Digiteq Automotive

CANSim4

User Manual 1.12

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Contents

List of Figures

List of Tables

Changes

Version	Date	Description of Change	Changed by	Approved by
1.00	3. 10. 2017	First version (corresponding with FW 1.16)	Jan Brabec	Michal Šindelka
1.01	13. 10. 2017	New chapter about CAN FD (corresponding with FW 1.17)	Jan Brabec	Michal Šindelka
1.02	13. 11. 2017	Fix of chapter about CAN FD – prescaler inserted	Jan Brabec	Michal Šindelka
1.03	8. 6. 2018	Documentation for Mode 4 MQB37W; messages table for Mode 1; FW versions table, flashing	Jan Brabec	Michal Šindelka
1.04	18. 10. 2019	MEB, schematics actualization, PWM, Accessories	Jan Brabec, Tomáš Penk, Michal Havelka	Michal Šindelka
1.05	12. 5. 2020	New template, FW version table actualization, added chapter About this User Manual, Safety Instructions, Operating Instructions, CANSim Studio application and Picture and Table List	Jan Brabec, Tomáš Penk, Dominik Pěček	Michal Šindelka
1.06	4. 6. 2020	Schematics of cable harness fixed, USB powering updated, accessories photos updated	Jan Brabec, Michal Havelka, Dominik Pěček	Michal Šindelka
1.07	3. 12. 2021	FlashDq chapter updated, mode 6 switches fixed, battery indicator added, FW version table actualization	Jan Brabec, Robert Nedvěd	Dominik Pěček
1.08	6. 7. 2022	Added new chapters: Power Supply Possibilities, Mode 5 – user defined simulations and CANSim API, Mode 8 – Baseline, Mode 9 – MEB UN ECE, Modbus API; CANSim Studio moved to separate manual	Tomáš Penk	Jan Brabec
1.09	11. 10. 2022	Email and classification fixed	Jan Brabec, Tomáš Penk	Michal Šindelka
1.10	14. 11. 2022	Bus names fixed to German	Jan Brabec	Michal Šindelka

1.11	18. 3. 2024	MQBW.Baseline - DIP switches fixed	Jan Brabec	
1.12	30. 4. 2024	Recycling information added, FW version updated	Jan Brabec	

1 About User Manual

The company reserves the right to make technical changes to the equipment or changes to this document without any prior notice. No guarantee is given for the information provided. No part of this manual may be reproduced in any form or by any means without the written permission of the publisher. All technical information, drawings, screenshots, etc. are protected under copyright law.

We are grateful for references to mistakes or for suggestions for improvements to be able to offer you even more efficient products in future.

2 Safety Instructions

Dear Customer,

The following safety instructions are intended not only for the protection of your health, but also for the protection of the product.

This section gives an overview of all important aspects of safety for the protection of individuals and to ensure safe and trouble-free operation.

The warranty/guarantee becomes void if damage is incurred resulting from non-compliance with these operating instructions. We do not assume any liability for consequential damage!

We also do not assume any liability for damage to other property or personal injury caused by improper use or failure to observe the safety instructions. In such case, the guarantee/warranty will become void!

Therefore, read the following items very carefully before connecting the product and putting it into operation.

2.1 General Safety Instructions

- The product may only be set up, started or serviced after gaining familiarity with the appropriate Operating Instruction.
- The products, equipment and device must only be used indoor.
- Use the products, equipment and device only for its intended purpose as described in Product Specification.
- The products, equipment and devices should not be operated in potentially explosive atmospheres.
- During operation of the products, equipment and device, do not permit any work method that hinders the safety of the products, equipment and device.
- Always keep the working area of the unit clean and orderly, in order to avoid danger from dirt or scattered parts.
- Do not exceed the technical performance data specified for each products, equipment and device.
- Keep all safety precautions and danger, hazard descriptions at the products, equipment and devices in legible condition and replace the descriptions as needed.
- Operation as well as work on the products, equipment and devices must only be carried out by trained personnel.
- In case of malfunction, immediately stop the unit.
- Have the fault corrected by appropriately trained personnel.

3 Product Specification

CANSim4 (further as CANSim) is a successor of CANSim3, a widely used rest-bus CAN simulator, which simulates the features of the entire car for the tested unit.

3.1 General Description

CANSim is capable of simulating several different units of the VW concern at the same time. It has been developed according to the needs of our main customer - Škoda Auto a.s. The primary purpose of the device is to simulate Radios (MIB / ICAS units), but nowadays it can be used for other units and purposes as well. The most common use of CANSim is in the testing area, but it can be also used in miscellaneous demonstrators. The main advantages of the CANSim are its small size, simple operation, comprehensive functionality and affordable price.

CANSim allows you to control basic simulation signals with manual control elements, which eliminates the need for a computer use. Those signal are for example speed, dimming level, or position of the switch box. Current 4th generation supports platforms MQB, MQB37W and electrical MEB.

CANSim offers several user modes:

- Ten operating modes covering most applications
- Modes for MQB, MQB37W and MEB platforms
- Special modes for Infotainment test benches
- Special mode for MEB Test Bench (IgnSwExtV1 module is required)
- Mode which generates PWM-Signal “No Crash” (covering frequency of 10 Hz and 100 Hz)

If none of them fits customer requirements, it is possible to make appropriate firmware modifications. Firmware update by the user is possible via the USB interface.

Key features:

- 4x CAN interfaces (2 are CAN FD compatible)
- 2x LIN interfaces
- 2x HS switches (e.g. KL.15 and KL.S simulation) and 1x LS switch
- BAP simulation
- RTC
- User programmable 6x potentiometers and 4x switches
- User defined rest-bus simulation
- LED indication of CAN and LIN communication for all ports
- Network management NM high
- Up to 16 different modes (1 mode for FW update)
- Mini USB interface for firmware update and remote control
- Possibility of customized firmware modification
- Remote control over CANSim API
- CANSim Studio (our application for user defined simulations based on .dbc files)

Relevant information about the device including documentation, software, and new firmware can be found on product web site cansim.digiteqautomotive.com.

3.2 Interfaces

- 4x CAN interfaces (2 are CAN FD compatible, terminators can be connected)
- 2x LIN interfaces (or they can be used as digital input)
- 2x HS switches (e.g. KL.15 and KL.S simulation)
- 1x LS switch (PWM output)
- USB port suitable for control and FW update

3.3 Mechanical and Electrical Properties

Table 1: Mechanical and Electrical Properties

Supported Platforms	MQB, MQB37W, MEB
CAN Physical Layer	ISO 11898 compatible
Built-in CAN Terminators	120 Ω, switched by DIP switches on rear panel
Max. Output Load of KL.15, KL.S and PWM	700 mA
Digital input (when not used as LIN)	Limiting voltage ±40 V Output and input compliant to LIN norm
Power Supply (cf. Chapter 3.4)	8 V to 18 V undervoltage protection (prevents unexpected behavior during undervoltage) short-time overvoltage protection **ATTENTION:** When testing start pulses, it is necessary to power CANSim from an external supply!
Supply Voltage Limit	19 V
Operating Current	Approx. 100 mA (depending on supply voltage, CAN traffic, and load connected on KL.15 or KL.S outputs)
Operating Temperature	-20 °C to 70 °C while preventing condensation
Storage Temperature	-50 °C to 100 °C while preventing condensation
Dimensions (W x D x H)	72 x 148 x 35 mm (including connectors and control elements)
Weight	220 g

The device complies with the VW80000 (2017-10) requirement for functional state A (all parameters OK) in operating mode II.c (maximum permissible load).

3.4 Power Supply Possibilities

It is possible to use either main connector DSUB15 (Chapter 9 pin “KL:30”) or external connector (Chapter 10.3). When both are connected the higher voltage is selected as the power supply for CANSim. This voltage is referred as the (only) power supply. In any case, CANSim is fully powered (i.e. peripheral transceivers such as CAN and LIN) only in these two cases.

CANSim can also be powered via USB in a restricted fashion, in which case transceivers are not working! Only FW update and device configuration are available.

ATTENTION: CAN and LIN communication is not possible when CANSim is powered from the USB connector!

3.5 Recycling

This device contains an internal battery. When disposing of this device, please adhere to local regulations regarding hazardous waste disposal. The battery contains substances that may be harmful to the environment, and proper recycling is essential for environmental protection.

3.6 CAN FD – Physical Layer

The CAN FD speed is set to 500 / 2000 kBaud. The sample point is set to 80 % for the arbitration phase and 70% for the data phase, and the prescaler is set to 2 in both phases (according to LAH.DUM.857.AG – CAN_6851, incompatible with default values in Vector CANoe SW) in all modes except the Test Mode.

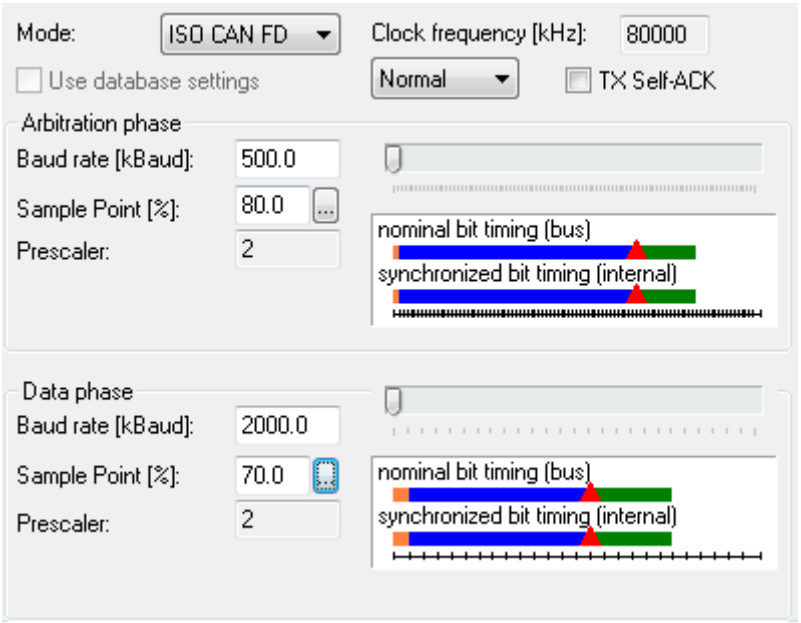

Figure 1: CANoe CAN FD Settings Dialog

In Test Mode (see Chapter 6.11), the CAN FD setting is left the same as the default setting for Vector CANoe SW – 70% for the arbitration phase and 75% for the data phase. The prescaler is set to 2 in both phases.

