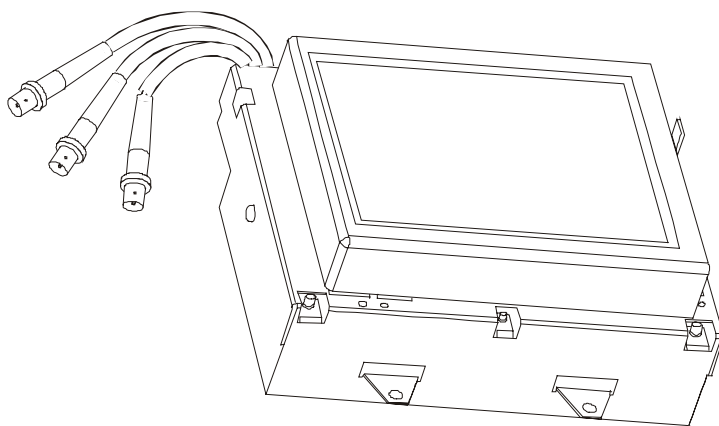


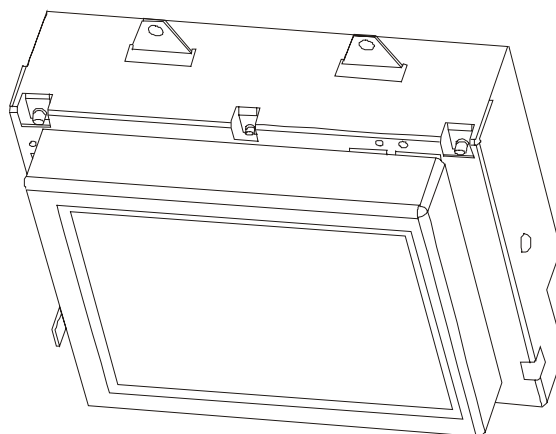
DMUX 1366

Hardware Documentation



Color

Monochrom



0 Imprint

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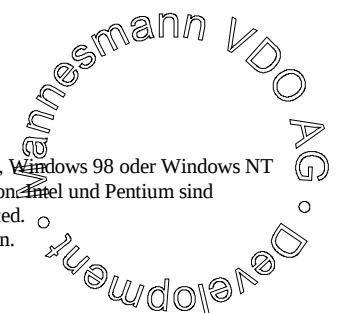
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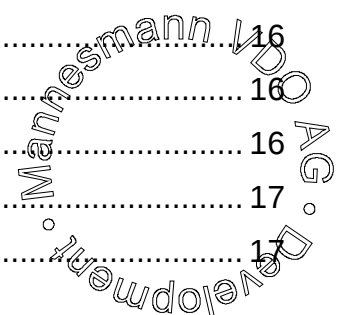
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1 Revision level

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01.00.00	15. Sep. 98	W. Hölzle	IC43 LE/FE		Initial version
01.01.00	19. Oct. 98	W. Hölzle	IC43 LE/FE		Mechanical dimensions updated
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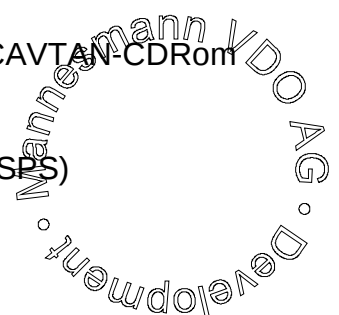
3 Introduction

3.1 Terms

DMUX	Display Multiplex Node
FAP	Driver Work Place (DWP) for City Buses
KIBES [®]	Kienzle Bord Elektronik System
MidLine	Monochromatic version (equivalent to DMUX-M)
HighLine	Color version, video capable (black and white NTSC-format) (equivalent to DMUX-C)
MOKI	Module Combi (Standard Instrument Cluster 1571/1572)
ZR2	KIBES-2 Central Computer
ZI	Central Informator (display within FAP with fixed program)

3.2 Acronyms

CAN	Controller Area Network
CAN_L	CAN Low
CAN_H	CAN High
CAN_L_AB	CAN termination resistor (120Ω)
CAVTAN [®]	Control And Visualization Tool for Automotive Networks
DSTN	Double Super Twisted Nematic
HS	High Side
I-CAN	Instrument CAN
K-CAN	Comfort CAN
MTCO	Modular Tachograph
Para Editor	Parameter Editor, separate program on CAVTAN-CDRom
Res_CAN	Reserved CAN
PLC	Programmable Logic Control (German = SPS)
TFT	Thin Film Transistor



4 Introduction

The DMUX subassembly contains a graphic display, an interface board and a control & power board. The graphics screen displays the central vehicle information. The interface board with analog/digital and status I/O senses the operating functions in the instrument panel, while the control & power board communicates with various interfaces for complete information exchange via the CAN buses with external components.

The Display Multiplex Node DMUX is the central display and I/O control unit in the instrument panel. It can be used as an individual component or integrated in the Module Combi or a Driver's Working Place.

The DMUX consists of following components:

The **Graphic Display** visualises central vehicle information as the primary monitor in the instrument panel or is used to display comfort functions in the secondary area.

The **Interface Board**, with analogue and digital inputs/outputs, provides the recording and control of operating functions in the in the instrument panel and fulfils the function of a special dashboard multiplex node.

The **Control and Power Board** is used to exchange information between the various system interfaces and external components.

