-PC104+, PowerCAN-PCI104 V2

Features

ODX-data	- Description of all vehicle diagnostic data and ECU data in XML - Extended ODX for full description of all communication data - Layer models for avoiding duplicated data - Data abstraction, overwriting, and replicating data via references
Diagnostic services	- Description of diagnostic data like request/response, Param, DataObjectProp, CompuMethod, Unit - Replication via references
Requirements	- Data collection of communication interfaces and vehicle / machine structure - Creation of data independent from protocols
Implementation	- Detailed implementation of interfaces - Import function for .dbc und a2l - Project view for ODX-files, style sheets and Test setups - Detail view for convenient creation of ODX-data - Table view for editing ODX-data even without ODX experience
Test	- Execution of communication processes in a test environment - Creation of test specifications and protocols - Adaptation of the test view via style sheets - Comparison to reference values
Release and diagnostics	- Code-generator for different platforms and programming languages - Diagnostic-interface towards MDT - Document handling via XSLT, data will be converted into .pdf or .doc - Firmware release organisation and history of different firmware versions

Release and diagnostics

Together with the Sontheim MDT the CLC-Manager offers a platform for both development and service tasks at vehicles and machines. The combination of the tools is realized with an easy-to-use software interface. The integrated code generator is used for creating source code independent from operating platforms and programming languages. Moreover, firmware releases and communication data can be exported into .doc and .pdf format for keeping track of the work at ECUs.

CLC-Manager

Different layers within the ECU communication
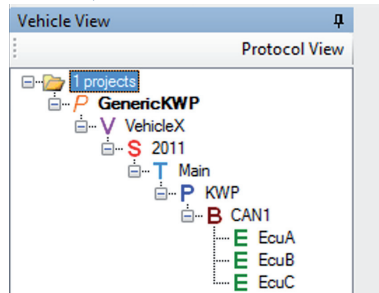
Clearly arranged view of the ECU-data

Test view for simulating communication

Ordering information

Art.-No.	Description
V940820100	CLC - Manager Administrator
V940820150	CLC - Manager Professional
C940821100	CLC - Manager Software-Maintenance Administrator
C940821150	CLC - Manager Software-Maintenance Professional

Options

V940821000	CLC - Manager Code-Generator Module
V940821010	CLC - Manager Diff/Merge Module
V940821020	CLC - Manager Source Code Management-Module
V940821030	CLC - Manager DBC-Import Module RawCAN
V940821040	CLC - Manager DBC-Import Module J1939
V940821050	CLC - Manager Table-View Module

ODX Editor
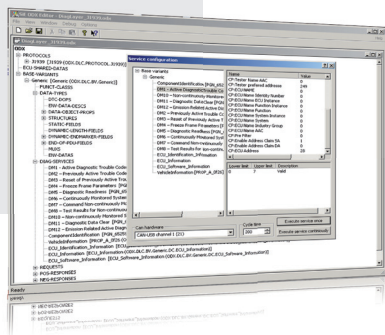
ODX-Editor is a software that completes the range of functions of the MDT Modular Diagnostic Tool. It is used for abstracting ECU parameters and visualizing existing ODX-data. The software is compliant with ASAM MCD-2D V2.0.1.

Monitoring

ODX-data is created and edited with the help of a graphical user interface. The software monitors all adherence to rules for creating valid data and it facilitates the writing of texts.

User support

The ODX-Editor is made for handling and processing ODX-data for diagnostic applications. All parameters of an ECU are transferred into a database, including communication parameters like baud rate and ECU ID, for which you can adjust both access and protocol specification. In order to support the user in the process of verifying the created data, ODX-Editor can check the validity by calling a connected ECU and displaying the return value.

ODX-Editor	Technical data
System requirements	Intel Pentium IV, 2 GHz or higher 512 MB RAM
Supported operating systems	Windows 2000, XP, Vista, 7 & 8
Supported CAN-interfaces	CANUSB, CANfox, CANUSBlight, Power-CAN-PCI V1 und V2, PowerCAN-PC104+, PowerCAN-PCI104 V2
Overall program structure	Integrated module for executing ODX-services
Supported standards	CANopen, SAE J2534, SAE J1939, ISO 15765 (KWP2000 on CAN) ODX 2.0.1 Access to Lotus Notes databases
Hardware-drivers	Windows 2000, XP, Vista,7 & 8

Ordering information

Art.-No.	Description
V940820000	ODX-Editor
V940821000	ODX-Editor Maintenance

Flash-Tool

As part of the Sontheim diagnostic tool chain, the Flash-Tool is designed for flashing single ECUs in a vehicle.

