



RA CONSULTING

RA Consulting GmbH DiagRA MCD Toolset

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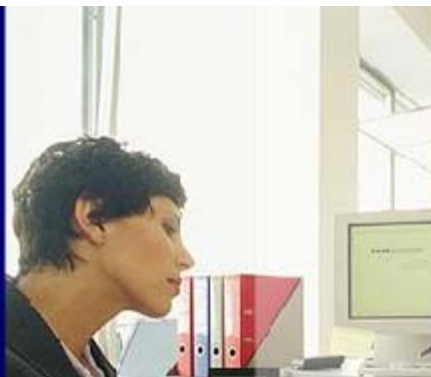
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Measurement, Calibration and
Diagnostics on ASAM standards

Lübbe Onken
2007





ASAM AE (Automotive electronics)

MCD1 protocols

- CCP
- XCP

MCD2 description

- D (Diagnostic Overview Document and Diagnostic Data Specification)
ODX
- MC (Standardized Description Data)
Asap 2, A2L Files

MCD3 automation

- Diagnostic Application Programmers Interface Specification

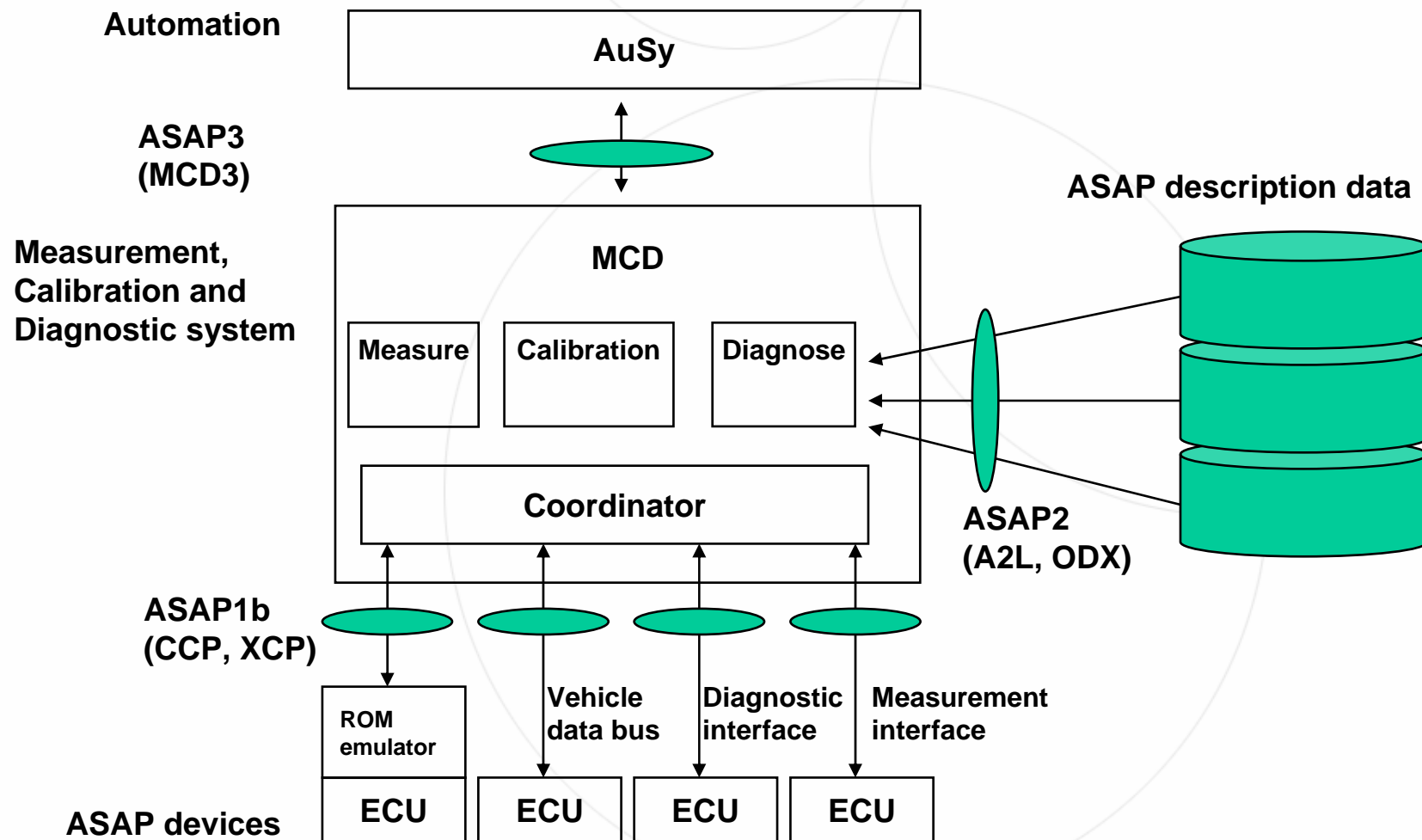
CARB standards

- OBD Scan Tool
- J1699 compliance test



Diagnostic interfaces: ASAM / ASAP2

MCD: Interface for description and integration of control and automation systems





Standards compliant toolset for Measurement, Calibration and Diagnostics

Protocols:

- XCP and CCP for Measurement and Calibration
- UDS, KWP, GMLAN, J1939, ... for Diagnostics

Description:

- A2L and ODX for Diagnostics & Calibration
- A2L for Measurement

Automation

- Asap 3 for Diagnostics

Certification

- J1699 Compliance test



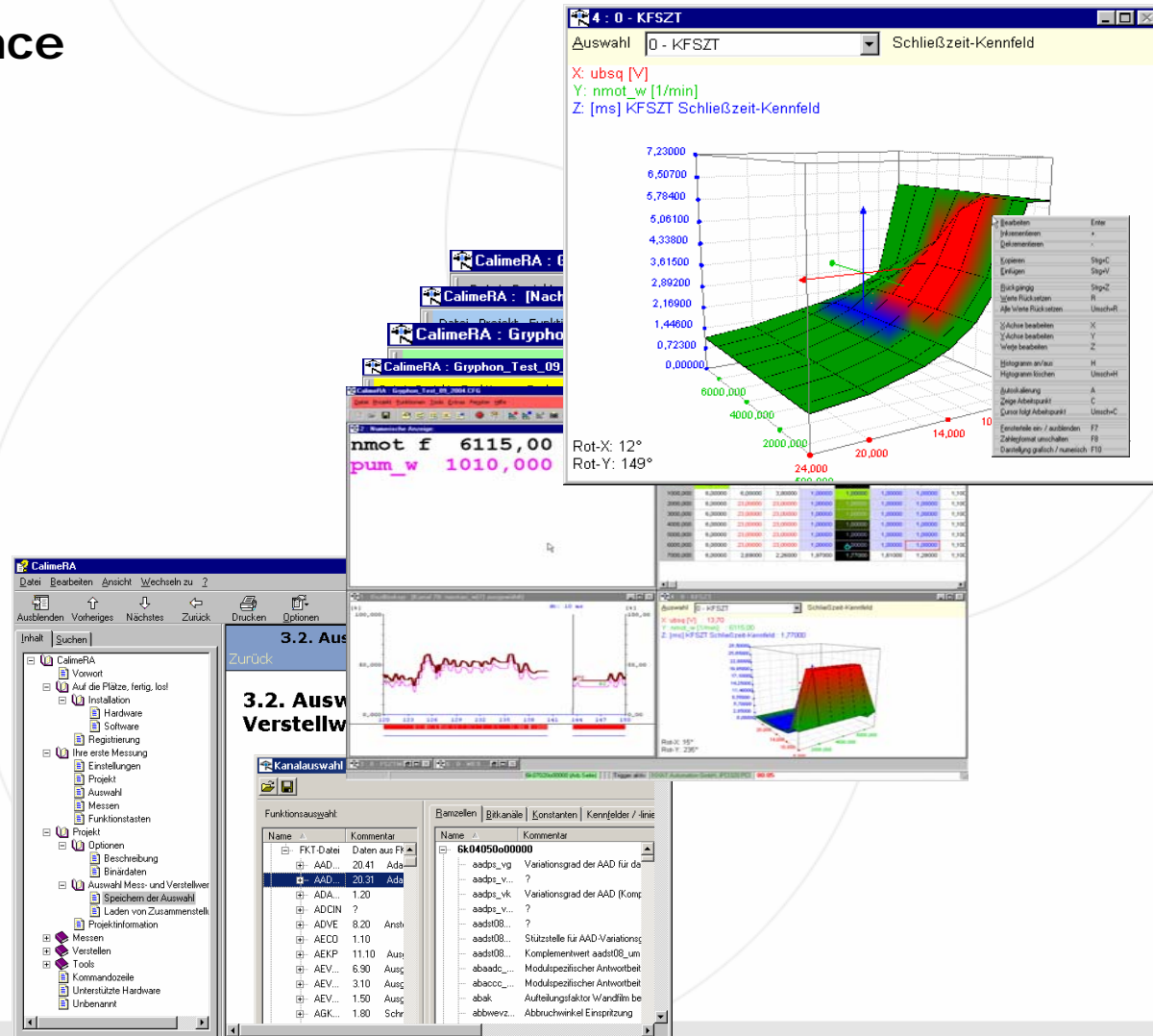
DiagRA MCD Toolset - Concept -

Testing Expo 2007

Standards compliance

Short set-up time

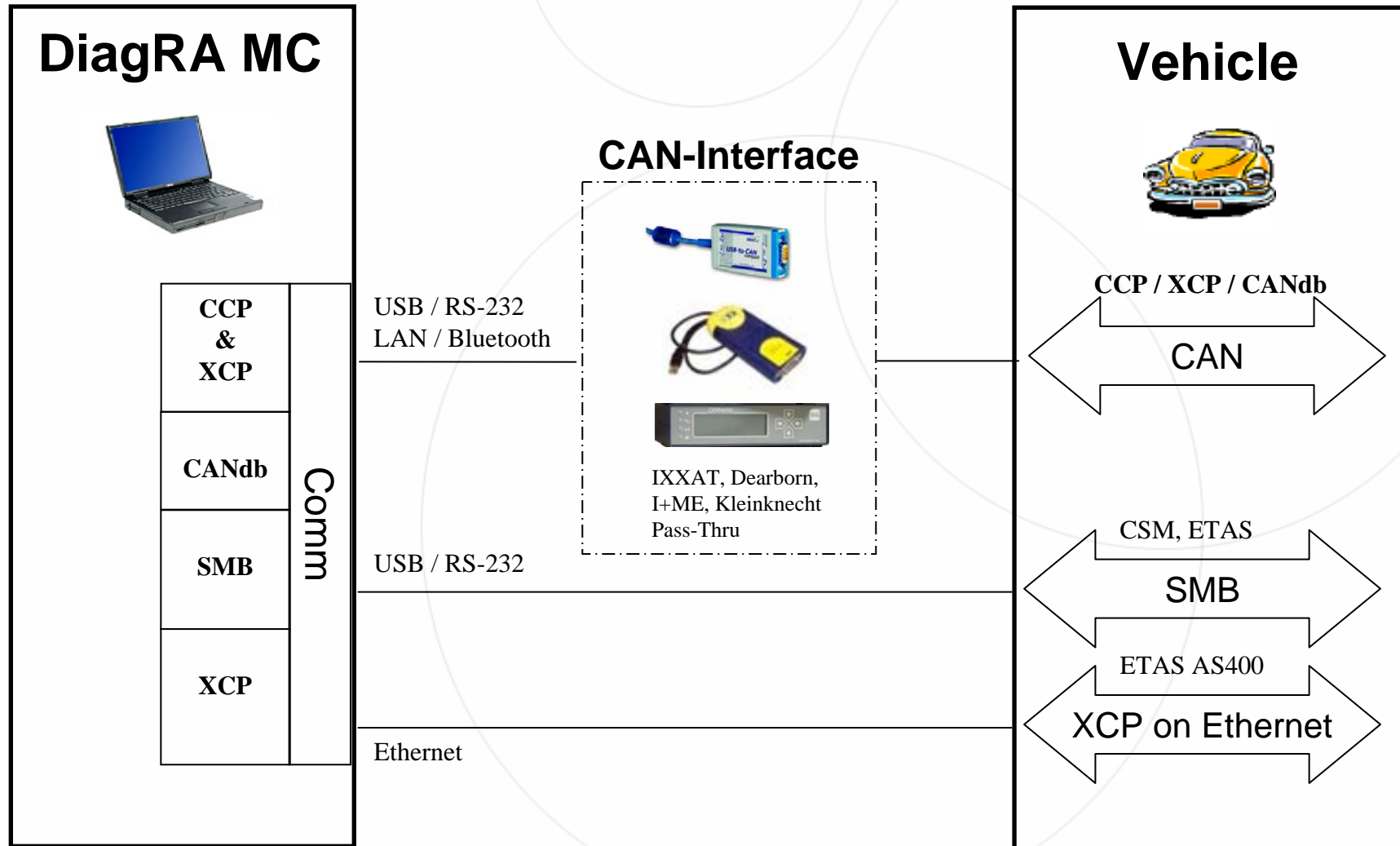
Intuitive operation





DiagRA MC - Configuration -

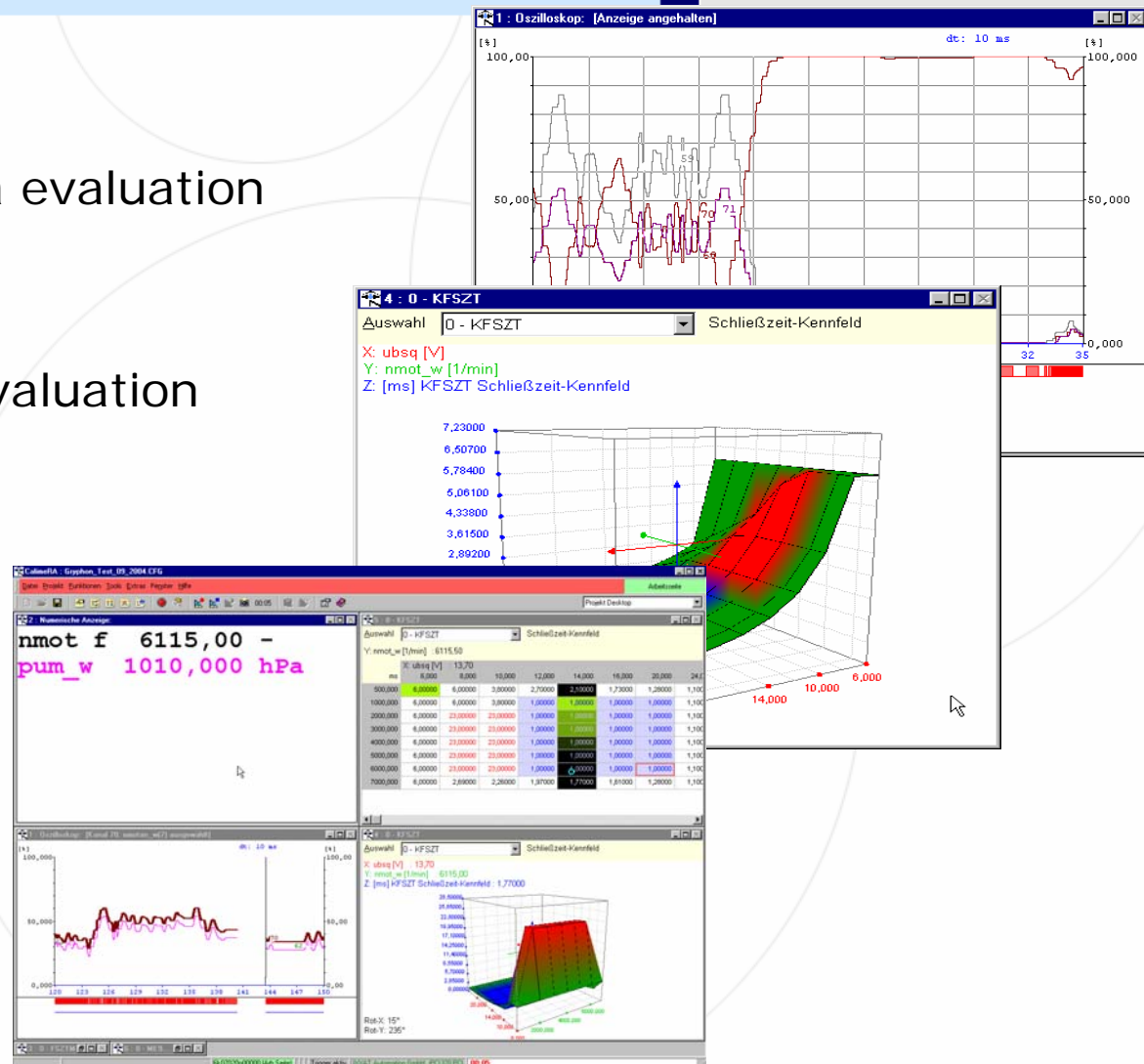
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DiagRA MC - Functions -