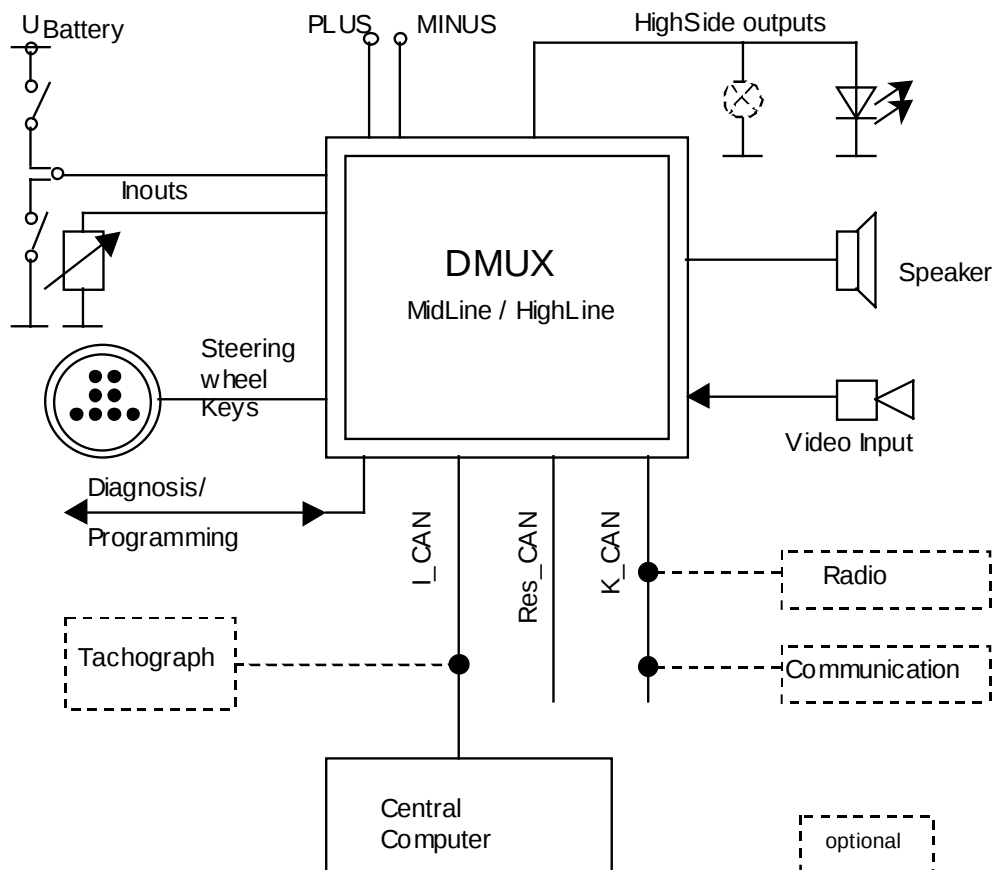
The basic version of the DMUX is primarily distinguished by the graphic display which is used. It is available as a monochrome (DMUX-M) or colour version (DMUX-C).

When used as the primary monitor, the information from the KIBES Electronic System, which is necessary for the central information representation for the driver, is made available by the CAN-Bus (in accordance to SAE J1939). In addition, via programmable Input/Outputs, the DMUX records/controls the functions of the operating elements in the area of the dashboard, such as switches and telltales, and makes them available to the Multiplex System via CAN. Special interfaces in hardware and software make it possible to extend the driver information system to an interactive control system for Commercial Vehicles.

The DMUX is programmed by vehicle manufacturers to meet their particular requirements. The comprehensive PC Programming Tool CAVTAN supports development and simulation of the graphical images for the man machine interface (MMI/HMI), enabling the development times for the vehicle manufacturer to be reduced, as well as the quality and security of the software to be increased. With **CAVTAN Design**, using existing function and image libraries, image masks and image sequences are created. With **CAVTAN Control** logical sequences can be

controlled directly in the DMUX by means of a PLC programming language. The final program is downloaded End of Line.