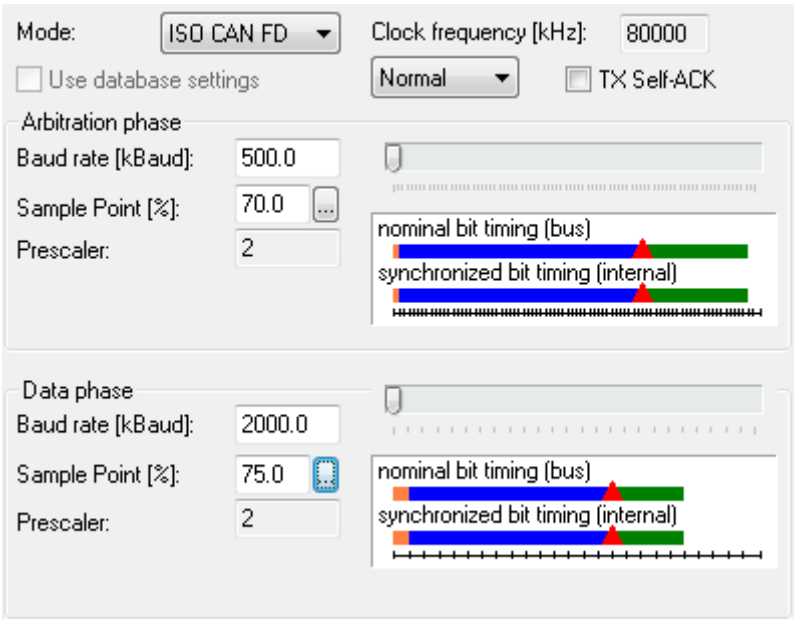

Figure 2: CANoe CAN FD Settings Dialog Mathed with CANSim Test Mode

3.7 FW Versions

Table 2: FW Versions of CANSim

1.01	28.11.2016	Initial version
1.02	20.12.2016	Correct clock for ISP call
1.03	4.1.2017	2 CAN-buses and potentiometer reading
1.04	12.1.2017	Infotainment
1.05	23.1.2017	Clamp S and speed potentiometer fixed
1.07	2.3.2017	Mode E – Indian radio
1.08	2.3.2017	4 CAN buses, CAN FD not yet implemented
1.09	10.3.2017	Version for LG, temporary NM
1.10	17.5.2017	MQB37w (without FD, DLC < 8)
1.11	19.5.2017	Sending long messages
1.12	25.5.2017	New bootloader
1.13	20.6.2017	Special version for OCU
1.14	12.7.2017	New Mode 4, Enabling/Disabling nodes in simulation possible (all 4 channels have to be active)
1.15	13.9.2017	Outside temperature fixed, electronic parking brake implemented
1.16	26.9.2017	Motorgas routing fixed, messages timing fixed
1.17	23.11.2017	CAN FD sampling changed to 70% (for basic rate 500kHz), message ESP21 fixed
1.18	23.11.2017	Info message was extended by DIP-switch setup, ESP7, new messages ESP33, EPB1 for MQB, MFL buttons for Kombi mode, CAN output buffer,

1.19	1.2.2018	PWM output for OCU
1.20	1.2.2018	Cruise control icon removed in Instrument cluster
1.21	1.2.2018	motor18 message added
1.22	27.4.2018	Special version for BAP simulations
1.23	27.4.2018	Improved CAN buffers, alt-bits in messages GW72 fixed
1.24	27.4.2018	Signals added to CANSim API, only 5V power problem fixed, BusOff reactivation fixed
1.25	29.6.2018	CRC for FD packets fixed; upper part of switches in mode 4 fixed
1.26	29.6.2018	Add ABCAN simulation to mode 1 for MEB platform
1.27	6.9.2018	MEB – ignition control for ICAS1; simulation (beta version) of door unit and SAM
1.28	20.11.2018	Full support off the MEB platform.
1.29	20.11.2018	Add support for MQB_37W to mode 1; slow start of some pieces fixed
1.30	13.2.2019	SAM control through cl. S pin when using expansion module
1.31	21.3.2019	CANSim API improved, new functions, new signals in MEB
1.32	17.04.2019	Modification according to ICA1FW LR57
1.33	4.10.2019	Small changes for MEB 2020, ICAS1 for c060, reverse
1.34	7.10.2019	NMH Problems in Mode 1
1.35	15.11.2019	LIN added in optional build
1.36	3.12.2019	“Anlernmodus” sets in ELV01, it solves switching KL.15 from some revisions of ICAS3
1.37	9.1.2020	Small CANSim API improvements
1.38	27.2.2020	BCM Simulation impovements, opening the hood
1.39	20.3.2020	Flash Team version
1.40	17.7.2020	Mode 6 revision
1.41	26.8.2020	Battery capacity
1.42	7.12.2020	VMM messages added in MEB
1.43	1.2.2021	CAN FD CRC fixed, preparation for license management
1.44	5.3.2021	Mode 3 fixed, write to eeprom implemented
1.45	12.3.2021	VIN and time fixed
1.46	17.3.2021	Rear view camera support
1.47	30.3.2021	Licensing support
1.48	28.5.2021	Modbus support
1.49	1.11.2021	Licensing fix
1.50	16.11.2021	First MQB.Baseline support
1.51	21.1.2022	First MEB UN ECE support
1.52	7.3.2022	MEB UN ECE release
1.53	28.3.2022	MQB.Baseline enhancement
1.54	25.4.2022	All Qbits removed from the simulation; Temperature of water fixed
1.55	17.5.2022	Some SAM messages inserted on connect CAN

1.56	23.9.2022	Modification of message ZV2
1.57	8.5.2023	Simulation improvement, message Klimasensor2 fixed
1.58	17.5.2023	Baseline simulation improvement for flashing HUD a GW ECUs
1.59	26.5.2023	Modbus for MEB UN ECE and MQB Baseline
1.60	7.6.2023	KL15 improvement
1.61	25.8.2023	MEB UN ECE database updated

4 Control Elements

The device behavior and values of sent messages are set with control elements placed on the top and sides of CANSim.

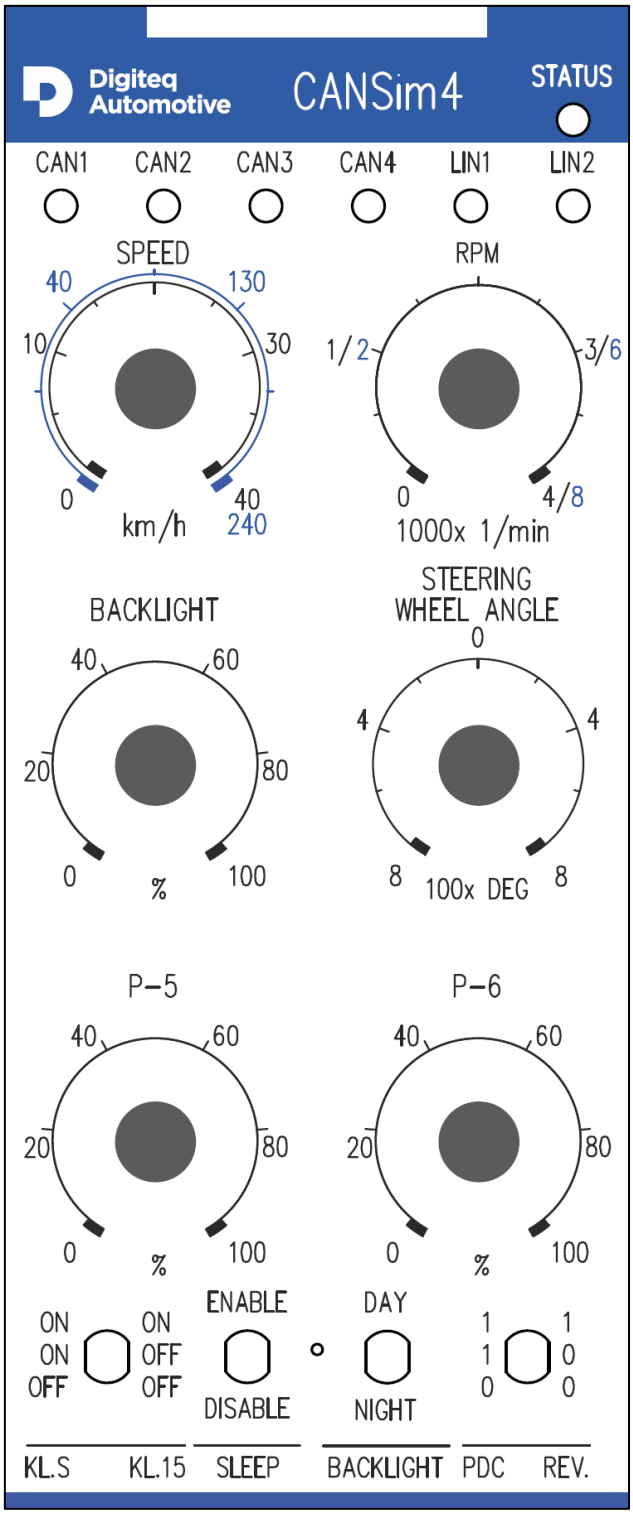

Figure 3: Top Panel Printing

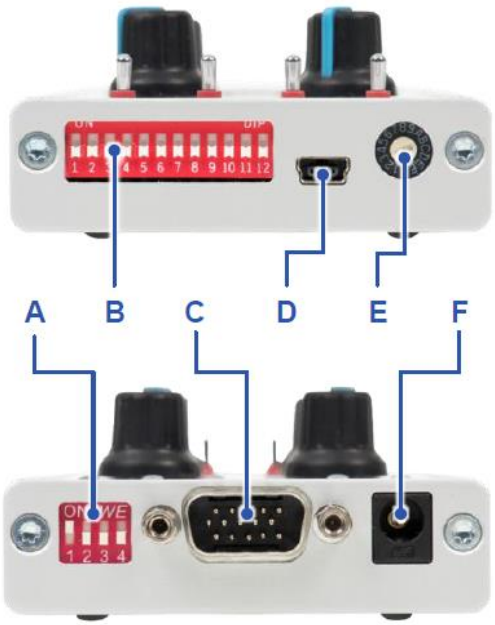

Figure 4: Controls

A) DIP switches for terminators
B) Functional DIP switches
C) Main connector
D) USB interface for FW update
E) Rotary mode switch
F) External power supply connector

4.1 Potentiometers

1. "**SPEED**" – Speed in range 0 - 240 km/h (0 - 40 km/h with limited range)
2. "**RPM**" – rotates in range 0 - 8000 rpm (0 - 4000 rpm with limited range)
3. "**BACKLIGHT**" (Dimming) – backlight in range 0 - 100%
4. "**WHEEL**" – wheel, range ± 800°
5. Combined controller (all values together):
   - CNG
   - Water temperature
   - Clutch
   - Open/close bonnet (max. position of the potentiometer)
   - Battery indicator / range (preliminary implementation, no guarantee)
6. Combined controller (all values together):
   - Outside temperature
   - Gas pedal

4.2 Switches

1. "**KL.S/KL.15**"– Controls signal values in the Klemmen_Status_01 message, as well as KL.15 and KL.S HW outputs. If the "SLEEP" switch is active, the NM-High state machine is also influenced.