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- Measurement
- Measurement data evaluation
- Calibration
- Calibration data evaluation
- Integrated toolset

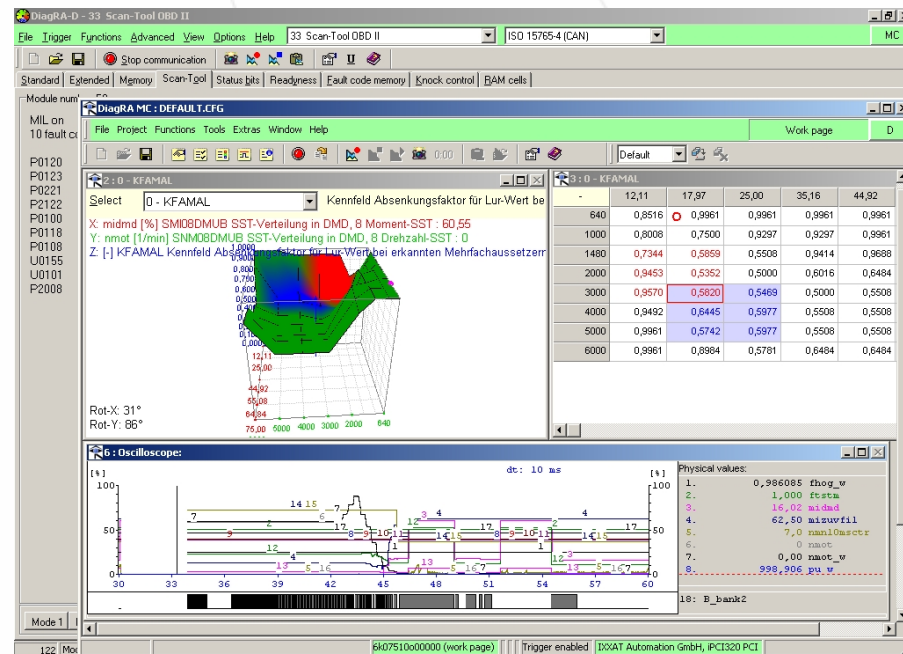




DiagRA MC - Measurement -

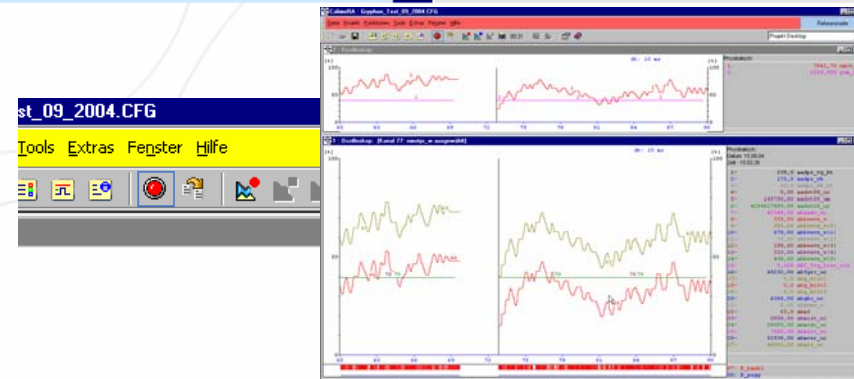
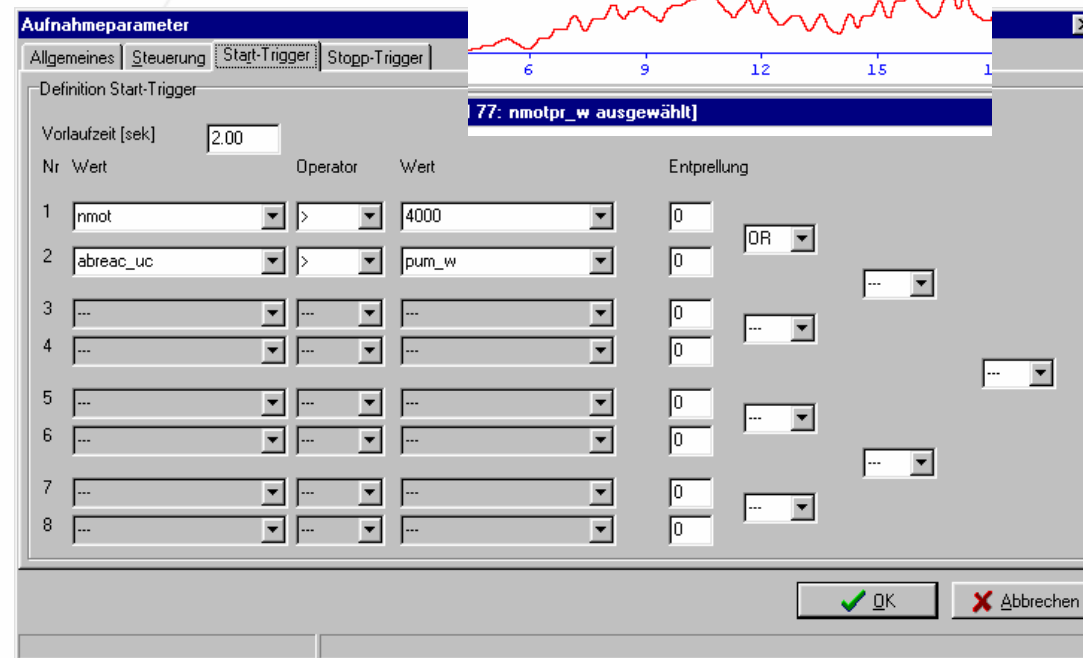
Start a measurement in DiagRA MC in four steps

1. Connect your Interface and ECU
2. Load the ECU description file into a work package
3. Select data acquisition values
4. Go online



DiagRA MC - Recording -

- Initiation by operator
- Start-/stop triggers
- Series measurement
- Snapshot

The screenshot shows the 'Aufnahmeparameter' (Recording Parameters) dialog box, specifically the 'Start-Trigger' tab. The 'Definition Start-Trigger' section is active, showing a 'Vorlaufzeit [sek]' of 2.00. Below this is a table for defining trigger conditions:

Nr	Wert	Operator	Wert	Entprellung
1	nmot	>	4000	0
2	abreac_uc	>	pum_w	0
3	---	---	---	0
4	---	---	---	0
5	---	---	---	0
6	---	---	---	0
7	---	---	---	0
8	---	---	---	0

The 'Entprellung' column has a dropdown menu set to 'OR'. At the bottom of the dialog, there are 'OK' and 'Abbrechen' buttons.