4.1 Technical system structure

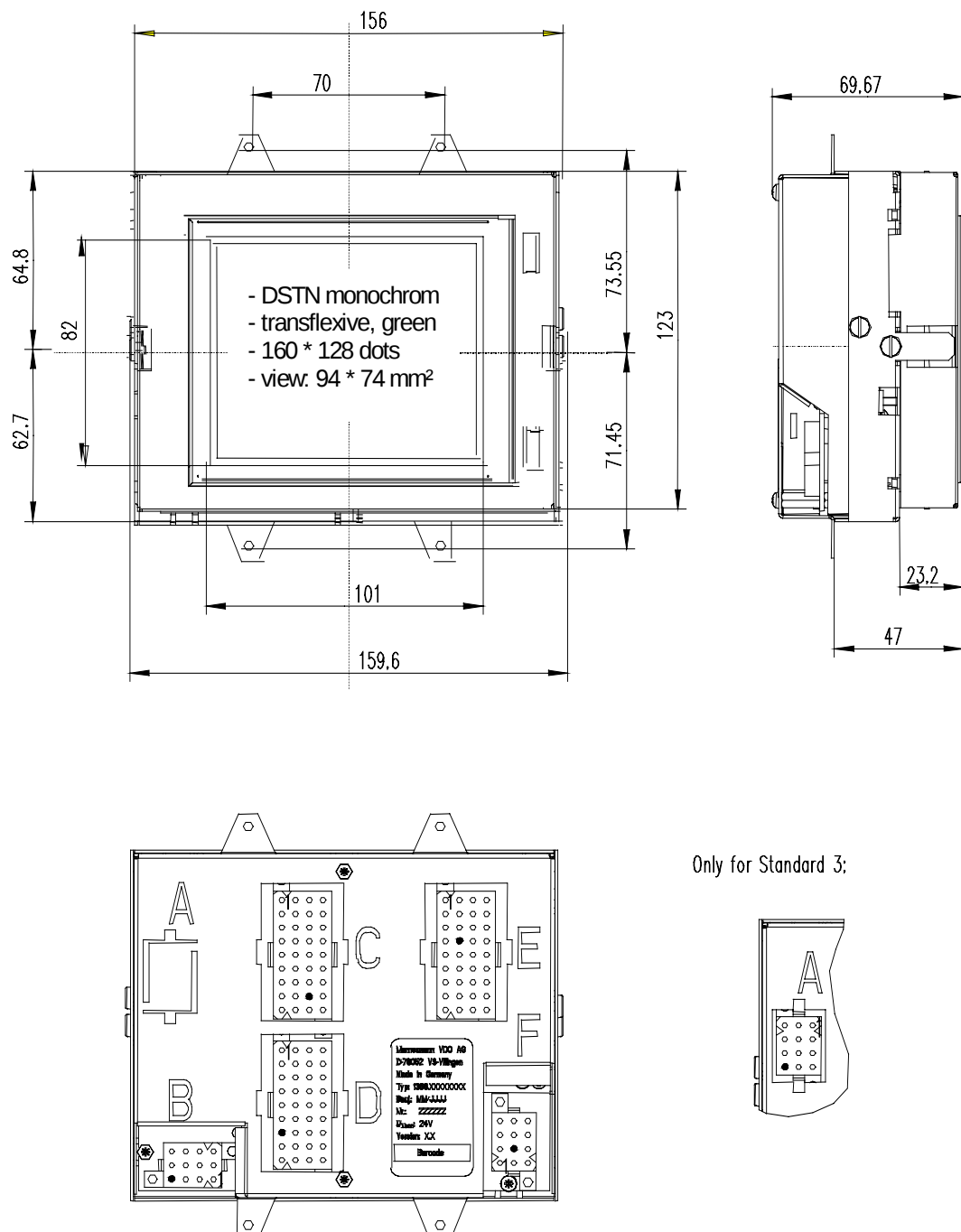


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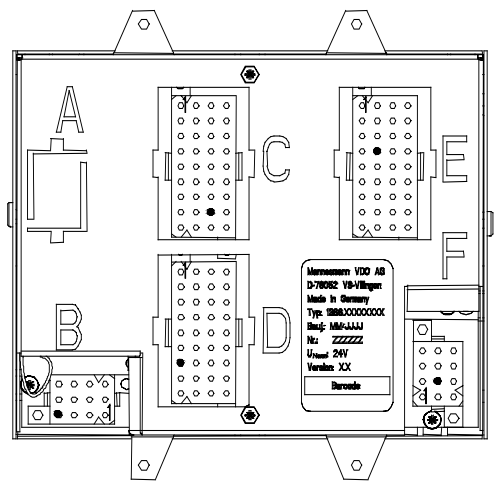
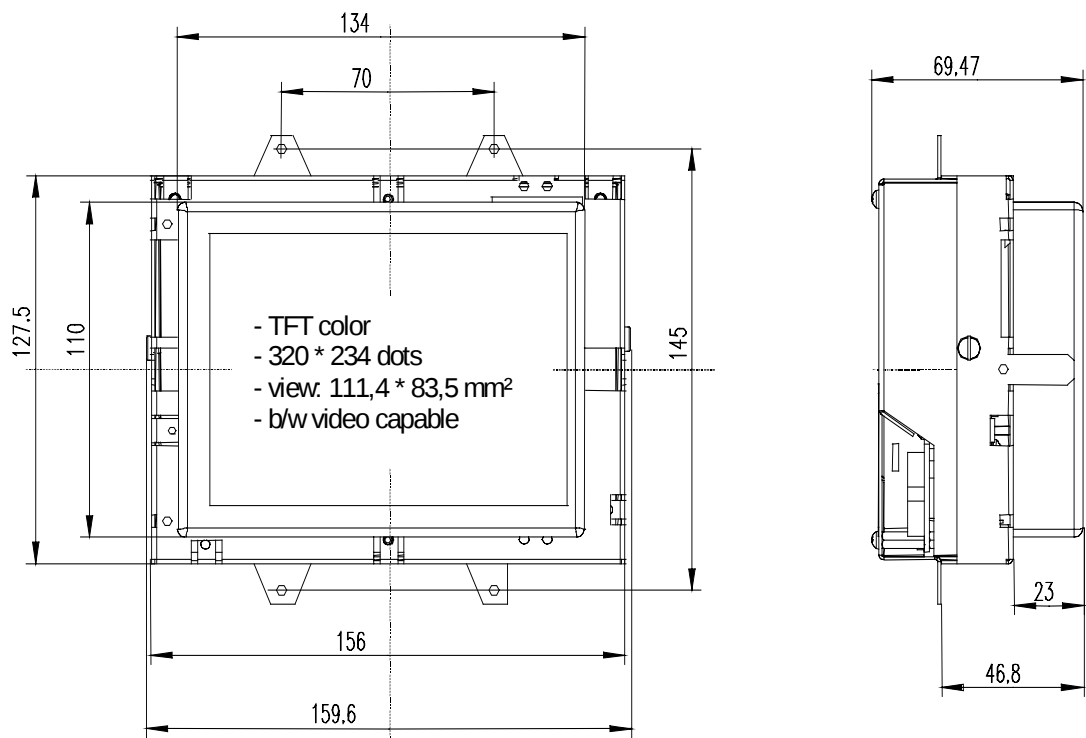
4.2 Housing

The top view of the module shows the 12° preferred direction of view (from top).

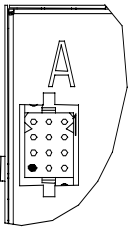
4.2.1 MidLine (DMUX-M)



4.2.2 High Line (DMUX-C)



Only for Standard 3:



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4.3 Plug and socket connectors

4.3.1 Counter connector for the wire harness

The ITT-Cannon series TRIDENT is used

- 12-pin type 192923-5940 (PACKING UNIT 100 parts)
- 36-pin type 192923-5960 (PACKING UNIT 100 parts)
- matching pin contacts for the connection size 0.75 – 1.5 mm²
loose contacts type 192990-0100 (PACKING UNIT 100 parts)
on-reel type 192990-2630 (PACKING UNIT 3000 parts)

4.3.2 Contact assignment

A

Signal			Signal			Signal			Signal
AUS_01_G1_HS	1	4	AUS_04_G1_HS			AUS_07_G1_HS	7	10	AUS_10_G1_HS
AUS_02_G1_HS	2	5	AUS_05_G1_HS			AUS_08_G1_HS	8	11	GND
AUS_03_G1_HS	3	6	AUS_06_G1_HS			AUS_09_G1_HS	9	12	!! CODEING PIN !!