2. "**SLEEP**" – Informs NM-High simulation about the durability of a communication request (Kommunikationsbedarf), so that a change to a "Ready Sleep" state is possible.
    - In case of "SLEEP" being set to OFF, NM-High remains in "Normal Operation" with a persisting communication request. CAN remains awake – see Network Management High.
    - In case of "SLEEP" being set to ON when cl.15 goes inactive, the inner NM state changes through "Ready Sleep", "Prepare", "Bus-Sleep Mode", to the final "Bus-Sleep Mode", in which all CAN units are already sleeping.
3. **"BACKLIGHT**" – positions DAY and NIGHT – simulates the state of the light controller on the CAN-bus – lights on/off – affects the backlight of the dashboard and all its inner parts.
4. **"PDC&REV**" – PDC simulation and reverse gear shift check:
    - PDC non-active, reverse not shifted
    - PDC active, reverse not shifted
    - PDC active, reverse shifted

4.3 DIP Switches

4.3.1 Functional DIP Switches

Functional DIP switches are located on the front panel of the device and contains 12 switches.

Switches affecting the behavior of the device in all modes:

11 – Turns on an rpm and speed range limitation (except Mode 8 - MQBW Baseline Test Bench)

Switches affecting the behavior of the device only in certain modes (see Chapter 6 - Operating Modes):

Mode 2 – MQB and Mode 3 – MQB37W

12 – Blocks simulation of the gateway

Mode 4 – MQB / MQB37W Test Bench:

1 to 7 – Block simulation of particular units (see Chapter 6.4)

12 – Selects MQB and MQB37W platform

Mode 6 – MEB Test Bench:

1 to 8 – Block simulation of particular units (see Chapter 6.5)

Mode 8 - MQBW Baseline Test Bench:

1 to 9 - Block simulation of particular units (see Chapter 6.7)

11 - Blocks routing (see Chapter 6.7)

12 - Enables simulation of gateway (see Chapter 6.7) (**Note:** reversed logic!)

Mode 9 - MEB UN ECE Test Bench:

1 to 6 - Block simulation of particular units (see Chapter 6.8)

7 to 8 - Configure fourth CAN bus (see Chapter 6.8)

Mode A – BAP simulation (see Chapter 0)

4.3.2 DIP Switches for Terminators

CANSim provides a CAN terminator for each bus (120 Ω resistor). Connection is selected with DIP switches 1 to 4. The position ON means the resistor is connected to the corresponding CAN-bus (switch no. 1 to CAN1, etc.).

4.4 Status Indicators

CANSim contains 7 indicators. 6 of them show the activity of each bus, and 1 shows the device activity (STATUS).

5 Operating Instructions

Basic operational steps are described in this chapter.

5.1 Putting into Operation

If you got CANSim as part of a test bench, please follow the manual for the test bench.

1. Unpack the CANSim device.
2. Have a small flathead screwdriver handy to operate small switches.
3. Select the correct operating mode on the rotary switch.
   - Select Mode 4 for MQB or MQB37W test benches and select the target platform by functional switch number 12 - OFF means MQB, ON means MQB37W, or select Mode 6 for MEB test benches.
   - Select simulated ECUs by functional switches 1 – 8 (see Chapter 6.4.1 for MQB/MQB37W or 6.6.1 for MEB)
   - Study Chapter 6 - Operating Modes if you need other operating modes
4. Set up the terminators on the terminator DIP switches.
5. Connect the CAN-buses to the CANSim device via the main connector.
6. Connect the power supply (8 V - 18 V, minimally 200 mA) to the external power connector or KL.30 and KL.31 via the main connector.
7. The CANSim device is now ready to work. For more information, please carefully read the following chapters of this manual.

5.2 Turning off

CANSim has such low power consumption that it doesn't need a power-off switch. It's expected that it will be turned off together with the entire test bench. Nevertheless, if you need to turn it off, disconnect the power and main connector from the CANSim device. It is safe to turn it off at any time except during FW update or when uploading a CANSim Studio configuration.

6 Operating Modes

CANSim contains several operating modes, which cover all common methods of MIB / ICAS testing. The modes can be selected using a rotary switch on the front panel. Additional configurations are done using functional DIP switches on the front panel.

(Using any other modes than those described in this user guide is not recommended. Otherwise, the device behavior is undefined.) With the exception of Mode 1 and partly 9 (where the connection is different), all modes have the following CAN-bus assignment: CAN1 Infotainment (Connect for MEB), CAN2 Komfort, CAN3 Antrieb and CAN4 Fahrwerk.

6.1 Mode 1 – Infotainment Gateway

6.1.1 Infotainment Gateway for MQB and MQB37W Platforms

The primary purpose of this mode is in radio testing. CANSim is used separately, or connected with other devices (e.g. a gateway). In the latter case, CANSim forwards their CAN messages in both directions. Signals generated in CANSim are always sent according to the CANSim settings. When using the gateway, please remember that signals generated by CANSim are only sent to the MIB (but not to other ECUs), and some of them, e.g. clamps, can be inconsistent between the MIB and the gateway. If the gateway is connected, it is recommended to use Mode 4 –. The choice between platforms is made via switch no. 12. OFF means MQB while ON means MQB37W.

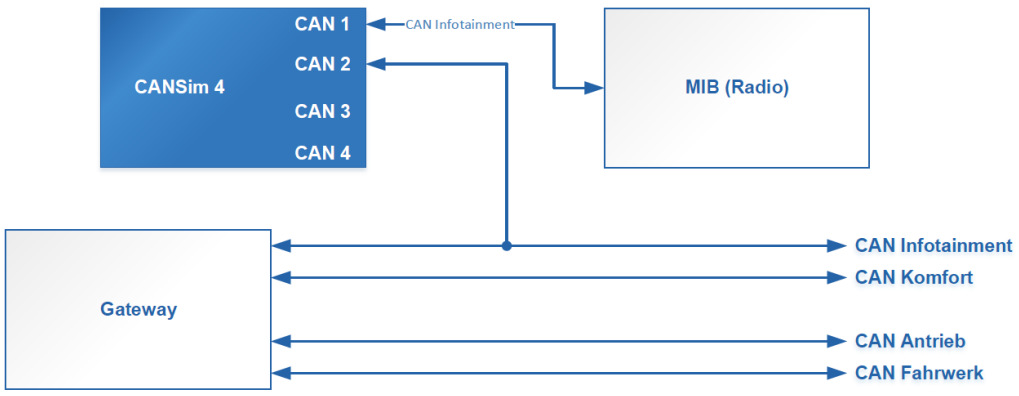

Figure 5: Connection Diagram of Infotainment Gateway Mode MQB / MQB37W

6.1.2 Infotainment Simulator for MEB Platform

Independently from the functional DIP switches configuration, the ABCAN (Anzeige und Bedienung) simulation runs on CAN3. Only one-way communication is implemented (no message forwarding).

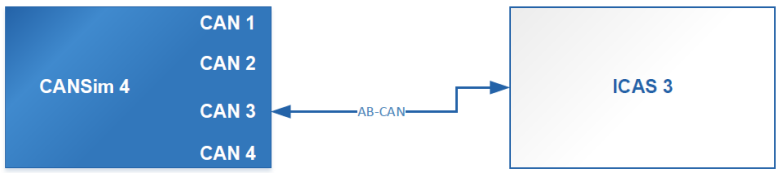

Figure 6: Connection Diagram of Infotainment Simulator Mode MEB

6.2 Mode 2 – MQB

This mode generates a restbus simulation for the MQB platform on all four buses in the same manner as real units, which CANSim simulates, would do. A gateway can optionally be used. The presence is selected with switch 12 (“ON” means the gateway is connected, “OFF” means simulated). If the gateway is present, its messages are not generated by CANSim, but forwarded instead. However, messages normally coming from the radio are generated by CANSim (see the Message List in Chapter 8.5).

If the gateway is simulated, messages generated by CANSim are transmitted to all buses according to the routing table. All messages normally generated by gateway (e.g. Gateway_XY, etc.) are now generated by CANSim. Messages normally generated by the radio are not generated by CANSim, and CANSim does not forward any messages.

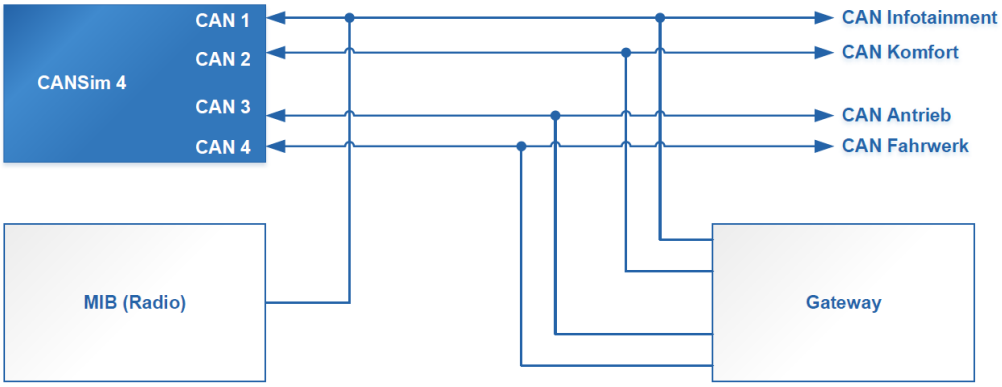

Figure 7: Connection Diagram of Modes 2 and 3 with Gateway and Radio

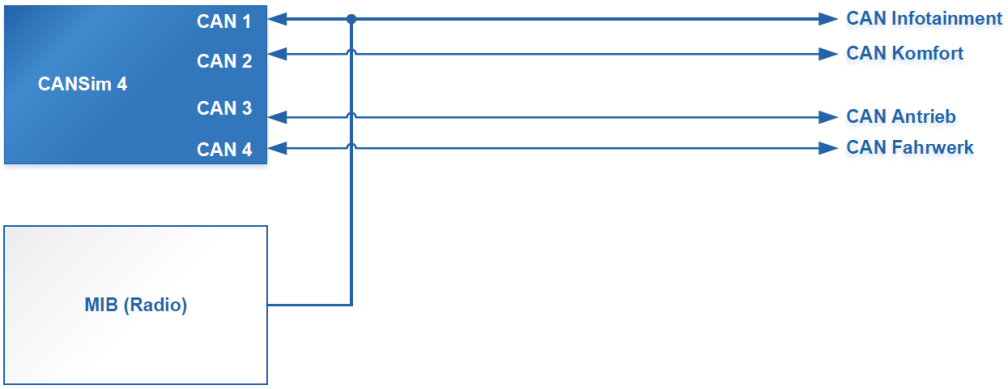

Figure 8: Connection Diagram of Modes 2 and 3 without Gateway

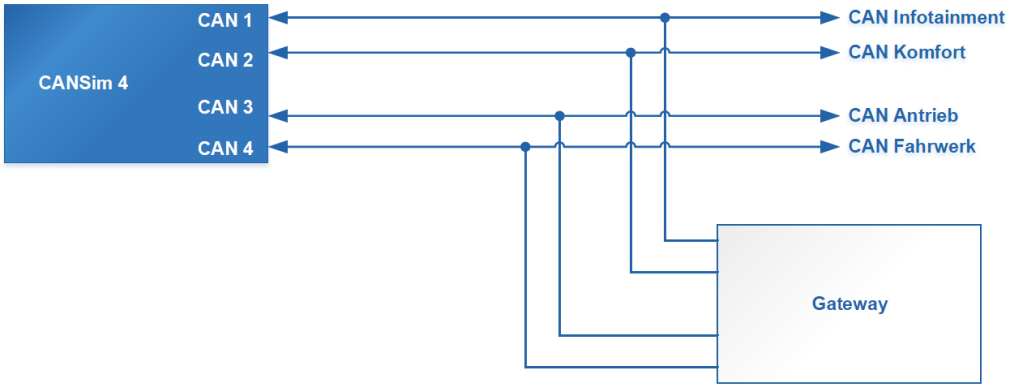

Figure 9: Connection diagram of Mode 2 and 3 with gateway and without radio

6.3 Mode 3 – MQB37W

This mode is similar to the previous MQB mode, with the difference being that it is adjusted to the MQB37W platform. The CAN FD on Antrieb and Fahrwerk buses are used in this case.