DiagRA MC - Calibration -

Clear representation of the adjustment parameters

Tabular and graphical view

Highlighting of the adjustment

Online, Offline calibration

Block operations

Dynamic views

4 - 0 - KFSZT

Auswahl: 0 - KFSZT Schließzeit-Kennfeld

Y: nmot_w [1/min] : 4305,25

X: ubsq [V] : 13,70

ms	6,000	8,000	10,000	12,000	14,000	16,000	20,000	24,000
500,000	6,00000	6,00000	3,80000	2,70000	2,10000	1,73000	1,28000	1,10000
1000,000	6,00000	6,00000	3,80000	2,70000	2,10000	1,73000	1,28000	1,10000
2000,000	6,00000	6,00100	3,80100	2,70000	2,10000	1,73000	1,28000	1,10000
3000,000	6,00000	5,48100	3,80100	2,70000	2,10000	1,72800	1,27800	1,09600
4000,000	6,00000	4,34100	3,65100	2,70000	2,10000	1,72600	1,27600	1,09600
5000,000	6,00000	3,77100	3,07100	2,67000	2,10000	1,72600	1,27600	1,09600

CalimeRA 0.14c - DEFAULT - [2-0 - KFAMAL]

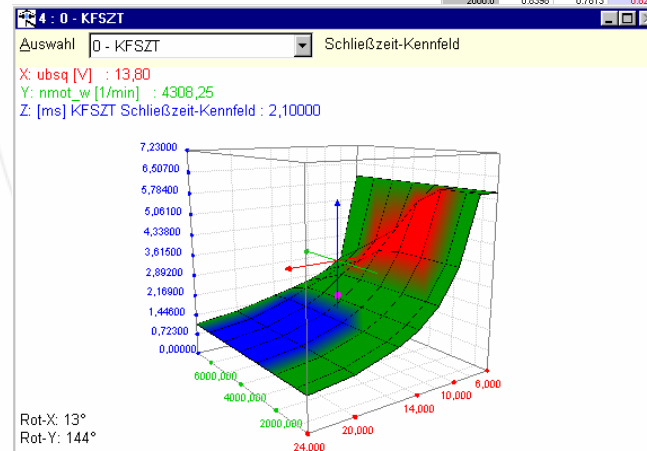
Kennfeld: 0 - KFAMAL Kennfeld Absenkungsfaktor für Lur-Wert bei erkannten Mehrfachaussetzern

Y: SNM08DMUB - SST-Verteilung in DMD, 8 Drehzahl-SST - [1/min]

X: SNM08DMUB - SST-Verteilung in DMD, 8 Moment-SST - [%]

(Phys)	14.844	25.000	39.844	50.000	60.156	69.922	80.078	94.922
640.0	0.6094	0.6602	0.4883	0.4102	0.4102	0.5000	0.7695	0.8203
1000.0	0.6094	0.6094	0.4805	0.5313	0.5781	0.6289	0.7695	0.8203
1480.0	0.6484	0.6289	0.6602	0.7070	0.6992	0.6797	0.7695	0.8203
2000.0	0.8398	0.7813	0.8203	0.7695	0.7383	0.6719	0.6992	0.8203
				0.8203	0.8672	0.7813	0.8398	0.8203
				0.8994	0.8789	0.8008	0.8281	0.9805
				0.8789	0.8994	0.8203	0.8906	0.8984
				0.8516	0.8398	0.8281	0.8984	0.9609

CFG: 8k:05030g00000 8k:05030g10001.s19 ECU: [???.?] Trigger nicht aktiv

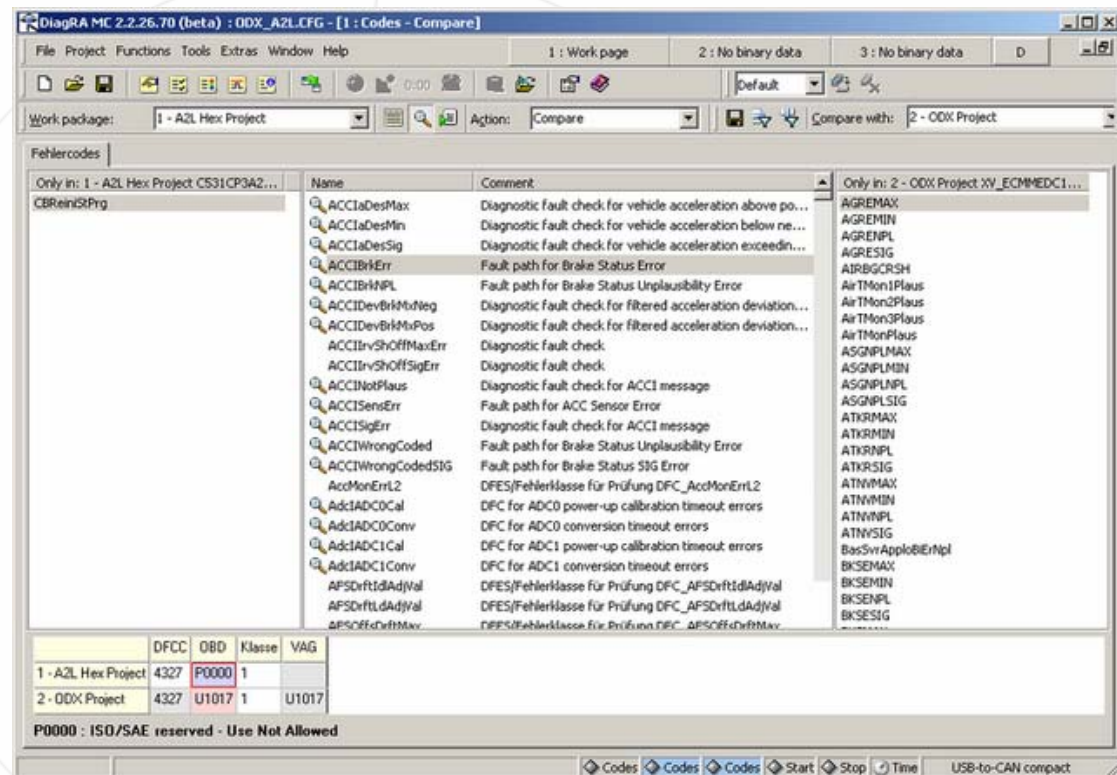




Loading of different work packages at the same time

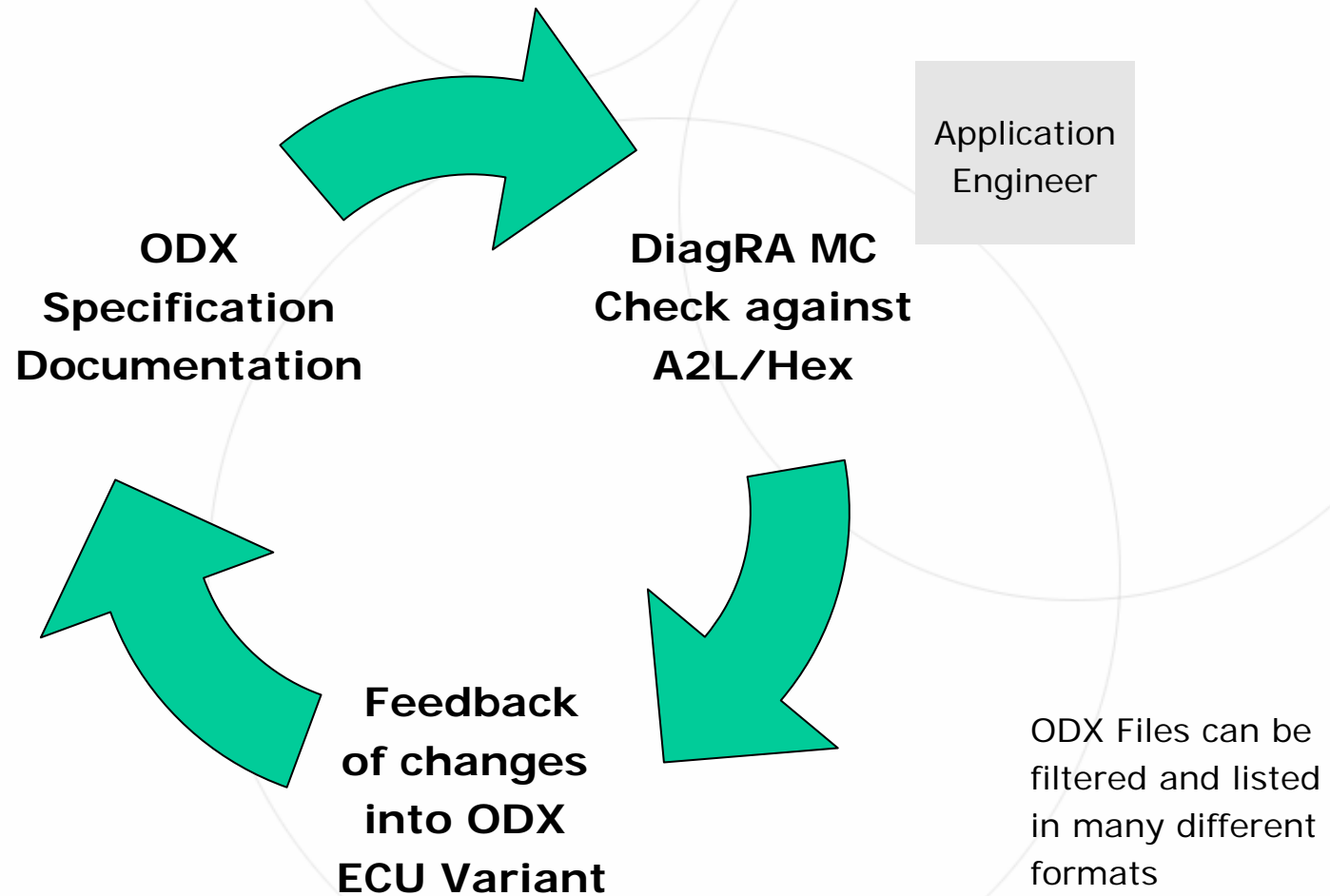
Comparison of work packages:

- A2L/Hex <->
A2L/Hex
- A2L/Hex <->
ODX Specification
- Listing of
differences





DiagRA MC - ODX Development cycle -





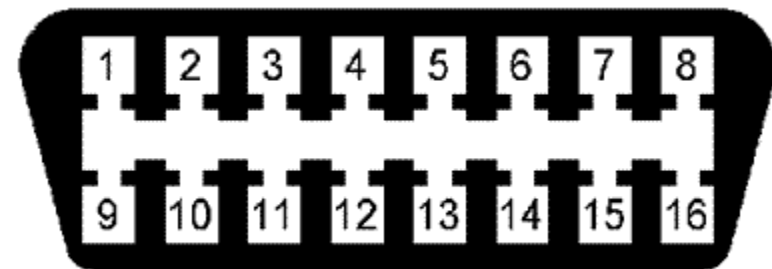
DiagRA MCD Toolset - OBD Regulations -

- Scanning emission related systems (Powertrain: Engine, transmission, exhaust system)
- Emission related faults have to be shown to the driver (MIL)
- Fault Codes and environmental conditions have to be stored and can be read out by standardized interface „Scan-Tool“
- Statistical Evaluation of Onboard Diagnostics and Failure Appearance (i.e. Readiness code)
- Documentation of functioning On Board Diagnosis are precondition for typ certification
- SAE J1699 vehicle communication confirmation test (2005)
- OBD for Heavy Trucks (2006)



DiagRA Toolset - OBD Standards -

- Protocol
 - ISO 9141 (K-Line)
 - SAE J1850
 - ISO 15765 (Diagnosis on CAN)
 - SAE J2284 (High Speed CAN)
 - SAE J2610 (Serial Data Communication Interface)
 - KWP 1281
 - ISO 14230 (KWP2000)
 - ISO/DIS 14229-1 (UDS)
 - SAE J2534 (PassThru)
- OBD
 - ISO 15031 (EOBD)
 - SAE J1979 (OBD)
 - SAE J1962 (OBD Plug) = ISO 15031-3
- Format
 - ASAM / ASAP



16 Pins, 9 free for use by OEM:

Pin 2 - J1850 Bus (+)

Pin 4 - Vehicle-ground

Pin 5 - Signal ground

Pin 6 - CAN High (J-2284)

Pin 7 - ISO 9141-2 K Output

Pin 10 - J1850 Bus (-)

Pin 14 - CAN Low (J-2284)

Pin 15 - ISO 9141-2 L Output

Pin 16 - Battery (+)-Voltage



DiagRA D

- Four levels of diagnostics -

■ **Scan-Tool:** Tester function with complete CARB Scan-Tool diagnosis according to ISO 9141-2/SAE J 1979 with the help of all 9 CARB-Modes and all PIDs which are defined by the authorities (emission related systems and data). The measurement data can be stored in different ways.

■ **Workshop-Tester:** Customer-specific section of the program for all ECUs inside the vehicle. Display of the status of the diagnosis functions, trouble code and their interpretation. Defined measurement values can be displayed and stored in different ways.

■ **Extended Functions:** Complete interrogation of internal memory; display of the status of the diagnosis functions, trouble codes and RAM-reading. For customizing the ECU description file in DAM- or A2L-format is needed.

■ **EOL-Tester:** Script based tool for the automation of the electronic production process (assembling, setup and testing). DiagRA EOL is for the use in small series or prototype productions.



DiagRA D

- OEM specific workshop diagnosis -

- read RAM/ EPROM/ EEPROM
- fuel level indicator
- valve timing and pump trigger
- functional addressing
- only small proprietary HW-interface, but maximal use of consumer HW (PC, PDA)



DiagRA D - OEM specific workshop diagnosis -

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The screenshot shows the DiagRA-D software interface for engine electronics diagnosis. The window title is "DiagRA-D - 01 Engine electronics I". The menu bar includes File, Trigger, Functions, Advanced, View, Options, and Help. The current selection is "01 Engine electronics I" and the vehicle model is "KWP 2000 (TP2.0)".

The interface is divided into several sections:

- ECU identification:** Displays various identifiers for the engine control unit, including Part number (4F1910559D), Configuration (XE47 programmable), System name (FK0EU4CM5 C6), Long Coding (00 00 00 00 00 00 00 00), Device number (00099), Importer number (128), Company number (00485), Hardware part number (4F1907559), Serial number (XXXXXXXXXXXX), Manufacturer plant (SME-RBG), Manufacturing date (21.01.03), Revision state (-----), Test bench number (R031), Manufacturer number (0914), Status of Flash (0000 0000 13 12 0000 0000), and Vehicle ident number (XXXXXXXXXXXX).
- Fault code memory:** Lists 10 fault code entries with details such as code, description, and status. For example, 16507 P0123 Throttle/Pedal Position Sensor A Circuit High Input.
- Basic setting/measuring blocks:** A table with 10 rows, each containing a dropdown menu and five data fields. The data fields show various engine parameters like RPM, temperature, pressure, voltage, and speed.

At the bottom of the interface, there are buttons for "Read", "Delete", "Cyclical", and "Once" for the fault codes, and "Selection", "Read", "Next", "Basic setting", "Cyclical", and "Once" for the measuring blocks. The status bar at the very bottom shows "73 Subfunction not supported, Service = readECUIdentification 6k06060o00000.a2l iPCI320 PCI".