B

Signal			Signal			Signal			Signal
I_CAN_L_AB	1	4	I_CAN_H1			CAN_GND2	7	10	!! CODEING PIN !!
I_CAN_L2	2	5	I_CAN_H2			Res_CAN_L	8	11	LAUTSPRECHER_A
I_CAN_L1	3	6	CAN_GND1			Res_CAN_H	9	12	LAUTSPRECHER_B

C

Signal			Signal			Signal			Signal
AUS_15_G2_HS	1	10	AUS_16_G2_HS			AUS_17_G2_HS	19	28	AUS_18_G2_HS
EIN_STATUS_34	2	11	EIN_STATUS_33			EIN_STATUS_37	20	29	EIN_STATUS_38
EIN_STATUS_35	3	12	EIN_STATUS_40			EIN_STATUS_39	21	30	EIN_STATUS_36
EIN_STATUS_54	4	13	EIN_STATUS_52			EIN_STATUS_44	22	31	EIN_STATUS_32
EIN_STATUS_45	5	14	EIN_STATUS_48			EIN_STATUS_58	23	32	EIN_STATUS_42
EIN_STATUS_51	6	15	EIN_STATUS_57			EIN_STATUS_53	24	33	EIN_STATUS_43
EIN_STATUS_49	7	16	EIN_STATUS_56			EIN_STATUS_47	25	34	EIN_STATUS_55
EIN_STATUS_46	8	17	EIN_STATUS_50			!! CODEING PIN !!	26	35	EIN_STATUS_41
AUS_19_G2_HS	9	18	AUS_20_G2_HS			AUS_21_G2_HS	27	36	AUS_22_G2_HS

D

Signal			Signal	Signal			Signal
EIN_STATUS_08 ¹⁾	1	10	EIN_STATUS_06 ¹⁾	EIN_STATUS_07 ¹⁾	19	28	EIN_STATUS_04 ¹⁾
EIN_STATUS_01 ¹⁾	2	11	EIN_STATUS_03 ¹⁾	EIN_STATUS_05 ¹⁾	20	29	EIN_STATUS_02 ¹⁾
EIN_STATUS_18	3	12	EIN_STATUS_10	EIN_STATUS_16	21	30	EIN_STATUS_24
EIN_STATUS_23	4	13	EIN_STATUS_12	EIN_STATUS_20	22	31	EIN_STATUS_26
EIN_STATUS_14	5	14	EIN_STATUS_27	EIN_STATUS_22	23	32	EIN_STATUS_25
EIN_STATUS_09	6	15	EIN_STATUS_21	EIN_STATUS_29	24	33	EIN_STATUS_19
!! CODEING PIN !!	7	16	EIN_STATUS_11	EIN_STATUS_13	25	34	EIN_STATUS_30
EIN_STATUS_28	8	17	EIN_STATUS_15	EIN_STATUS_17	26	35	EIN_STATUS_31
AUS_11_G2_HS	9	18	AUS_12_G2_HS	AUS_13_G2_HS	27	36	AUS_14_G2_HS

¹⁾ = wakeup capable input

E

Signal			Signal	Signal			Signal
AUS_23_G2_HS	1	10		EIN_STATUS_59	19	28	EIN_STATUS_60
AUS_24_G2_HS	2	11		EIN_STATUS_61	20	29	EIN_STATUS_62
AUS_25_G2_HS	3	12		EIN_STATUS_63	21	30	EIN_STATUS_64
AUS_26_G2_HS	4	13	!! CODEING PIN !!	EIN_STATUS_65	22	31	EIN_STATUS_66
AUS_27_G2_HS	5	14		EIN_STATUS_67	23	32	EIN_STATUS_68
AUS_28_G2_HS	6	15	I_CAN_GND2	EIN_ANALOG_01	24	33	MINUS
I_CAN_GND1	7	16	I_CAN_L_AB	EIN_ANALOG_02	25	34	MINUS
I_CAN_L1	8	17	I_CAN_L2	AUS_WAKE_UP	26	35	PLUS
I_CAN_H1	9	18	I_CAN_H2	AUS_PLUS	27	36	PLUS

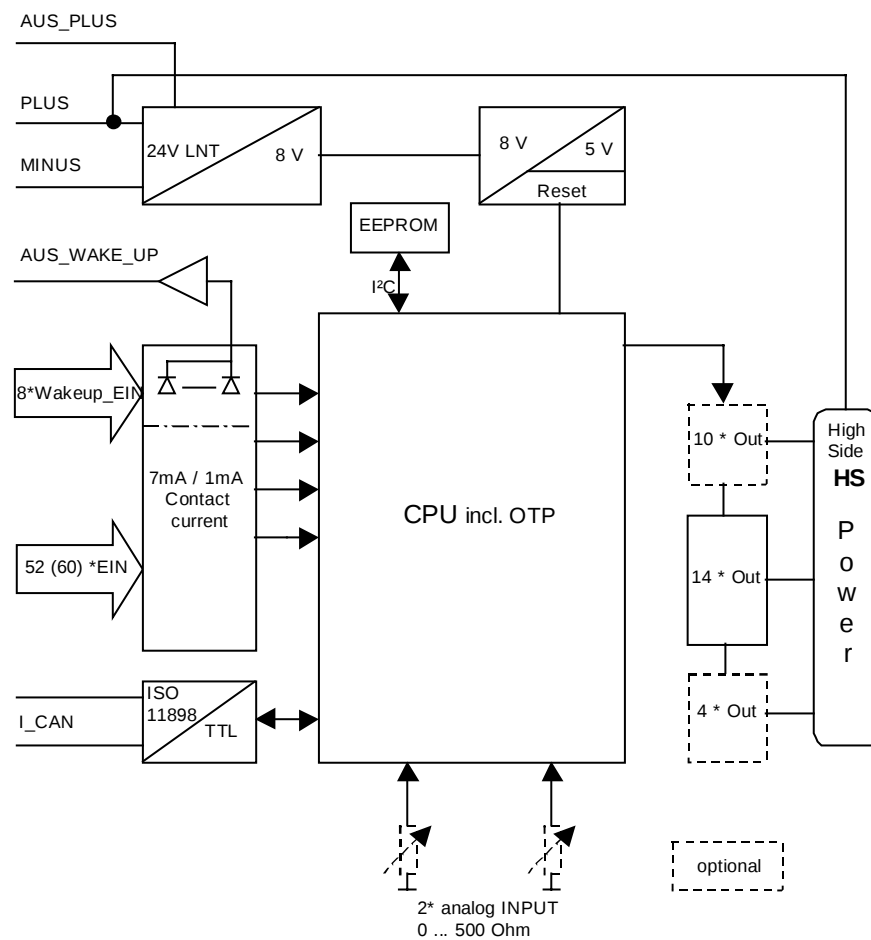
F

Signal			Signal	Signal			Signal
K_CAN_H	1	4	K_LINE	TASTATUR_PLUS	7	10	EXT_WAKE_UP1
K_CAN_L	2	5	!! CODEING PIN !!	TASTATUR_DATEN	8	11	EXT_WAKE_UP2
K_CAN_L_AB	3	6	TASTATUR_GND	MINUS	9	12	PLUS