6.4 Mode 4 – MQB / MQB37W Test Bench

Mode 4 is especially designed for radio test benches. In this mode, the Infotainment bus is not used (nothing is sent by way of it). Depending on switch 12, the MQB or MQB37W platform is simulated (OFF means MQB, ON means MQB37W). Compared to Mode 2, the gateway cannot be simulated (it should be present). However, other units from the list below can be chosen. The choice of simulated units is done by way of switches 1 to 7 of the functional DIP switches (1-12). The switch position ON indicates the physical presence of the unit, so its simulation is turned off.

For the correct functioning of the physical hardware KL.15 and KL.S on the MQB37W platform, the Extension Ignition Module has to be used (chapter 10.2).

6.4.1 List of Configurable Units and Assigned Switches

1. BCM
2. Engine and gearbox
3. Air-conditioning
4. Dashboard (Instrument cluster)
5. ABS & ESP
6. PDC
7. Door unit

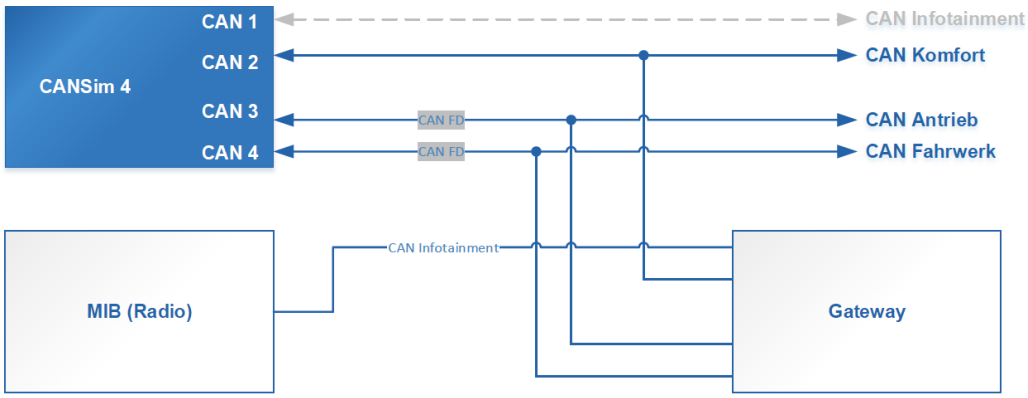

Figure 10: Connection Diagram of MQB / MQB37W Mode 4

6.5 Mode 5 – User Defined Simulations and CANSim API

In Mode 5 your own CAN bus simulations can be run. They can be created in CANSim Studio (see Chapter 7.2).

Another functionality that can be used in Mode 5 is CANSim API available at serial line via USB. For this purpose CANSim has to be connected to PC (cf. Chapter 7.4).

6.6 Mode 6 – MEB Test Bench

This mode is designated for the MEB platform. It is similar to Mode 4. Simulated units can be chosen using a functional DIP switches (1 to 8 according to the list below). The ICAS unit is not simulated (it has to be physically present).

For the correct functioning of the physical hardware KL.15, the Extension Ignition Module has to be used (Chapter 10.2).

6.6.1 List of Configurable Units and Assigned Switches

The choice of simulated units is done by way of switches 1 to 8 of the functional DIP switches (1-12). The switch position ON indicates the physical presence of the unit, so its simulation is turned off.

1. SAM
2. Engine and gearbox
3. Air-conditioning
4. ELV & Kessy
5. ABS & ESP
6. PDC
7. Door unit
8. OCU

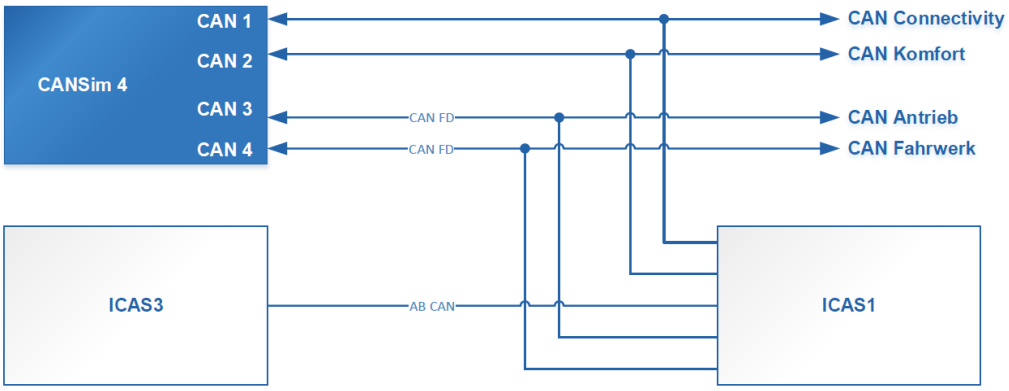

Figure 11: Connection Diagram of MEB Mode 6

6.7 Mode 8 – MQBW Baseline Test Bench

This mode is designated for the Baseline platform. The connection to CAN buses is as follows:

1. CAN1 (usually Infotainment) may be connected to Infotainment CAN.
2. CAN2 (usually Komfort) should be connected to Komfort CAN 1.
3. CAN3 (usually Antrieb) should be connected to Komfort CAN 2.
4. CAN4 (usually Fahrwerk) should be connected to Komfort CAN 3.

ATTENTION:

- Only the above mentioned CAN buses are simulated due to an increasing amount of Komfort CANs!
- Messages that are normally transmitted to other CAN buses and routed by gateway are simulated as if it were really present (cf. functional DIP switch 11).

6.7.1 List of Configurable Units and Assigned Switches:

The choice of simulated units is done by way of switches 1 to 8 of the functional DIP switches (1-12). The switch position ON indicates the physical presence of the unit, so its simulation is turned off. For switch 12 reversed logic is used, i.e. OFF means gateway is connected whereas ON enables its simulation.

1. BCM
2. Engine
3. MIB 3 or ICC
4. Kessy
5. ABS & ESP
6. Door unit
7. ELV
8. OCU
9. reserved
10. reserved
11. disable routing of CAN messages from other CANs as if gateway were connected (see below)
12. gateway

When you connect the device, messages from units that are normally sent to other CAN buses are virtually routed to other Komfort CANs and Infotainment CAN. This functionality substitutes gateway. If

this behavior is not wanted you may switch ON functional DIP switch 11 (it is recognized as an indication that there is a gateway connected) and the device stops routing the messages to other CANs.

If you switch ON position 12, the device will simulate messages that originally come from gateway. In this configuration you can connect MIB 3 directly to the device without using any other physical unit.

ATTENTION: Because of the ongoing development of the MQB Baseline platform we cannot assure that our simulation satisfies your needs. We cannot also guarantee that we will be able to adapt our simulation to your requirements in the future.

6.8 Mode 9 – MEB UN ECE Test Bench

This mode is designated for the MEB UN ECE platform. The ICAS1 unit cannot be simulated (it should be present).

One device ensures only a simpler simulation. If it is not sufficient and you need more complex simulation, two devices can be used (hereinafter referred to as A and B). Configuration of the devices is described in the following sections.

ATTENTION: Because of the ongoing development of the MEB UN ECE platform we cannot assure that our simulation satisfies your needs. We cannot also guarantee that we will be able to adapt our simulation to your requirements in the future.

6.8.1 Configuration of Device A for MEB UN ECE

The first device (and the only one if simple simulation is enough) should be switched to Mode 9 for this purpose. It is used for clamp control. The connection to CAN buses is as follows:

1. CAN1 (usually Infotainment) should be connected to Connect CAN.
2. CAN2 (usually Komfort) should be connected to Komfort CAN 1.
3. CAN3 (usually Antrieb) should be connected to Komfort CAN 2.
4. CAN4 (usually Fahrwerk) can be configured via functional DIP switch (see below).

6.8.2 List of Configurable Units and Assigned Switches

The choice of simulated units is done by way of switches 1 to 6 of the functional DIP switches (1-12). Switches 7 and 8 configure the fourth CAN bus of the device. The switch position ON indicates the physical presence of the unit, so its simulation is turned off.

1. SAM
2. Air-conditioning (for Electrification) / Engine (for Antrieb) / ABS & ESP (for Fahrwerk)
3. ELV
4. Kessy
5. OCU
6. Door unit
7. Configuration of CAN 4
8. Configuration of CAN 4

DIP switch 12 should be set to ON. Other functional DIP switches should be in the OFF position.

There are four possibilities that set which CAN is being simulated on CAN 4 device output:

- Functional DIP switch 7 OFF & 8 OFF = CAN 4 is Electrification (EV) CAN (this choice has to be used for the two-devices configuration)
- Functional DIP switch 7 ON & 8 OFF = CAN 4 is Antrieb CAN
- Functional DIP switch 7 OFF & 8 ON = CAN 4 is Fahrwerk CAN
- Functional DIP switch 7 ON & 8 ON = reserved

6.8.3 Configuration of Device B for MEB UN ECE

The second device should be switched to Mode 6 in which it simulates other units in same way as for MEB (see Chapter 6.6). Functional DIP switch 1 should be ON (because SAM messages are generated by device A in Mode 9). Connection to CAN buses is as follows (based on Mode 6):

1. CAN1 (usually Infotainment) may be optionally connected to MFL.
2. CAN2 (usually Komfort) should be connected to Komfort CAN 1.
3. CAN3 (usually Antrieb) should be connected to Antrieb.
4. CAN4 (usually Fahrwerk) should be connected to Fahrwerk.

Other functional DIP switches (2 to 8) can be set ON or OFF according to the physical presence of the corresponding unit as specified for Mode 6 (Chapter 6.6).

6.9 Mode A – BAP Simulations

This mode contains BAP simulations for testing MQB radios. This feature is only found in a special FW and is subject to a special licence. (cf. Chapter 7.2.1).

The basic CAN simulation is the same as in Mode 1. On the BAP level, several different FSGs are simulated. Nowadays, it is available for MQB and MQB37W platforms (they can be switched using switch 12 in the same way as described for Mode 1).

6.9.1 BAP Simulation for MQB

In this case one variant of the special FW is needed. It simulates the following FSGs: ACC, AWV, BC_MFA, BCmE, Brake, Clock, DoorLocking, ExteriorLight, Charisma, IntegralSafety, InteriorLight, Klima, Klima2, LDW_HCA, Mirror, MKE, ParkHeater, PDC, PedestrianAssist, RDK, Seat, SIA, StartStopReasons, SWA, UnitMaster, Wiper_Comfort.