DiagRA D

- Enhanced diagnosis for developers -

Additional views based on DAM/A2L description files:

- Internal fault code memory (DTC, fault path, Freeze Frame data, environment variables)
- Status of all diagnostic functions (status bit)
- Ratio values (scan tool mode 9, In use performance tracking)
- Readiness status (scan tool mode 1 PID1, Readiness bit/testing path/fault path)
- Reset monitor (number and cause of reset ECU function)
- Knock control (adaptation values, dynamic classes of operating point, RPM and load balancing)
- RAM cells (values, curves and maps)



DiagRA D enhanced diagnosis for developers - Internal fault path and related information -

DiagRA-D - 01 Engine electronics I

File Trigger Functions Advanced View Options Help | 01 Engine electronics I | KWP 2000 (TP2.0) | MC

Standard Extended Memory Status bits Readyness Fault code memory Knock control Reset monitor RAM cells

Fault path	Comment
DVEU	DV-E Error at UMA learning process
DVEUB	DV-E adaption abortion because of...
FP1P	Accelerator pedal 1st potentiometer
FP2P	Accelerator pedal 2nd potentiometer
TM	Engine temperature TMOT
CAIR	Airbag Message
CAT	CAN interface, Timeout ASC
CBR2	Message Break 2
CINS	Diagnostics CAN timeout
CTOG	TOG message
TA	Intake air (charge air) temperature ...
DK1P	Throttle valve 1st poti

Fault code information

dfp DVEU DV-E Error at UMA learning process

dfp 39 Fault path identifier
tsf 255 Fault path severity counter
tps 0000 0011 Fault path status
0 : erfact Error flag set
1 : zyf Cycle flag set

typ 1000 1000 Fault path type
3 : actnpl Test value was unplausible at most recent detection
7 : ininpl Test value was unplausible at first detection

fes 0110 0100 Fault path entry status
2 : stl Fault code entry not yet healed

cla 13 Error class
flc 3 MIL on counter
hlc 4 MIL off counter
dlc 40 Deletion counter
hz 2 Frequency Counter

Freeze frames

flgrs	1111 1111	CARB FREEZE FRAME Byte, bench 1, for LR
flgrs2	1111 1111	CARB FREEZE FRAME Byte, bench 2, for LR
rml	99.609 %	(Value = FF) calculated load value according SAE
tmot_u	215.00 GradC	(Value = FF) Engine temperature with quantisation
fr_u	1.9922	(Value = FF) Lambda controller output (Byte)
fra_u	1.9922	(Value = FF) multiplicative mixture correction of mix
fr2_u	1.9922	(Value = FF) Lambda controller output; bench2 (B
fra2_u	1.9922	(Value = FF) multiplicative mixture correction of mix
psdss_u	255 dez	(Value = FF)
nmot	10200.0 Upm	(Value = FF) Engine speed
vfzg_u	255.00 km/h	(Value = FF) Car velocity, with defined quantisation

Environment information

Environment values at 1th fault code entry:

top_w	0.00 min	Operating time since powerfail
kmstand_w	0.00 km	Vehicle lenght of run as information via CAN
udkp1_u	4.9805 V	(Value = FF) Voltage throttle valve poti 1 (Byte)
udkp2_u	4.9805 V	(Value = FF) Voltage throttle valve poti 2 (Byte)

Environment values at current fault code entry:

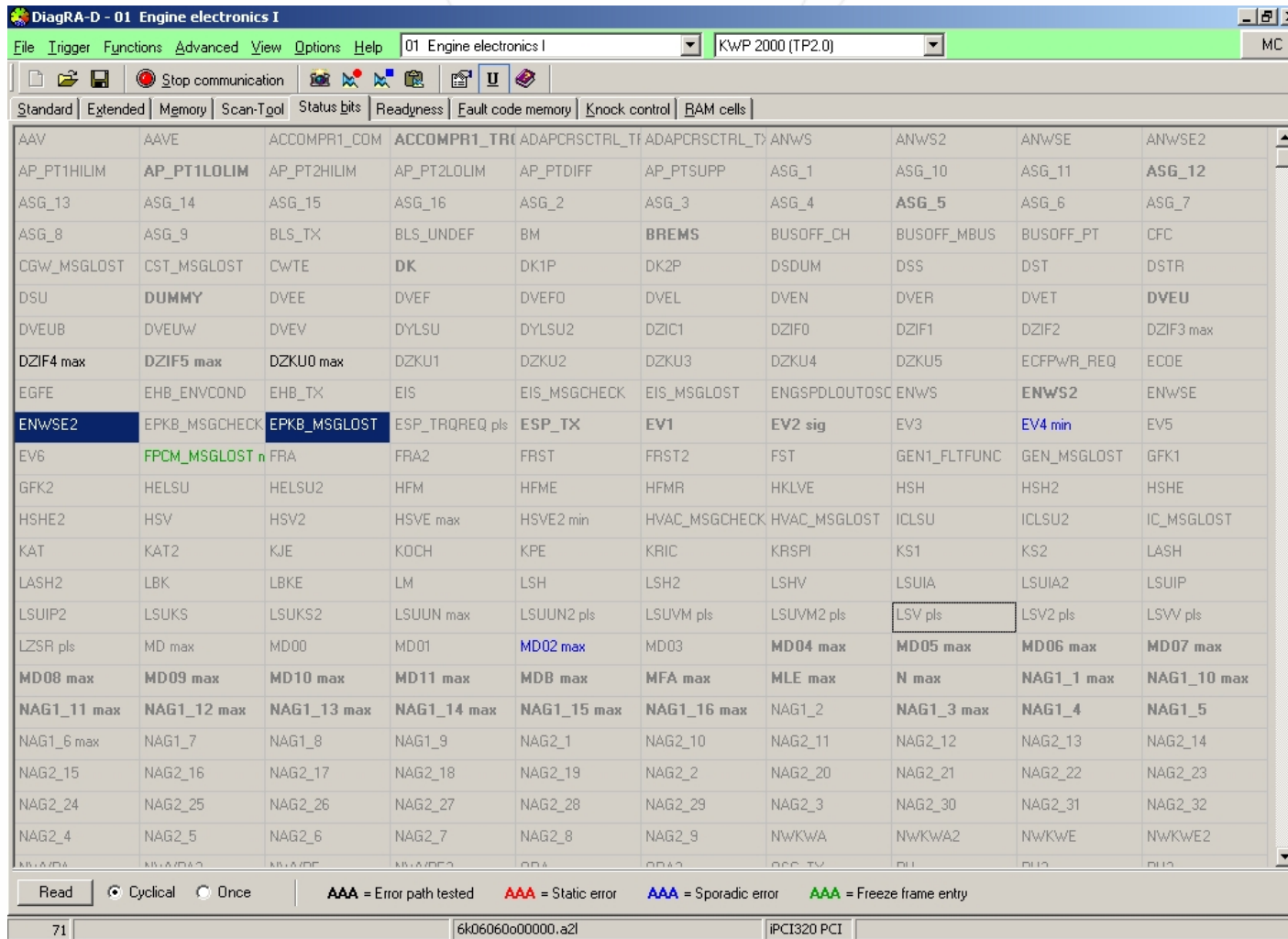
top_w	0.00 min	Operating time since powerfail
kmstand_w	0.00 km	Vehicle lenght of run as information via CAN
udkp1_u	0.0195 V	Voltage throttle valve poti 1 (Byte)
udkp2_u	0.0000 V	Voltage throttle valve poti 2 (Byte)

Fault code entries: 12

Read Delete Cyclical Once Dump

123 Developer functions enabled | 5e91u21g_eng.a2l | ANT_466.dbc

DiagRA D enhanced diagnosis for developers - status of diagnostic function (status bit) -