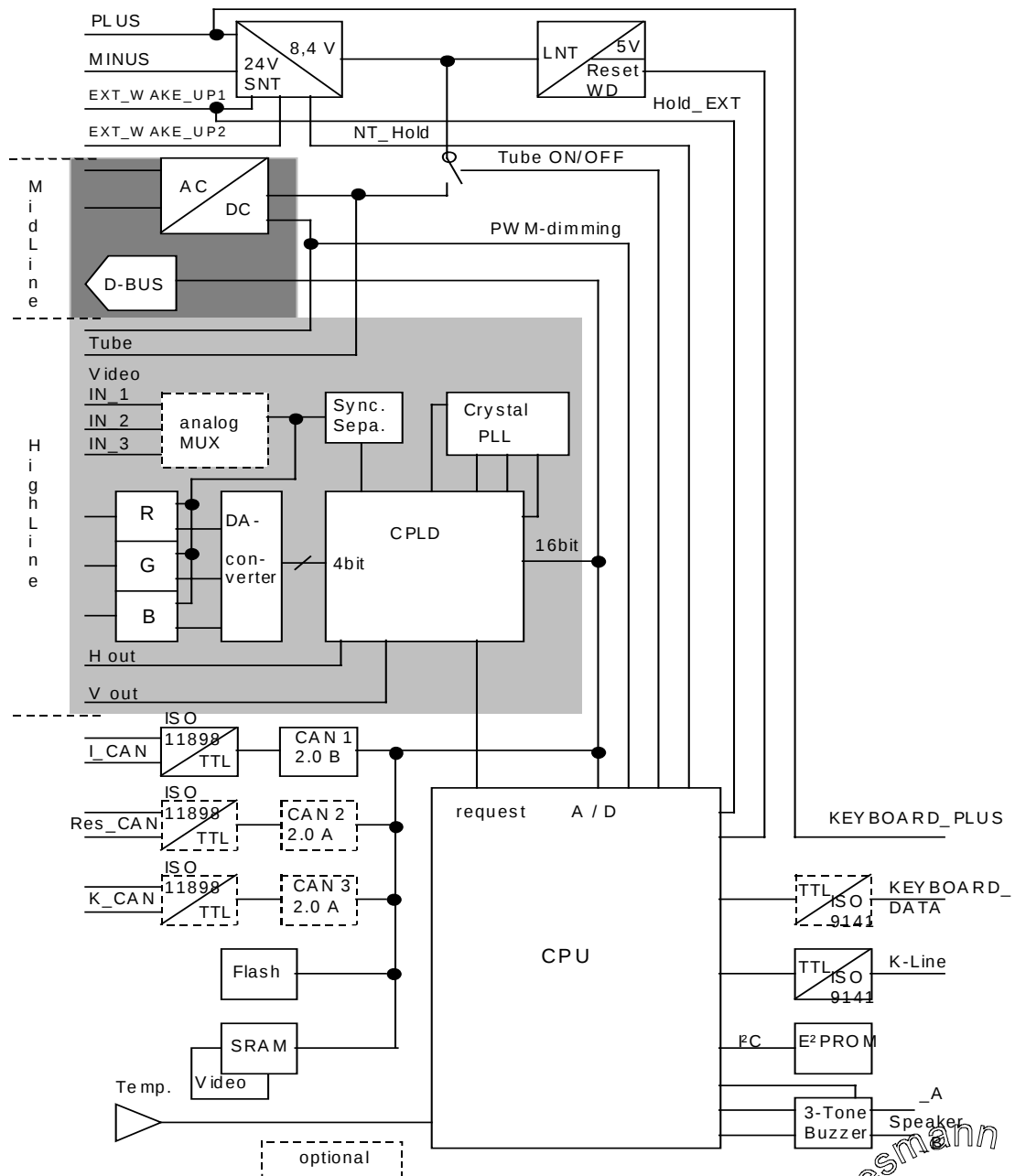
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4.4 Block circuit diagram

4.4.1 Interface board



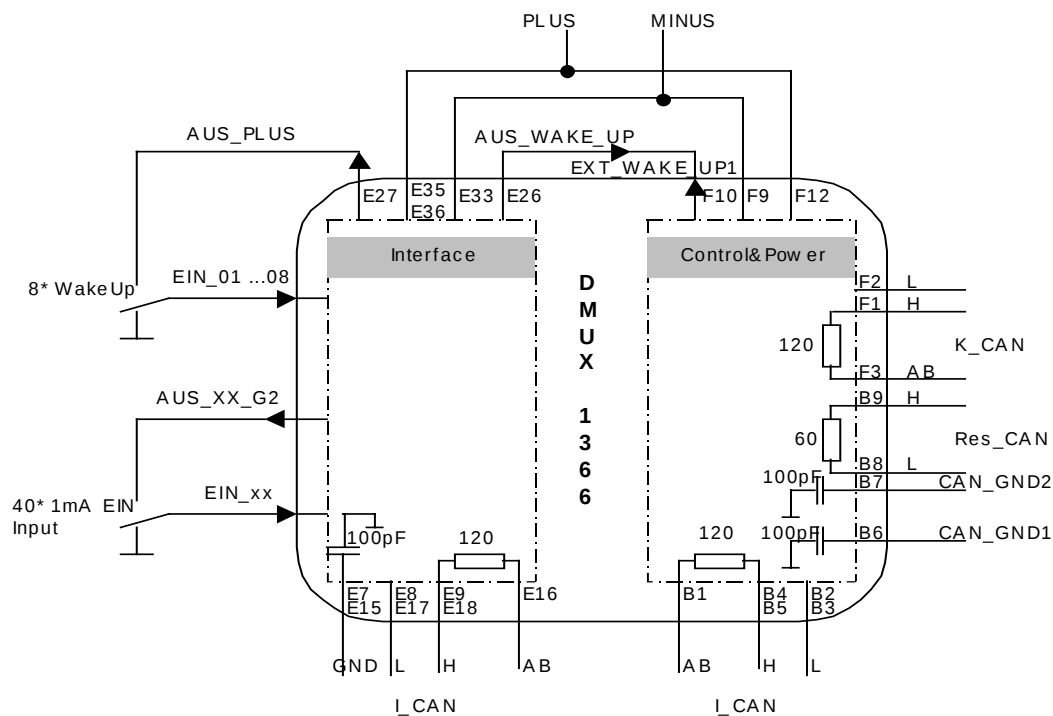
4.4.2 Control & power board



4.4.3 Wiring

Necessary board connections have to be made via the wire harness.