6.9.2 BAP Simulation for MQB37W

In this case, there are three variants of special FW (units listed below). The variants are chosen with switches nos. 8 and 9. Their setting has to match the flashed FW. For the first variant, both switches have to be OFF, while for the second variant, switch 8 has to be ON and switch 9 OFF, and for the third variant, switch 8 has to be OFF and 9 ON. Otherwise, BAP simulation will not work.

1. ACC, AWV, BC_MFA, Brake, BCmE, ClimateZone, ClimateZone2, ClimateMaster, Clock, DoorLocking, EfficiencyAssist, ExteriorLight, Charisma, IntegralSafety, InteriorLight, LDW_HCA, Mirror, MKE, PaCo, ParkHeater, PDC, RDK, Seat, SIA, SWA, UnitMaster, Wiper_Comfort
2. BatteryControl, Car2X, IAA_PSO, Hybrid, FAS_Profiles, Statistics
3. ENI

6.10 Mode B – Demonstration

This is a special mode for Škoda Auto demonstrators.

6.11 Mode C – Test Mode

The test mode sends unusual packets that are not used by VW (a packet with zero length, rtr, FD ISO and NON-ISO, FD with fast and slow data, FD with error, CAN packet with dlc > 8). It is designed for testing of your CAN message viewer possibilities. (*Even CANoe is not ideal for viewing unusual packets. Such a packet can be overlaid by another one with the same ID in a trace window. Nevertheless, all anomalies are unambiguously documented in the log file.*)

6.12 Mode E – Indian Radio

There is a special mode for radios that are delivered to the Indian market and other developing countries. Those radios are equipped with passive eavesdropping of the Infotainment CAN (can't block the operation of the relevant bus). Those radios don't send an acknowledge bit. The easiest way to send an acknowledge bit is to connect CAN 1 and CAN 2 in parallel on the CANSim device (valid for Mode 1 and Mode E).

Mode E generates messages for the relevant PQ radios. Nowadays, MQB radios are used on the Indian market, and Mode 1, in which CAN 1 and CAN 2 has to be connected, is satisfactory for the simulation thereof.

6.13 Mode F – Firmware Update

In this mode, communication with the FlashDq update software tool and CANSim Studio is enabled. More information can be found in Chapter 7 - Application Support for CANSim.

7 Application Support for CANSim

7.1 Connection to PC

CANSim can be connected to a PC by USB (mini-USB connector on the front panel). FTDI drivers VCP and D2XX should be installed on the PC. These drivers are usually installed automatically when CANSim is connected to the computer for the first time. If the computer is connected to the Škoda Auto network, drivers have to be installed manually. A local administrator account is necessary for the installation.

Drivers can be obtained from the FTDI website: http://www.ftdichip.com/Drivers/VCP.htm. It is recommended to download the “setup executable” file (see Figure 12) and install it.

Currently Supported VCP Drivers:

		Processor Architecture							
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	PPC	ARM	MIPSII	MIPSIV	SH4	Comments
Windows*	2017-08-30	2.12.28	2.12.28	-	-	-	-	-	WHQL Certified. Includes VCP and D2XX. Available as a setup executable. Please read the Release Notes and Installation Guides.
Linux	-	-	-	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19 Refer to TN-101 if you need a custom VCP VID/PID in Linux VCP drivers are integrated into the kernel.
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-	-	Refer to TN-105 if you need a custom VCP VID/PID in MAC OS
Mac OS X 10.9 and above	2017-05-12	-	2.4.2	-	-	-	-	-	This driver is signed by Apple
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10	
Windows CE 6.0/7.0	2016-11-03	1.1.0.22 CE 6.0 CAT CE 7.0 CAT	-	-	1.1.0.22 CE 6.0 CAT CE 7.0 CAT	1.1.0.10	1.1.0.10	1.1.0.10	For use of the CAT files supplied for ARM and x86 builds refer to AN_319
Windows CE 2013	2015-03-06	1.0.0			1.0.0				VCP Driver Support for WinCE2013

Figure 12: Screenshot of Webpage with FTDI Drivers

7.2 CANSim Studio

The CANSim Studio application is a support tool for CANSim device. You can create your own CAN-bus simulations based on .dbc files. Such simulations then run in Mode 5. It is also possible to change the device VIN, time or date. You can automatically download the latest firmware and flash it to the device.

The application can be downloaded from the CANSim site: cansim.digiteqautomotive.com. Application manual can be found there, too.

7.2.1 Licence Management

Some features of the CANSim device are subject to a special licence. Currently, these features are:

1. CANSim API – In Mode 5 you can control your device via PC (the device has to be connected via USB).
2. user defined simulations – In Mode 5 your own simulation (created in CANSim Studio) can run.
3. BAP functionality – In Mode A BAP simulations can run (needs special firmware with other product code).

If you are interested in some of the mentioned features, please do not hesitate to contact us at e-mail business.products@digiteqautomotive.com.

7.3 FlashDq

The FlashDq application is designed for firmware update of certain Digiteq Automotive devices, one of which is CANSim. Unlike CANSim Studio, it is a general tool without any specialized function. However, it is necessary to use FlashDq for some specific operations, e.g. when a firmware with different product code should be flashed into CANSim.

For FW update, the correct update file (*.fdq) has to be used. Available update files are available at our product site cansim.digiteqautomotive.com where you can also download the current release of FlashDq.

For FW update please select Mode F first (Chapter 6.13 – Mode F – Firmware Update). Next, choose the update file or type the path to it. Then select the COM port to which the CANSim device is connected and press the *Flash* button. The update process will begin. During the process the device must not be disconnected and the PC must not be turned off or switched to sleep mode. The application will inform while the flashing process has been terminated (either successfully or with an error). The FW update can take several minutes. If you want to see more information, click on *show details* at the bottom of the dialog window.

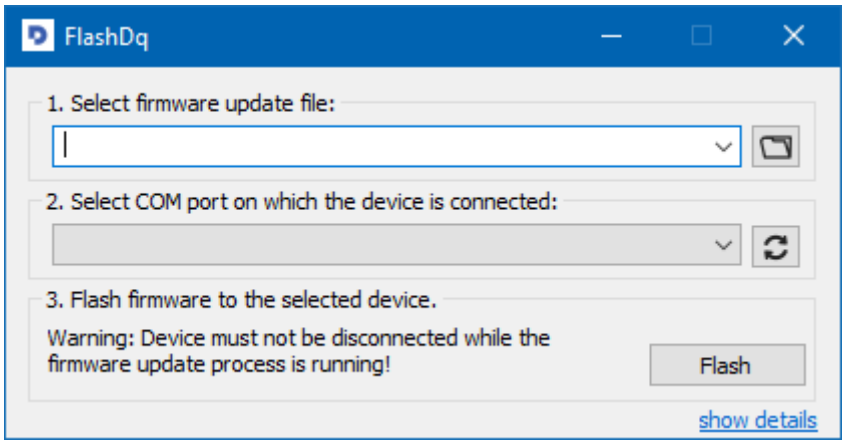

Figure 13: FlashDq Application GUI

7.4 CANSim API

The CANSim allows you to dynamically control (from your PC program) what the device should send. It is done via serial line. See Chapter 7.1 for information on how to connect your device to the PC. This functionality is available in Mode 5 and requires special license.

We provide a Windows library (.h, .lib and .dll) for you. It has a C language interface. You can download the library from our product site cansim.digiteqautomotive.com.

7.5 Modbus

CANSim device supports limited control via the open Modbus protocol specification (cf. https://modbus.org/).

ATTENTION: *This possibility is available in Mode 6 – MEB Test Bench only!*

CANSim device accepts Modbus RTU packets sent via its serial line. The parameters are:

- Baud rate: 115.200
- Parity: odd
- Data length: 8 bit
- Stop bit: 1

The device is used as a slave (server) with default address 1.

More detailed documentation about currently implemented Modbus features and a demo application with source codes can be found at cansim.digiteqautomotive.com.

8 Message List

The “Transmitter” column contains messages that can be blocked when a real unit is connected and the appropriate functional DIP switch is configured. Messages without “Transmitter” are always sent.

8.1 CANSim Identification Message

A special CANSim identification message for debugging purposes is sent for every mode and every CAN channel. Identification message attributes are shown in the following table.

Table 3: Identification Message Attributes

ID	1FFFFFFF
Type	Extended CAN
DLC	7
Cycle time	1000

The content of the identification message is explained in the following table. All values are transmitted in the order according to Motorola Byte.

Table 4: Identification Message Content

Bit Position	Length	Value
0	16	FW version (BCD number)
16	4	CAN channel number
20	4	Mode (position of the rotary switch)
24	4	Functional DIP switches 9 to 12
32	8	Functional DIP switches 1 to 8
40	16	Serial number (BCD)

8.2 Mode 1 – MQB Infotainment Gateway

Table 5: Messages in Mode 1 - MQB Infotainment CAN

ID	Name	Cycle Time	DLC
40	Airbag_01	50	8
65A	BCM_01	1000	8
663	BEM_02	100	8
6B2	Diagnose_01	1000	8
5F0	Dimmung_01	200	8
643	Einheiten_01	1000	8
101	ESP_02	20	8
116	ESP_10	200	8
FD	ESP_21	20	8
3DA	Gateway_71	100	8
3DB	Gateway_72	100	8
3DC	Gateway_73	50	8
3EA	Gateway_77	200	8

3C0	Klemmen_Status_01	100	4
30B	Kombi_01	50	8
6B7	Kombi_02	1000	8
6B8	Kombi_03	1000	8
3D5	Licht_Anf_01	100	8
585	Systeminfo_01	1000	8
5B0	TimeDate (KCAN)	1000	8
6B6	Uhrzeit_01	200	6
6B4	VIN_01	200	8

8.3 Mode 1 – MQB37W Infotainment Gateway

Table 6: Messages in Mode 1 - MQB37W Infotainment CAN

ID	Name	Cycle Time	DLC
67C	AGA_01	1000	8
40	Airbag_01	50	8
520	Airbag_02	200	8
65A	BCM_01	1000	8
663	BEM_02	100	8
366	Blinkmodi_02	1000	8
12DD5507x	Daempfer_06	100	8
12DD5508x	Daempfer_06	100	8
6B2	Diagnose_01	1000	8
353	DiETa_01	80	8
5F0	Dimmung_01	200	8
1F0	EA_02	500	8
643	Einheiten_01	1000	8
101	ESP_02	20	8
116	ESP_10	200	8
65D	ESP_20	1000	8
FD	ESP_21	20	8
31B	ESP_24	50	8
2C3	FDR_04	100	8
1A555564x	FoD_01	1000	8
3DA	Gateway_71	100	8
3DB	Gateway_72	100	8
3DC	Gateway_73	50	8
3EA	Gateway_77	200	8
3C0	Klemmen_Status_01	100	4
668	Klima_12	200	8
16A95493x	Klima_16	1000	8
5E1	Klima_Sensor_02	200	8
30B	Kombi_01	50	8
6B7	Kombi_02	1000	8