The screenshot shows the DiagRA-D software interface for '01 Engine electronics I' on a 'KWP 2000 (TP2.0)' protocol. The 'Status bits' tab is active, displaying a grid of diagnostic status bits. The grid is organized into columns and rows, with various bit names and their corresponding values or states.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10
AAV	AAVE	ACCOMPR1_COM	ACCOMPR1_TRC	ADAPCRSCTRL_TF	ADAPCRSCTRL_TF	ANWS	ANWS2	ANWSE	ANWSE2
AP_PT1HILIM	AP_PT1L0LIM	AP_PT2HILIM	AP_PT2L0LIM	AP_PTDIFF	AP_PTSUPP	ASG_1	ASG_10	ASG_11	ASG_12
ASG_13	ASG_14	ASG_15	ASG_16	ASG_2	ASG_3	ASG_4	ASG_5	ASG_6	ASG_7
ASG_8	ASG_9	BLS_TX	BLS_UNDEF	BM	BREMS	BUSOFF_CH	BUSOFF_MBUS	BUSOFF_PT	CFC
CGW_MSGLOST	CST_MSGLOST	CWTE	DK	DK1P	DK2P	DSDUM	DSS	DST	DSTR
DSU	DUMMY	DVEE	DVEF	DVEFO	DVEL	DVEN	DVER	DVET	DVEU
DVEUB	DVEUW	DVEV	DYLSU	DYLSU2	DZIC1	DZIF0	DZIF1	DZIF2	DZIF3 max
DZIF4 max	DZIF5 max	DZKU0 max	DZKU1	DZKU2	DZKU3	DZKU4	DZKU5	ECFPWR_REQ	ECOE
EGFE	EHB_ENVCOND	EHB_TX	EIS	EIS_MSGCHECK	EIS_MSGLOST	ENSPDL0UTOSC	ENWS	ENWS2	ENWSE
ENWSE2	EPKB_MSGCHECK	EPKB_MSGLOST	ESP_TRQREQ pls	ESP_TX	EV1	EV2 sig	EV3	EV4 min	EV5
EV6	FPCM_MSGLOST n	FRA	FRA2	FRST	FRST2	FST	GEN1_FLTFUNC	GEN_MSGLOST	GFK1
GFK2	HELSU	HELSU2	HFM	HFME	HFMR	HKLVE	HSH	HSH2	HSHE
HSHE2	HSV	HSV2	HSVE max	HSVE2 min	HVAC_MSGCHECK	HVAC_MSGLOST	ICLSU	ICLSU2	IC_MSGLOST
KAT	KAT2	KJE	KOCH	KPE	KRIC	KRSPI	KS1	KS2	LASH
LASH2	LBK	LBKE	LM	LSH	LSH2	LSHV	LSUIA	LSUIA2	LSUIP
LSUIP2	LSUKS	LSUKS2	LSUUN max	LSUUN2 pls	LSUVM pls	LSUVM2 pls	LSV pls	LSV2 pls	LSVV pls
LZSR pls	MD max	MD00	MD01	MD02 max	MD03	MD04 max	MD05 max	MD06 max	MD07 max
MD08 max	MD09 max	MD10 max	MD11 max	MDB max	MFA max	MLE max	N max	NAG1_1 max	NAG1_10 max
NAG1_11 max	NAG1_12 max	NAG1_13 max	NAG1_14 max	NAG1_15 max	NAG1_16 max	NAG1_2	NAG1_3 max	NAG1_4	NAG1_5
NAG1_6 max	NAG1_7	NAG1_8	NAG1_9	NAG2_1	NAG2_10	NAG2_11	NAG2_12	NAG2_13	NAG2_14
NAG2_15	NAG2_16	NAG2_17	NAG2_18	NAG2_19	NAG2_2	NAG2_20	NAG2_21	NAG2_22	NAG2_23
NAG2_24	NAG2_25	NAG2_26	NAG2_27	NAG2_28	NAG2_29	NAG2_3	NAG2_30	NAG2_31	NAG2_32
NAG2_4	NAG2_5	NAG2_6	NAG2_7	NAG2_8	NAG2_9	NWKWA	NWKWA2	NWKWE	NWKWE2

Legend: AAA = Error path tested (red), AAA = Static error (red), AAA = Sporadic error (blue), AAA = Freeze frame entry (green)

71 | 6k06060o00000.a2l | iPCI320 PCI



Silver Scan-Tool

- Scan-Tool for OBDII and EOBD -

- Supports all Modes and PIDs as defined in ISO-15031
- Automatic configuration
- SAE J 1699 test (based on the SAE open source SW)
- Overview of all supported ECU's, Modes and PIDs
- Selection of PIDs in Mode 1
- Protocol support:
 - ISO-9141
 - ISO-14230
 - ISO-15765 (CAN)
- Support of PassThru-Devices
 - SAE J-2534



Silver Scan-Tool - Features -

- Mode 1: Current measurement values
- Mode 2: Freeze Frames (selected values stored by the ECU at occurring errors)
- Mode 3: Read Error Code
- Mode 4: Delete Error Code
- Mode 5: Lambda-Sensor-Test Value
- Mode 6: Testing results of non continuous measurements
- Mode 7: Testing results of continuous measurements
- Mode 8: Control of the On-Board-Systems
- Mode 9: Read Vehicle Information
- Support of all PIDs, TIDs, VIDs



Silver Scan-Tool - Scan-Tool for OBDII and EOBD -

Testing Expo 2007

DiagRA - 33 Scan-Tool mode

File Trigger Functions View Options Help 33 Scan-Tool mode

Standard Extended Memory CARB Status bits Readiness Fault code memory Reset monitor BAM cells

Module number 10 Engine control unit

PID 1	0000 0000	MIL off, 0 fault code entries
	0000 0111	
	0110 1101	
	0110 1100	
		System status
		Misfire monitoring supported and complete
		Fuel system monitoring supported and complete
		Comprehensive component monitoring supported and complete
		Catalyst monitoring supported and complete
		Evaporative system monitoring supported
		Secondary air system monitoring supported
		Oxygen sensor monitoring supported
		Oxygen sensor heater monitoring supported
PID 5	-40 °C	Engine coolant temperature
PID 12	0 1/min	Engine speed
PID 13	0 km/h	Vehicle speed

Module number 1A Transmission control unit

PID 1	1000 1011	MIL on, 11 fault code entries
	0000 0100	
	0000 0000	
	0000 0000	
		System status
		Comprehensive component monitoring supported and complete
PID 5	0 °C	Engine coolant temperature
PID 12	114 1/min	Engine speed
PID 13	0 km/h	Vehicle speed

Select PIDs for Mode 1

PID	Comment
<input checked="" type="checkbox"/>	PID 1 System status
<input type="checkbox"/>	PID 3 Fuel system status
<input type="checkbox"/>	PID 4 Calculated load value
<input checked="" type="checkbox"/>	PID 5 Engine coolant temperature
<input type="checkbox"/>	PID 6 Short term fuel trim - Bank 1
<input type="checkbox"/>	PID 7 Long term fuel trim - Bank 1
<input checked="" type="checkbox"/>	PID 12 Engine speed
<input checked="" type="checkbox"/>	PID 13 Vehicle speed
<input type="checkbox"/>	PID 14 Ignition angle
<input type="checkbox"/>	PID 15 Intake air temperature
<input type="checkbox"/>	PID 16 Air flow rate
<input type="checkbox"/>	PID 19 Location of oxygen sensors
<input type="checkbox"/>	PID 20 Oxygen sensor output Bank 1 Sensor 1, Short term fuel trim Bank 1 Sensor 1
<input type="checkbox"/>	PID 22 Oxygen sensor output Bank 1 Sensor 3, Short term fuel trim Bank 1 Sensor 3
<input type="checkbox"/>	PID 28 OBD requirements
<input type="checkbox"/>	PID 52 Equivalence ratio Bank 1 Sensor 1, Oxygen sensor current Bank 1 Sensor 1

OK Cancel Help Show all PIDs

Mode 1 Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Mode 7 Mode 8 Mode 9 Cyclical Once Overview Selection

78 Communication in progress. Address word: 33 Baudrate: 10400 Description file: VWRatiofahrt KW21.a2l



DiagRA MCD Toolset - CARB SAE J1699/3 -

- Starting with the 2005 model year, the California Air Resource Board (CARB) has introduced this certification to ensure the flawless functioning of the communication interface between emission-related on-board vehicle diagnostics and scan tester.
- The SAE J1699/3 standard defines a number of tests that verify the implementation of the CARB/EPA OBD II.
- Starting with the 2005 model year, all vehicles must pass these tests before they can be certified for sale in the state of California.
- To check communication with one or more ECU's, the J1699/3 tests utilize a pass-thru device that confirms to the SAE J2534 standard.
- There is only one J1699 testing software accepted by CARB. This DOS software has been funded by some OEM and is provided as general public license („Open-Source Software“) by the SAE J1699 committee.
- RA implemented windows based remote control-, visualisation- and GUI-software modules, which are integrated in DiagRA D and Silver Scan Tool.