- **WAKE_UP:** this logic interface signal (AUS_WAKE_UP) activates the Control & power board at EXT_WAKE_UP1 and also wakes up other system components, when at least one EIN_STATUS_01 ..._08 has reached the threshold value of about 75% U_{PLUS} .
- **AUS_PLUS:** short circuit protected high side output for the voltage supply of the wakeup capable status inputs.
- **AUS_XX_G2:** A high side output of group2 can be used to generate an application controlled voltage supply for the status inputs.
- **I_CAN:** Connection to instrument panel (e.g. Module Combi), Tachograph, Central Computer ZR, etc.
see also 6.1 CAN wiring (proposal)



4.5 Voltage supply

For the supply voltage a central load-dump protection of 58V is required. The system is supplied via a constant power supply.

4.6 Computer core

4.6.1 Interface board

The computer core consists of an 8-bit microprocessor with peripheral extensions. The program is located in a not changeable ROM.

4.6.2 Control & power board

The microprocessor is micro code compatible to Intel 8086. A Flash-Eprom serves as program memory for the operating system and the user program.

4.7 Sensors and actuators

4.7.1 Inputs

- 60 (optional 68) diagnosis capable quasi analog status inputs, of these 8 inputs are wakeup capable.
23*7mA, 37(45)*1mA
- 2 analog inputs for resistance sensor (0 ... 500 ohms)

4.7.2 Outputs

Not diagnosis capable, not dimmable, short circuit protected high side outputs.

4.7.2.1 High side outputs

- 14 (optional 18) outputs for switch function LED's with 20mA each.
- 1 protected voltage supply output.
- Optional 10 outputs (group1) for the FAP-luminous field module with 60mA each.



4.8 Interfaces

4.8.1 CAN

Point-to-point connections to other components:

- I_CAN with physical layer according to ISO 11898
To the Tachograph and within the instrument cluster (Module Combi)
- K_CAN with physical layer according to ISO 11898 (optional)
to the system network radio, GSM, route guidance.
The protocol is not part of the standard DMUX device and must be specified according to projects
- CAN with physical layer according to ISO 11898 (optional)
Reserved for future use

4.8.2 Diagnosis / Programming

Serial K-Line interface according to ISO 9141

4.8.3 Keyboard (only HighLine version DMUX-C)

Adjusted serial interface according to ISO 9141 in the standard UART format as defined for the VDO System Steering Wheel 1590.

4.8.4 Speaker

Signal output for an external speaker with 1 watt.

4.8.5 Video inputs for cameras (only HighLine version DMUX-C)

3 black/white video signals (75 ohm) according to the NTSC standard.
Used for rear-view camera and for surveillance cameras, etc.

4.9 Firmware

The interface board has a core program that can not be modified by the user. The control of the DMUX is up to the control & power board. The operating system, the base program (control and diagnosis) as well as the visualization program are running here.

The VDO standard parameters for the Interface- and the Control&Power Board may be customized using the PC-Tool "Para Editor".

In case of an error the DMUX has a programmable emergency program.

This function sets I/O states for the 28 interface outputs.

5 Technical data

5.1 Validity

This specification is only valid for the C-samples.

5.2 Scope

Operational temperature	:	-20°C ...+70°C MidLine (DMUX-M) -20°C ... +50°C HighLine (DMUX-C)
Storage temperature	:	-40°C ... +80°C
Protection type		IP 20

	Not designed for use in explosion areas	
	Not planned as a part of safety-related systems	

To protect the unit and the wire harness (contacts) the mounting/demounting may only be done without connected voltage.

It is recommended to mount the DMUX behind a protection glass.



5.3 Voltage supply

The DMUX is supplied via constant power supply (with central load dump protection (max. 58V).

Nominal voltage:	PLUS (KI.30):	+24V	+12V variant
	MINUS (KI.31):	GND	not available yet
Functional range :		+21.5V ... +30V	

Operating current (with Input/Outputs not connected):

MidLine (DMUX-M): 250 mA at min. display illumination
430 mA at max. display illumination

HighLine (DMUX-C): 520 mA at min. display illumination
770 mA at max. display illumination

Stand-by consumption, interface board:	< 3 mA
Control & power board:	< 10 mA

Interface board:

Name	Connector pin
MINUS	E-33
MINUS	E-34
PLUS	E-35
PLUS	E-36

Control & power board:

Name	Connector pin
MINUS	F-9
PLUS	F-12

5.4 Activation of the unit

The DMUX 1366 can be turned on via Ext_WakeUP1 or Ext_WakeUP2.

The interface-inputs „EIN_STATUS_01 ... EIN_STATUS_08“ are wakeup capable signals and activate the „AUS_WAKE_UP“. This output (AUS_WAKE_UP) has then to be fed to the „EXT_WAKE_UP1“-input via the wire harness. A non switchable, short circuit protected output „AUS_PLUS“ ($I < 60\text{mA}$) can be used for the current supply ($+U_{\text{BAT}}$) of the switches.

interface board:

Name	Connector pin
AUS_PLUS	E-27
EIN_STATUS_01	D-2
EIN_STATUS_02	D-29
EIN_STATUS_03	D-11
EIN_STATUS_04	D-28
EIN_STATUS_05	D-20
EIN_STATUS_06	D-10
EIN_STATUS_07	D-19
EIN_STATUS_08	D-1
AUS_WAKE_UP	E-26

A wakeup input is active at $U_{\text{on}} \geq 75\% U_{\text{PLUS}}$

Control & power board:

Name	Connector pin
EXT_WAKE_UP1	F-10
EXT_WAKE_UP2	F-11

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5.5 Interfaces

5.5.1 CAN

- with physical layer according to ISO 11898

The I_CAN-interface exists twice at the connectors. The connector pins with the names CAN_L1 and CAN_L2, as well as CAN_H1 and CAN_H2 are connected internally and therefore equivalent.