6B8	Kombi_03	1000	8
16A95497x	Kombi_08	1000	8
16A954A8x	Kombi_23	1000	8
3D5	Licht_Anf_01	100	8
3D6	Licht_hinten_01	100	8
658	Licht_vorne_01	1000	8
48C	MFG_03	200	8
107	Motor_04	20	8
3BE	Motor_14	100	8
65F	Motor_16	500	8
670	Motor_18	500	8
56F	Motor_25	500	8
3C7	Motor_26	100	8
641	Motor_Code_01	1000	8
54B	Parkhilfe_04	100	8
16A9540Ax	Personalisierung_01	1000	8
12DD5485x	Personalisierung_02	1000	8
6AF	Rear_View_01	1000	8
1A5555ACx	SOK_NoAuthenticTime_01	1000	8
585	Systeminfo_01	1000	8
5B0	TimeDate (KCAN)	1000	8
6B6	Uhrzeit_01	200	6
6B4	VIN_01	200	8
551	WFS_01	200	8
1A55551Bx	WLC1_01	1000	8

8.4 Mode 1 – MEB Infotainment Simulator

Table 7: Messages in Mode 1 - MEB Anzeige und Bedienung CAN

ID	Name	Cycle Time	DLC	Type
40	Airbag_01	50	8	CAN FD
661	Anhaenger_01	100	8	CAN FD
65A	BCM_01	1000	8	CAN FD
663	BEM_02	100	8	CAN FD
48B	BEM_06	100	8	CAN FD
366	Blinkmodi_02	1000	8	CAN FD
387	Bremse_EV_02	100	8	CAN FD
12DD5506x	Daempfer_05	100	10	CAN FD
6B2	Diagnose_01	1000	8	CAN FD
5F0	Dimmung_01	200	8	CAN FD
1F0	EA_02	500	8	CAN FD
643	Einheiten_01 (KCAN)	1000	8	CAN FD
1F7	EPB_03	200	8	CAN FD
101	ESP_02 (KCAN)	20	8	CAN FD

116	ESP_10	200	8	CAN FD
FD	ESP_21	20	8	CAN FD
31B	ESP_24	50	8	CAN FD
1A555521x	ESP_30	1000	8	CAN FD
1A555564x	FoD_01	1000	8	CAN FD
3DA	Gateway_71	100	8	CAN FD
3DC	Gateway_73	50	8	CAN FD
144	Getriebe_16	20	8	CAN FD
503	HVK_01	100	8	CAN FD
592	Kessy_04	200	8	CAN FD
3C0	Klemmen_Status_01	100	4	CAN FD
58C	Klemmen_Steuerung_01	1000	8	CAN FD
30B	Kombi_01	50	8	CAN FD
6B7	Kombi_02	1000	8	CAN FD
6B8	Kombi_03	1000	8	CAN FD
32A	LH_EPS_01	50	8	CAN FD
3D6	Licht_hinten_01	100	8	CAN FD
658	Licht_vorne_01	1000	8	CAN FD
230	MFL_02	100	8	CAN FD
3BE	Motor_14	100	8	CAN FD
3C7	Motor_26	100	8	CAN FD
1A555548x	ORU_01	500	8	CAN FD
54B	Parkhilfe_04	100	8	CAN FD
16A9540Ax	Personalisierung_01	1000	8	CAN FD
5A0	RLS_01	200	5	CAN FD
585	Systeminfo_01	1000	8	CAN FD
12DD54D6x	UserStateServer_01	100	8	CAN FD
6B4	VIN_01	200	8	CAN FD
394	WBA_03	160	8	CAN FD
6A6	Wischer_01	1000	2	CAN FD
1A55551Bx	WLC1_01	1000	8	CAN FD

8.5 Mode 2 – MQB

Table 8: Messages in Mode 2 - MQB Infotainment CAN

ID	Name	Cycle Time	DLC	Sender
40	Airbag_01	50	8	Gateway
65A	BCM_01	1000	8	Gateway
663	BEM_02	100	8	Gateway
6B2	Diagnose_01	1000	8	Gateway
5F0	Dimmung_01	200	8	Gateway
643	Einheiten_01	1000	8	Gateway
101	ESP_02	20	8	Gateway
116	ESP_10	20	8	Gateway

FD	ESP_21	20	8	Gateway
3DA	Gateway_71	100	8	Gateway
3DB	Gateway_72	100	8	Gateway
3DC	Gateway_73	50	8	Gateway
3EA	Gateway_77	200	8	Gateway
3C0	Klemmen_Status_01	100	4	Gateway
50	Klima_Sensor_02	200	8	Gateway
30B	Kombi_01	50	8	Gateway
6B7	Kombi_02	1000	8	Gateway
6B8	Kombi_03	1000	8	Gateway
3D5	Licht_Anf_01	100	8	Gateway
107	Motor_04	20	8	Gateway
A8	Motor_12	10	8	Gateway
3BE	Motor_14	100	8	Gateway
641	Motor_Code_01Rx	100	8	Gateway
32D	Motor_Gas_01	50	8	Gateway
650	Radio_01	1000	8	Radio
585	Systeminfo_01	1000	8	Gateway
5B0	TimeDate	1000	8	Gateway
6B4	VIN_01	200	8	Gateway

Table 9: Messages in Mode 2 - MQB Komfort CAN

ID	Name	Cycle Time	DLC	Sender
65A	BCM_01	1000	8	
6B2	Diagnose_01	1000	8	Gateway
5F0	Dimmung_01	200	8	
643	Einheiten_01	1000	8	
B2	ESP_19	10	8	Gateway
65D	ESP_20	1000	8	Gateway
31B	ESP_24	50	8	Gateway
3DA	Gateway_71	100	8	Gateway
3C0	Klemmen_Status_01	100	4	
50	Klima_Sensor_02	200	8	
30B	Kombi_01	50	8	
6B7	Kombi_02	1000	8	
6B8	Kombi_03	1000	8	
3D5	Licht_Anf_01	100	8	
647	Motor_09	50	8	Gateway
641	Motor_Code_01	100	8	Gateway
32D	Motor_Gas_01	50	8	Gateway
6B6	Uhrzeit_01	1000	6	
6B4	VIN_01	200	8	

Table 10: Messages in Mode 2 - MQB Antrieb CAN

ID	Name	Cycle Time	DLC	Sender
40	Airbag_01	50	8	Gateway
6B2	Diagnose_01	1000	8	Gateway
5F0	Dimmung_01	200	8	Gateway
128	Getriebe_06	20	3	
3C0	Klemmen_Status_01	100	4	Gateway
3D5	Licht_Anf_01	100	8	Gateway
86	LWI_01	10	8	
107	Motor_04	20	8	
647	Motor_09	50	8	
A8	Motor_12	10	8	
3BE	Motor_14	100	8	
641	Motor_Code_01	100	8	
32D	Motor_Gas_01	50	8	

Table 11: Messages in Mode 2 - MQB Fahrwerk CAN

ID	Name	Cycle Time	DLC	Sender
6B2	Diagnose_01	1000	8	Gateway
5F0	Dimmung_01	200	8	Gateway
101	ESP_02	20	8	
116	ESP_10	20	8	
B2	ESP_19	10	8	
65D	ESP_20	1000	8	Gateway
FD	ESP_21	20	8	
31B	ESP_24	50	8	
3C0	Klemmen_Status_01	100	4	Gateway
9F	LH_EPS_03	10	8	
3D5	Licht_Anf_01	100	8	Gateway
641	Motor_Code_01	100	8	Gateway

8.6 Mode 3 – MQB37W

Table 12: Messages in Mode 3 - MQB37W Infotainment CAN

ID	Name	Cycle Time	DLC	Sender
67C	AGA_01	100	8	Gateway
40	Airbag_01	50	8	Gateway
520	Airbag_02	200	8	Gateway
65A	BCM_01	100	8	Gateway
663	BEM_02	100	8	Gateway
366	Blinkmodi_02	100	8	Gateway
6B2	Diagnose_01	100	8	Gateway
5F0	Dimmung_01	200	8	Gateway

643	Einheiten_01	100	8	Gateway
116	ESP_10	20	8	Gateway
3DA	Gateway_71	100	8	Gateway
3DB	Gateway_72	100	8	Gateway
3DC	Gateway_73	50	8	Gateway
3EA	Gateway_77	200	8	Gateway
3C0	Klemmen_Status_01	100	4	Gateway
668	Klima_12	200	8	Gateway
30B	Kombi_01	50	8	Gateway
6B7	Kombi_02	1000	8	Gateway
6B8	Kombi_03	100	8	Gateway
16A95497x	Kombi_08	100	8	Gateway
3D5	Licht_Anf_01	100	8	Gateway
658	Licht_vorne_01	100	8	Gateway
481	MainUnit_01	1000	8	Gateway
107	Motor_04	20	8	Gateway
3BE	Motor_14	100	8	Gateway
3C7	Motor_26	100	8	Gateway
641	Motor_Code_01	100	8	Gateway
32D	Motor_Gas_01	50	8	Gateway
650	Radio_01	1000	8	Radio
585	Systeminfo_01	100	8	Gateway
665	Telefon_01	1000	7	Radio
5B0	TimeDate	1000	8	Gateway
6B4	VIN_01	200	8	Gateway

Table 13: Messages in Mode 3 - MQB37W Komfort CAN

ID	Name	Cycle Time	DLC	Sender
67C	AGA_01	1000	8	Gateway
40	Airbag_01	40	8	Gateway
520	Airbag_02	200	8	Gateway
65A	BCM_01	1000	8	
366	Blinkmodi_02	1000	8	
6B2	Diagnose_01	1000	8	
5F0	Dimmung_01	200	8	
643	Einheiten_01	1000	8	
116	ESP_10	20	8	Gateway
3EA	Gateway 77	200	8	Gateway
3DA	Gateway_71	100	8	Gateway
3DC	Gateway_73	50	8	Gateway
3C0	Klemmen_Status_01	100	4	
58C	Klemmen_Steuerung_01	1000	8	
668	Klima_12	200	8	
30B	Kombi_01	50	8	

6B8	Kombi_03	1000	8	
16A95497x	Kombi_08	1000	8	
3D5	Licht_Anf_01	100	8	
3D6	Licht_hinten_0	100	8	
658	Licht_vorne_01	100	8	
107	Motor_04	20	8	Gateway
3BE	Motor_14	100	8	Gateway
3C7	Motor_26	100	8	Gateway
641	Motor_Code_01	1000	8	Gateway
32D	Motor_Gas_01	50	8	Gateway
5B0	TimeDate	1000	8	
6B4	VIN_01	200	8	