Support of protocols and microcontrollers

This tool enables a download of applications, flash loaders and other data - based on the KWP2000 communication protocol. However, its multi-protocol support also facilitates the use of other protocols like CANopen, SAE J1939 and customer-specific or proprietary protocols. In addition to that there are numerous 8, 16 and 32 Bit microcontrollers supported like Infineon, Motorola, Fujitsu Siemens, Philips ARM7 and Atmel ARM9 as well as TriCore-based ECUs.

Operation

In order to guarantee the highest possible operating comfort, there are various "Look and Feel" elements implemented. The flash process itself can be set to either guided or automatic mode.

Modular design

With its modular design the Flash-Tool can be equipped individually, fitting its functions and user-interface exactly to your requirements. Besides Intel and Motorola Hex-format there is support for proprietary formats available upon request. Another benefit for you is a programming of binary data if needed.
All configuration files that have been read and created by the Flash-Tool are saved in XML-format for further editing.

Flash-Tool	Technical data
Bus systems	CAN Additional bus systems upon enquiry
Protocols	KWP2000 CANopen ISO 15765 (Diagnostics on CAN) J1939 Raw-CAN Other protocol upon enquiry
Microcontroller-support	Infineon SAK C167 family Philips ARM7, ARM9 family Motorola Fujitsu Siemens Atmel TriCore-based ECUs Other microcontrollers upon enquiry
Format-support	Intel Hex-Format Motorola Hex-Format
System requirements	Windows 2000/XP, 700 MHz CPU, 256 MB RAM

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Ordering information

Art.-No.	Description
V940840000	SiE Flash-Tool (KWP 2000)

Vehicle-Simulator

Specifically designed for training and education purposes, the vehicle simulator facilitates a very practical and descriptive know-how transfer in the area of ECU communication. The users are trained at an operational device in vehicle electronics, ECUs, diagnostics, end-of-Line programming (EoL), CAN-bus and SAE J1939

Comprehensive simulation functions

The Sontheim simulator offers numerous functions for creating a broad understanding of the vehicle CAN-bus. There are switches and displays of the ignition, the electronics with lighting and power supply as well as a dashboard on the simulator available. You can adjust all of the vehicle functions via jumpers, slide controls or within the software that comes along with the device. All possible error conditions can be simulated for an in-dept training at the CAN-bus in connection with different ECUs in vehicles.

Hard- and software diagnostics

Besides the hardware controls, the user can define error conditions and solutions to that via Sontheim diagnostic software MDT. Depending on the knowledge of the user, you can choose between guided analysis or expert analysis. The software shows for each error the corresponding vehicle behavior and is also suited for a virtual-only simulator version. A very useful feature for you might also be the validation and simulation in the prototype construction.

| Vehicle Simulator	Technical data
Components	
CANUSB 2x CAN, CANUSB-cable	Interface PC / Simulator
MDT Runtime license	Software for MDT vehicle diagnostic applications
Diagnostic application	Specifically created application
CANexplorer 4	CAN-Bus diagnostic software
Modules	
Power supply and communication	Battery, ignition, voltage control, dashboard and ECU control
Motor and gearbox	Motor engine speed, gear, speed, fuel level, cooler temperature
Dashboard	Analogue values, digital values, CAN-based messages and values
Lighting	ECU-control, lighting ECU