A necessary termination resistor (120 ohm) is integrated on each board. It is activated via a jumper at the respective end of the branch. All CAN_GND's are decoupled with a capacitor of 100pF from the logic ground.

Interface board:

Name	Connector pin	Note
I_CAN_GND1	E-7	
I_CAN_GND2	E-15	
I_CAN_L1	E-8	
I_CAN_H1	E-9	
I_CAN_L2	E-17	
I_CAN_H2	E-18	
I_CAN_L_AB	E-16	120 ohm

Control & power board:

Name	Connector pin	Note
CAN_GND2	B-7	
Res_CAN_L	B-8	optional ^❶
Res_CAN_H	B-9	optional ^❶
CAN_GND1	B-6	
I_CAN_L1	B-3	
I_CAN_H1	B-4	
I_CAN_L2	B-2	
I_CAN_H2	B-5	
I_CAN_L_AB	B-1	120Ω
K_CAN_L_AB	F-3	120Ω ^❷
K_CAN_L	F-2	Optional ^❷
K_CAN_H	F-1	Optional ^❷

^❶ permanently assembled termination resistor = 60 ohm

^❷ not applicable in combination with Res_CAN

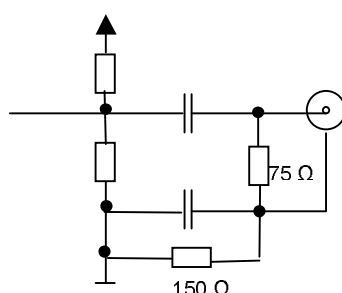


5.5.2 Video Input for Camera

The optional video connections are designed as pig tail. The connection is done via BNC-connector (video input: 1Vpp, 75Ω).

The shield of the video line has to be connected to ground on the side of the camera, since the DMUX decouples the shield capacitively (100pF) from the logic ground.

DMUX Line-Input



5.5.3 Diagnosis/Programming, Keyboard, Speaker

- Diagnosis/Programming
Serial K-Line according to ISO 9141
- Keyboard
3-wires (serial data according to ISO 9141 and power) to the steering wheel keyboard
- Speaker (1 Watt at 8 Ohm)

Control & power board:

Name (German)	Name (English)	Connector pin	Note
K_LINE	K_LINE	F-4	
TASTATUR_GND	KEYBOARD_GND	F-6	
TASTATUR_PLUS	KEYBOARD_PLUS	F-7	optional
TASTATUR_DATEN	KEYBOARD_DATA	F-8	optional
LAUTSPRECHER_A	SPEAKER_A	B-11	1 Watt at
LAUTSPRECHER_B	SPEAKER_B	B-12	8 Ohm



5.6 Sensors and actuators

5.6.1 Interface Inputs

Parameters selected at VDO factory:

Input contact current	type	Thresholds [U_{PLUS}]
1mA	1, F, 0	Low: 33%, High: 66%
7mA	1, -, 0	Low: 72%, High: 76%

5.6.1.1 Status Inputs

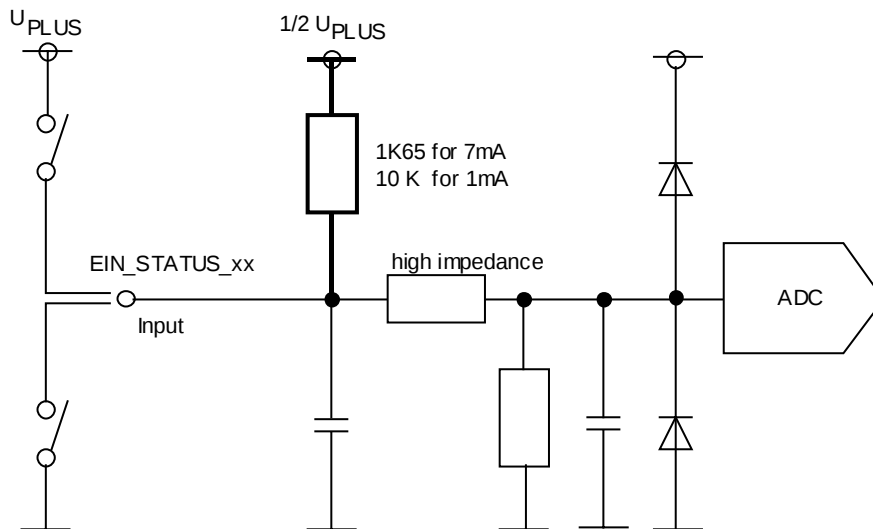
Name	Connector pin	Contact current	Note
EIN_STATUS_01	D-2	1 mA	Wake-up signal
EIN_STATUS_02	D-29	1 mA	Wake-up signal
EIN_STATUS_03	D-11	1 mA	Wake-up signal
EIN_STATUS_04	D-28	1 mA	Wake-up signal
EIN_STATUS_05	D-20	1 mA	Wake-up signal
EIN_STATUS_06	D-10	7 mA	Wake-up signal
EIN_STATUS_07	D-19	7 mA	Wake-up signal
EIN_STATUS_08	D-1	7 mA	Wake-up signal
EIN_STATUS_09	D-6	1 mA	
EIN_STATUS_10	D-12	7 mA	
EIN_STATUS_11	D-16	1 mA	
EIN_STATUS_12	D-13	7 mA	
EIN_STATUS_13	D-25	1 mA	
EIN_STATUS_14	D-5	7 mA	
EIN_STATUS_15	D-17	1 mA	
EIN_STATUS_16	D-21	7 mA	
EIN_STATUS_17	D-26	1 mA	
EIN_STATUS_18	D-3	7 mA	
EIN_STATUS_19	D-33	1 mA	
EIN_STATUS_20	D-22	7 mA	
EIN_STATUS_21	D-15	1 mA	