Table 14: Messages in Mode 3 - MQB37W Antrieb CAN

ID	Name	Cycle Time	DLC	Sender	Type
67C	AGA_01	1000	8		CAN FD
40	Airbag_01	40	8		CAN
520	Airbag_02	200	8		CAN
6B2	Diagnose_01	1000	8	Gateway	CAN FD
5F0	Dimmung_01	200	8	Gateway	CAN FD
643	Einheiten_01	1000	8	Gateway	CAN FD
116	ESP_10	20	8	Gateway	CAN FD
3DB	Gateway_72	100	8	Gateway	CAN FD
3C0	Klemmen_Status_01	100	4	Gateway	CAN
3C0	Klemmen_Status_01	100	4	Gateway	CAN FD
58C	Klemmen_Steuerung_01	1000	8	Gateway	CAN FD
30B	Kombi_01	50	8	Gateway	CAN FD
6B7	Kombi_02	1000	8	Gateway	CAN FD
3D6	Licht_hinten_01	100	8	Gateway	CAN FD
86	LWI_01	5	8		CAN FD
3BE	Motor_14	100	8		CAN FD
3C7	Motor_26	100	8		CAN FD
641	Motor_Code_01	1000	8		CAN FD
32D	Motor_Gas_01	50	8		CAN FD
14A	Motor52	20	32		CAN FD
6B4	VIN_01	200	8	Gateway	CAN FD

Table 15: Messages in Mode 3 - MQB37W Fahrwerk CAN

ID	Name	Cycle Time	DLC	Sender	Type
40	Airbag_01	40	8	Gateway	CAN FD
520	Airbag_02	200	8	Gateway	CAN FD
5F0	Dimmung_01	200	8	Gateway	CAN FD
116	ESP_10	20	8		CAN FD
3DB	Gateway_72	100	8	Gateway	CAN FD

3C0	Klemmen_Status_01	100	4	Gateway	CAN FD
30B	Kombi_01	50	8	Gateway	CAN FD
6B7	Kombi_02	1000	8	Gateway	CAN FD
3D6	Licht_hinten_01	100	8	Gateway	CAN FD
3BE	Motor_14	100	8		CAN FD
641	Motor_Code_01	1000	8	Gateway	CAN FD
32D	Motor_Gas_01	50	8	Gateway	CAN FD
6B4	VIN_01	200	8	Gateway	CAN FD

8.7 Mode 4 – MQB Test Bench

Table 16: Messages in Mode 4 - MQB Komfort CAN

ID	Name	Cycle Time	DLC	Sender
65A	BCM_01	1000	8	BCM
366	Blinkmodi_02	1000	8	BCM
5F0	Dimmung_01	200	8	BCM
643	Einheiten_01	1000	8	Kombi
3C0	Klemmen_Status_01	100	4	BCM
668	Klima_12	200	8	Klima
5E1	Klima_Sensor_02	200	8	BCM
30B	Kombi_01	50	8	Kombi
6B7	Kombi_02	1000	8	Kombi
6B8	Kombi_03	1000	8	Kombi
3D5	Licht_Anf_01	100	8	BCM
6B6	Uhrzeit_01	1000	6	Kombi
6B4	VIN_01	200	8	Kombi

Table 17: Messages in Mode 4 - MQB Antrieb CAN

ID	Name	Cycle Time	DLC	Sender
40	Airbag_01	50	8	
520	Airbag_02	200	8	
128	Getriebe_06	20	3	Motor
86	LWI_01	10	8	
107	Motor_04	20	8	Motor
647	Motor_09	500	8	Motor
A8	Motor_12	10	8	Motor
3BE	Motor_14	100	8	Motor
3C7	Motor_26	100	8	Motor
641	Motor_Code_01	1000	8	Motor

Table 18: Messages in Mode 4 - MQB Fahrwerk CAN

ID	Name	Cycle Time	DLC	Sender
104	EPB_01	20	8	ESP
101	ESP_02	20	8	ESP

116	ESP_10	20	8	ESP
B2	ESP_19	10	8	ESP
65D	ESP_20	1000	8	ESP
31B	ESP_24	50	8	ESP
9F	LH_EPS_03	10	8	ESP

8.8 Mode 4 – MQB37W Test Bench

Table 19: Messages in Mode 4 - MQB37W Komfort CAN

ID	Name	Cycle Time	DLC	Sender
56A	BCM_01	1000	8	BCM
366	Blinkmodi_02	1000	8	BCM
5F0	Dimmung_01	200	4	BCM
643	Einheiten_01	1000	8	Kombi
3C0	Klemmen_Status_01	1000	4	BCM
58V	Klemmen_Steuerung_01	1000	8	BCM
668	Klima_12	200	8	Klima
5E1	Klima_Sensor_02	200	8	BCM
30B	Kombi_01	50	8	Kombi
6B7	Kombi_02	1000	8	Kombi
6B8	Kombi_03	1000	8	Kombi
16A95497x	Kombi_08	1000	8	Kombi
3D5	Licht_Anf_01	100	8	BCM
6B6	Uhrzeit_01	1000	6	Kombi

Table 20: Messages in Mode 4 - MQB37W Antrieb CAN

ID	Name	Cycle Time	DLC	Sender	Type
67C	AGA_01	1000	8	Motor	CAN FD
86	LWI_01	10	8		CAN FD
647	Motor_09	500	8	Motor	CAN FD
A8	Motor_12	10	8	Motor	CAN FD
3BE	Motor_14	100	8	Motor	CAN FD
3C7	Motor_26	100	8	Motor	CAN FD
14A	Motor_52	20	13	Motor	CAN FD
641	Motor_Code_01	1000	8	Motor	CAN FD
32D	Motor_Gas_01	50	8	Motor	CAN FD

Table 21: Messages in Mode 4 - MQB37W Fahrwerk CAN

ID	Name	Cycle Time	DLC	Sender	Type
40	Airbag_01	50	8		CAN FD
520	Airbag_02	200	8		CAN FD
116	ESP_10	20	8	ESP	CAN FD
65D	ESP_20	1000	8	ESP	CAN FD
FD	ESP_21	20	8	ESP	CAN FD

31B	ESP_24	50	8	ESP	CAN FD
9F	LH_EPS_03	10	8	ESP	CAN FD

8.9 Mode 6 – MEB Test Bench

Table 22: Messages in Mode 6 - MEB Connect CAN

ID	Name	Cycle Time	DLC	Sender
65A	BCM_01	1000	8	SAM
16A9549Dx	NFC_MiKo_01	200	8	
16A9549Ex	NFC_TGS_01	200	8	
205	SAM_01	200	8	SAM
5A7	TM_01	1000	8	OCU
12DD54C8x	UHF_Kessy_01	200	8	SAM
12DD5525x	UHF_Sensor_09	200	8	SAM

Table 23: Messages in Mode 6 - MEB Komfort CAN

ID	Name	Cycle Time	DLC	Sender
661	Anhaenger_01	100	8	AAG
656	ELV_01	100	8	ELV
65A	BCM_01	1000	8	SAM
12DD546Fx	BCM_04	200	8	SAM
12DD5471x	BCM_05	200	8	SAM
20E	BCM_06	200	8	SAM
598	BCM_Taster_02	1000	8	SAM
643	Einheiten_01	1000	8	
5F4	Innenlicht_11	500	8	SAM
3B5	Klima_11	100	8	Klima
668	Klima_12	200	8	Klima
5A0	RLS_01	200	5	SAM
205	SAM_01	200	8	SAM
3D0	TGS_FT_01	100	8	

Table 24: Messages in Mode 6 - MEB Antrieb CAN

ID	Name	Cycle Time	DLC	Sender	Type
40	Airbag_01	50	8	Airbag	CAN
520	Airbag_02	200	8	Airbag	CAN
AD	Getriebe_11	10	8	Motor_BEV	CAN FD
144x	Getriebe_16	20	8	Motor_BEV	CAN FD
503	HVK_01	100	8	Motor_BEV	CAN FD
A8	Motor_12	10	8	Motor_BEV	CAN FD
3BE	Motor_14	100	8	Motor_BEV	CAN FD
670	Motor_18	500	8	Motor_BEV	CAN FD
3C7	Motor_26	100	8	Motor_BEV	CAN FD
14A	Motor_52	20	13	Motor_BEV	CAN FD

641	Motor_Code_01	1000	8	Motor_BEV	CAN FD
13F	PreCrash_02	200	8	Airbag	CAN
B5	Waehlhebel_04	10	8		CAN
12DD54BFx	Waehlhebel_06	1000	8		CAN
394	WBA_03	160	8	Motor_BEV	CAN

Table 25: Messages in Mode 6 - MEB Fahrwerk CAN

ID	Name	Cycle Time	DLC	Sender	Type
387	Bremse_EV_02	100	8		CAN FD
12DD5506x	Daempfer_05	100	10		CAN FD
176	EBKV_03	20	8		CAN FD
1F7	EPB_03	200	8	ESC_EPB	CAN FD
102	ESC_50	20	14	ESC_EPB	CAN FD
FC	ESC_51	10	14	ESC_EPB	CAN FD
116	ESP_10	20	8	ESC_EPB	CAN FD
65D	ESP_20	1000	8	ESC_EPB	CAN FD
FD	ESP_21	20	8	ESC_EPB	CAN FD
31B	ESP_24	50	8	ESC_EPB	CAN FD
1A555521x	ESP_30	1000	8	ESC_EPB	CAN FD
32A	LH_EPS_01	50	8		CAN FD
9F	LH_EPS_03	10	8		CAN FD
86	LWI_01	10	8		CAN FD
2B7	RCTA_01	50	8		CAN FD

8.10 Mode 8 – MQBW Baseline Test Bench

Message table will be added in future release of the user manual.

8.11 Mode 9 – MEB UN ECE Test Bench

Message table will be added in future release of the user manual.

9 Main Connector Pinout

Figure 14: Main Connector DSUB15

Table 26: Main Connector Pinout

Pin No.	Name	Pin No.	Name	Pin No.	Name
1	GND	6	LIN2	11	LIN1
2	PWM	7	CAN1 High	12	CAN1 Low
3	Kl .S	8	CAN2 High	13	CAN2 Low
4	Kl.15	9	CAN3 High	14	CAN3 Low
5	Kl.30 (input)	10	CAN4 High	15	CAN4 Low

PIN 5 ”KL.30” accepts input supply voltage 8 - 18 V. Overvoltage can damage the device!

9.1 KL.15 and KL.S Output

CANSim is equipped with embedded 12 V HS switch for KL.15 and KL.S signals. Electronic fuses, which disconnect the output when the current exceeds 700 mA, are installed on the switches. To restore the full function of the device it is necessary to restart the device (unplug and plug the power supply).

9.2 PWM Output

CANSim device generates analog signal “no-crash” (according to standard VW80105-93) on pin number 2. This signal is normally generated by airbag unit and it is needed by OCU unit.

ATTENTION: *This signal isn’t connected in any old cable harness “1:1”. It is necessary to check it before use!*

10 Accessories

10.1 Cable Harness

It is possible to get three types of cable harness.

10.1.1 Cable Harness 1:1

This bundle connects all contacts from the main CANON 15 connector (female) with the same connector (male). The wiring is 1-to-1, i.e. the same pinout on both connectors.