Ordering information

Art.-No.	Description
V930242100	Vehicle Simulator
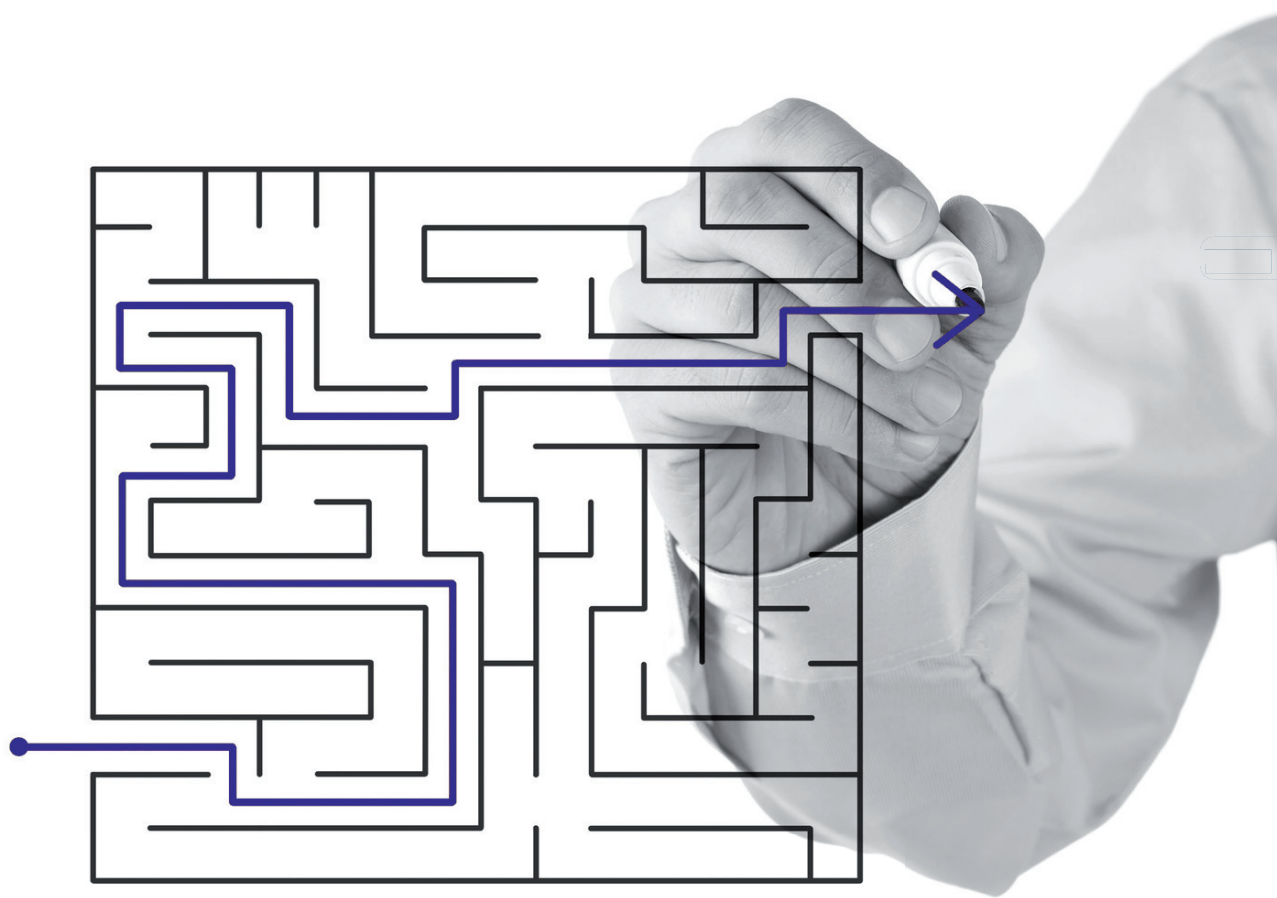
Legal information

Contact:

DE **Sontheim Industrie Elektronik GmbH**
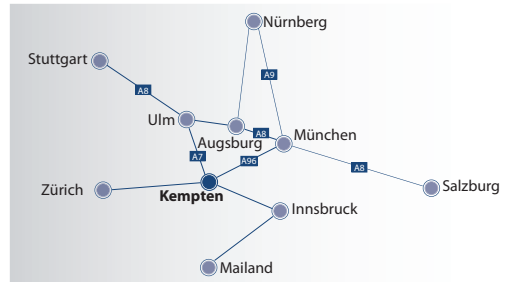Georg-Krug-Strasse 2 · 87437 Kempten - Germany
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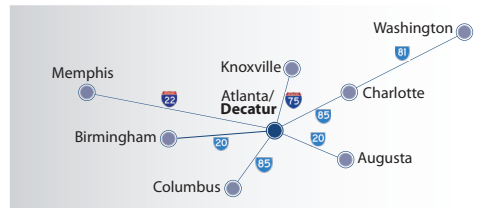
Visit our website or follow us on Facebook or Xing and do not miss any news about Sontheim:
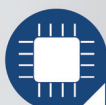
Sontheim Overview and Portfolio:

Engineering

Fieldbus

Hardware-
Development

Software-
Development

Diagnostics

Automation

Automotive

Production

Service

We are looking forward to your enquiry. For a personal advice and
detailled information please refer to our specialists:

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