DiagRA MCD Toolset - CARB SAE J1699/3 software -

Testing Expo 2007

J1699-3 Remote Control

J1699-3 version: 12.00.08

start static tests

start dynamic tests

model year: 2005

number of OBD II ECUs: please select

vehicle make: Volkswagen

number of reprogrammable ECUs: please select

model of vehicle: [text box]

engine type: otto engine, diesel engine, hybrid engine

your name: [text box]

PassThru device: please select

3.00

exit

progress of test

transmitting your data
about 0.5 min.

test with no failure / engine off
about 3 min.

test with no failure / engine on
about 10 min.

1. driving cycle with failure
about 3 min.

2. driving cycle with failure
about 3 min.

1. healing driving cycle
about 3 min. (as long as it takes to heal your fault)

2. healing driving cycle
about 3 min. (as long as it takes to heal your fault)

3. healing driving cycle
about 3 min. (as long as it takes to heal your fault)

test with healed failure
about 3 min.

clear fault codes
about 1 to 3 min.

```
test console
How many reprogrammable, OBD-II ECUs are on this vehicle (1 to 8)? 1
Does the vehicle use compression ignition (i.e. diesel)? n
Is this a hybrid vehicle? n
Is this an engineering test (i.e. ignore protocol errors)? y
Mon Sep 26 14:35:01 2005

**** LOG FILENAME 2005-Audi-u-1.log ****
**** SAE J1699-3 Revision 12.0.8 (Build Date: Jun 29 2005) ****

**** NOTE: Timestamp on left is from the PC ****
**** NOTE: Timestamp with messages is from the J2534 interface ****

Windows NT/2K/XP (08930005)
How many OBD-II ECUs are on this vehicle (1 to 8)? 1
How many reprogrammable, OBD-II ECUs are on this vehicle (1 to 8)? 1
Does the vehicle use compression ignition (i.e. diesel)? NO
Is this a hybrid vehicle? NO
Is this an engineering test (i.e. ignore protocol errors)? YES
Enter your name and/or contact information (optional) (Press Enter): i

**** Test 5.1 (No DTC set) ****
Turn key OFF for at least thirty (30) seconds (Press Enter):
```

J1699-3 test in progress...

options show console show progress

instruction

turn KEY OFF for at least 30 seconds

done

question

original J1699 message (do not follow instructions)

```
**** Test 5.1 (No DTC set) ****
Turn key OFF for at least thirty (30) seconds (Press Enter):
```

DiagRA MCD Toolset

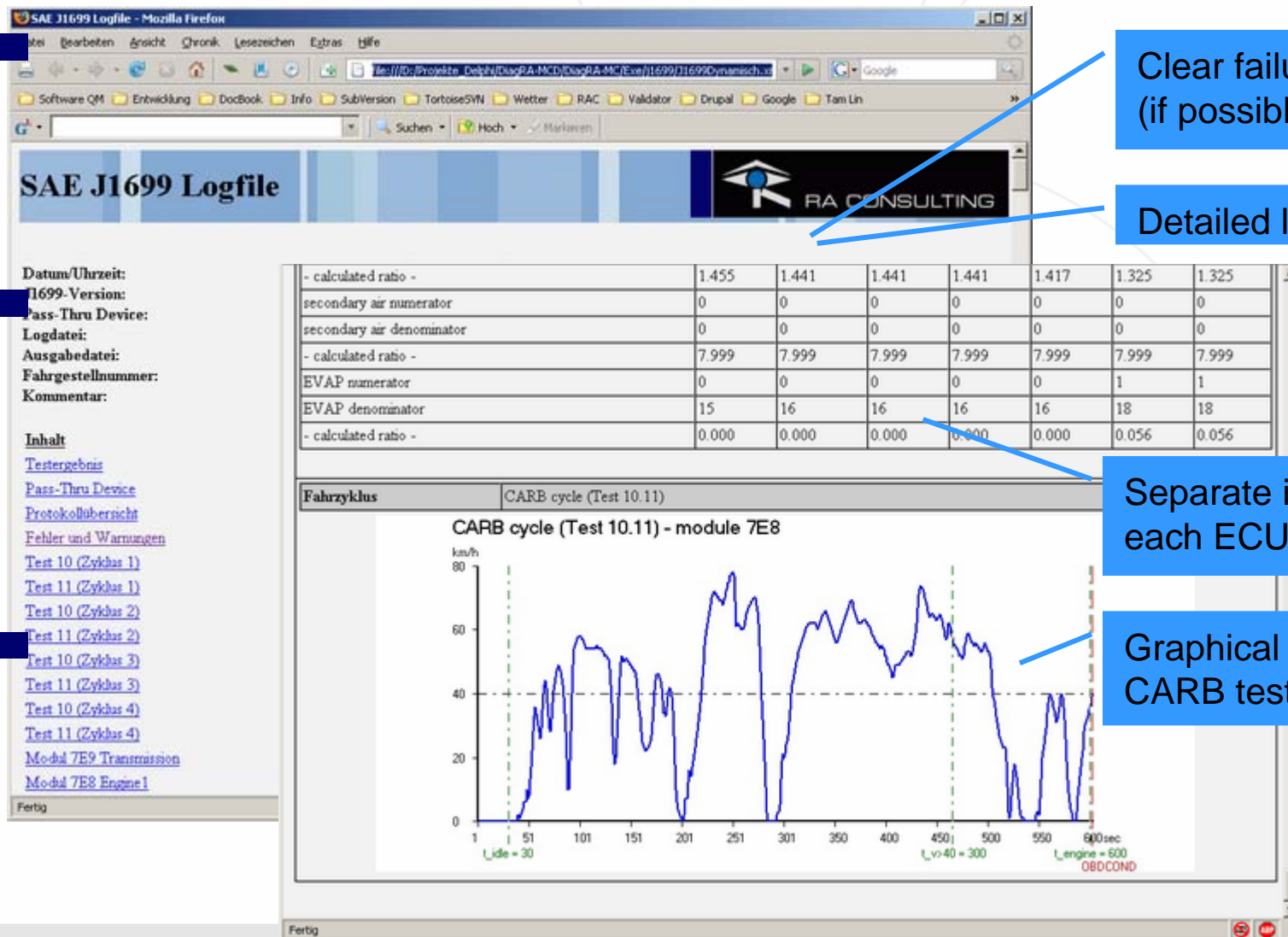
- CARB SAE J1699/3 test report -

Clear failure classification (if possible)

Detailed list of failures

Separate info table for each ECU

Graphical display of CARB test cycle



SAE J1699 Logfile

Datum/Uhrzeit:
 J1699- Version:
 Pass-Thru Device:
 Logdatei:
 Ausgabedatei:
 Fahrgestellnummer:
 Kommentar:

Inhalt

- [Testergebnis](#)
- [Pass-Thru Device](#)
- [Protokollübersicht](#)
- [Fehler und Warnungen](#)
- [Test 10 \(Zyklus 1\)](#)
- [Test 11 \(Zyklus 1\)](#)
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- [Test 10 \(Zyklus 4\)](#)
- [Test 11 \(Zyklus 4\)](#)
- [Modul 7E9 Transmission](#)
- [Modul 7E8 Engine1](#)

Fertig

- calculated ratio -	1.455	1.441	1.441	1.441	1.417	1.325	1.325
secondary air numerator	0	0	0	0	0	0	0
secondary air denominator	0	0	0	0	0	0	0
- calculated ratio -	7.999	7.999	7.999	7.999	7.999	7.999	7.999
EVAP numerator	0	0	0	0	0	1	1
EVAP denominator	15	16	16	16	16	18	18
- calculated ratio -	0.000	0.000	0.000	0.000	0.000	0.056	0.056

Fahrzyklus CARB cycle (Test 10.11)

CARB cycle (Test 10.11) - module 7E8

km/h

80
60
40
20
0

1 51 101 151 201 251 301 350 400 450 500 550 600

L_idle = 30 L_v40 = 300 L_engine = 600 OBDCOND

Fertig



Thanks for your attention

Visit us at booth #