Figure 15: Cable Harness "1:1" – Photo

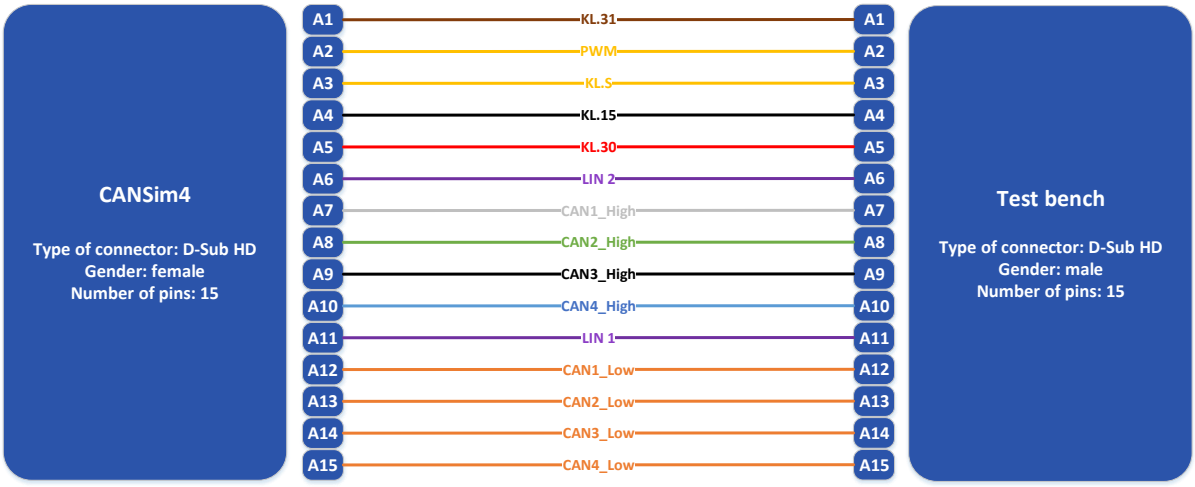

Figure 16: Cable Harness 1:1 – Schematics

10.1.2 Octopus Cable Harness

All CANs from the main CANON 15 connector (female) are divided into separate CANON 9 connectors (male).

Figure 17: Octopus Cable Harness – Photo

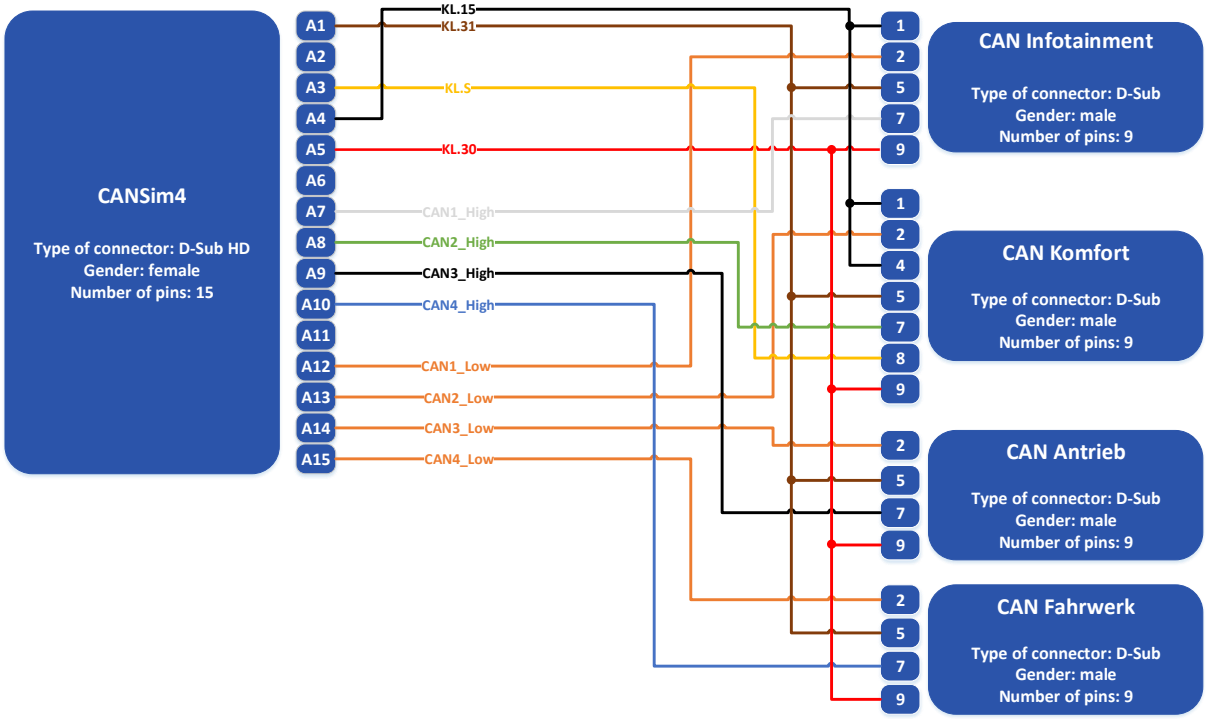

Figure 18: Octopus Cable Harness – Schematics

10.1.3 Full Octopus Cable Harness

All CANs, power supply (KL.30, KL.31), LIN buses and PWM output from the main CANON 15 connector (female) are divided and connected to separate CANON 9 connectors (male) and banana connectors.

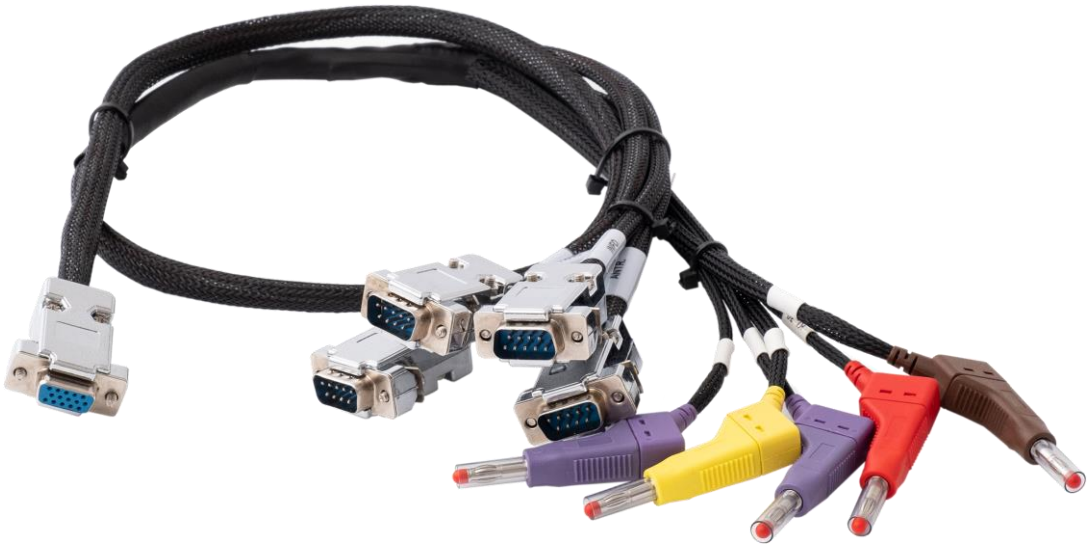

Figure 19: Full Octopus Cable Harness – Photo

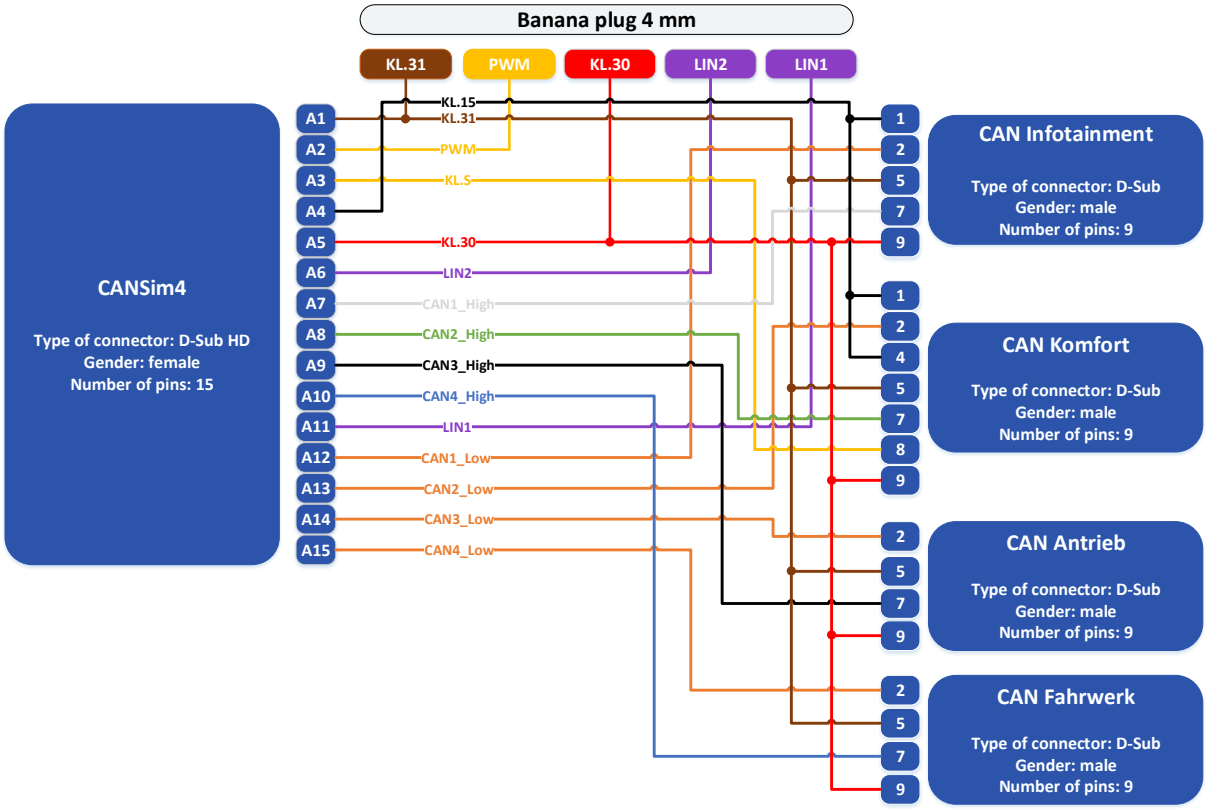

Figure 20: Full Octopus Cable Harness – Schematics

10.2 Extension Ignition Module

MQB37W and MEB test benches are equipped with an extension ignition module to ensure correct functioning of the KL.15 (and KL.S for the former one) pin due to the opposite polarity of the appropriate pins on the BCM unit (in case of MQB37W) and SAM unit (in the case of MEB, since May 2019, all Digiteq Automotive test benches for the MEB platform are equipped with an extension ignition module. Additional mounting to MQB37W test benches, to previously manufactured MEB test benches, or to other test benches (just like ones from third parties) is possible on demand.

Figure 21: Extension Ignition Module

10.3 Power Supply

For power supply a power adapter can be used (see Figure 22). A cable with banana connectors (see Figure 23) can be used for 12 V supply (e.g. laboratory supply). The polarity is shown in Figure 24.

Figure 22: Power Adapter

Figure 23: Cable with Banana Connectors

Figure 24: External Power Supply Polarity

10.4 Computer Connection

A mini USB cable (see Figure 25) can be used for connecting CANSim to a computer (e.g. for FW upgrade). **CANSim may be powered the USB cable during FW update and configuration, but not for CAN-bus communication.**

Figure 25: USB Data Cable