EIN_STATUS_22	D-23	7 mA	
EIN_STATUS_23	D-4	7 mA	
EIN_STATUS_24	D-30	7 mA	
EIN_STATUS_25	D-32	7 mA	
EIN_STATUS_26	D-31	7 mA	
EIN_STATUS_27	D-14	7 mA	
EIN_STATUS_28	D-8	1 mA	
EIN_STATUS_29	D-24	1 mA	
EIN_STATUS_30	D-34	1 mA	
EIN_STATUS_31	D-35	1 mA	
EIN_STATUS_32	C-31	1 mA	
EIN_STATUS_33	C-11	7 mA	
EIN_STATUS_34	C-2	7 mA	
EIN_STATUS_35	C-3	7 mA	
EIN_STATUS_36	C-30	7 mA	
EIN_STATUS_37	C-20	7 mA	
EIN_STATUS_38	C-29	7 mA	
EIN_STATUS_39	C-21	7 mA	
EIN_STATUS_40	C-12	7 mA	
EIN_STATUS_41	C-35	1 mA	
EIN_STATUS_42	C-32	1 mA	
EIN_STATUS_43	C-33	1 mA	
EIN_STATUS_44	C-22	1 mA	
EIN_STATUS_45	C-5	1 mA	
EIN_STATUS_46	C-8	1 mA	
EIN_STATUS_47	C-25	1 mA	
EIN_STATUS_48	C-14	1 mA	
EIN_STATUS_49	C-7	1 mA	
EIN_STATUS_50	C-17	1 mA	
EIN_STATUS_51	C-6	1 mA	
EIN_STATUS_52	C-13	1 mA	
EIN_STATUS_53	C-24	1 mA	

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EIN_STATUS_54	C-4	1 mA	
EIN_STATUS_55	C-34	1 mA	
EIN_STATUS_56	C-16	1 mA	
EIN_STATUS_57	C-15	1 mA	
EIN_STATUS_58	C-23	1 mA	
EIN_STATUS_59	E-19	1 mA	
EIN_STATUS_60	E-28	1 mA	
EIN_STATUS_61	E-20	1 mA	optional
EIN_STATUS_62	E-29	1 mA	optional
EIN_STATUS_63	E-21	1 mA	optional
EIN_STATUS_64	E-30	1 mA	optional
EIN_STATUS_65	E-22	1 mA	optional
EIN_STATUS_66	E-31	1 mA	optional
EIN_STATUS_67	E-23	1 mA	optional
EIN_STATUS_68	E-32	1 mA	optional

The contact currents are exclusively valid for 24 Volt operation.



The status inputs are sensed analog. A digital conversion takes place in the unit. It can be influenced via the parameters:

- Upper threshold value (High)
- Lower threshold value (Low)
- Type (arrangement of the ranges „ON(1)“, „OFF(0)“, „ERROR(F)“)
- Error time (can only be set as a fixed value)

The upper and lower **threshold value** parameters are specified in relation to the vehicle board voltage in percent (0...100% U_{KL30}). The board voltage range is divided into three (two) ranges by the two threshold values.

The **type** parameter specifies, which conditions are allocated to the three ranges.

- Range above the upper threshold value (1,0 or F)
- Range in the center (1,0,F or nothing)
- Range below the lower threshold value (1,0 or F)

The **error time** parameter specifies after how much time an error should be reported. The time is entered in steps of 10ms in the value range 0...250 (t = 0...2500ms). The error time is valid for all status inputs of a DMUX unit.

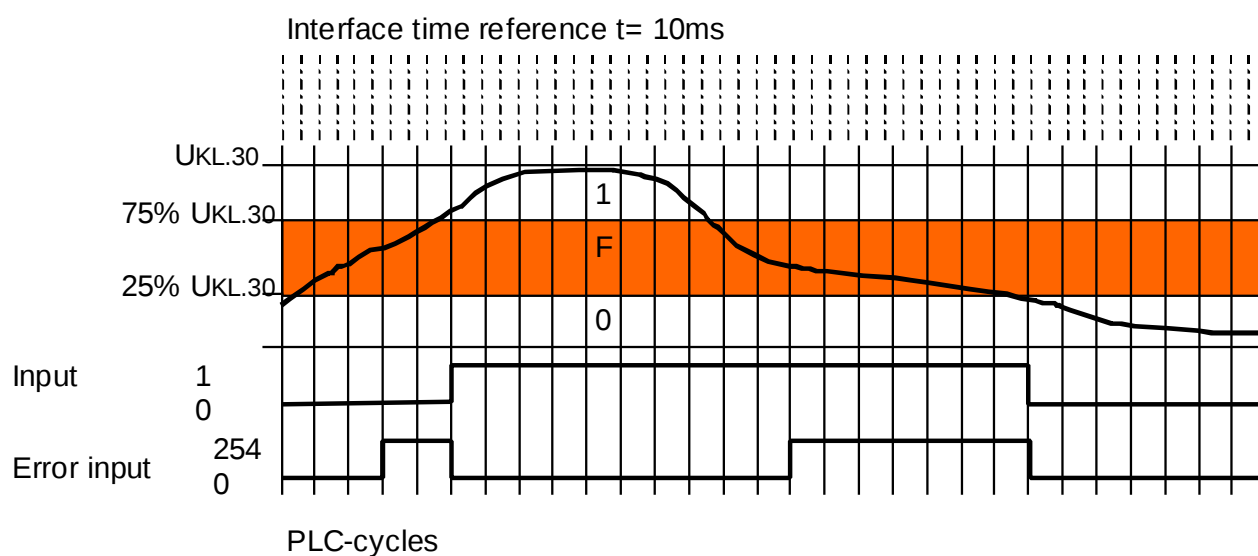
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Examples:

(upper threshold value = 75%, lower threshold value = 25%, board voltage = 24V)

0-1 →	voltages above 18V	→ status „inactive“
	voltages between 6 and 18V	→ status „active“
	or	→ status „inactive“
	voltages below 6V	→ status „active“
01F →	voltages above 18V	→ status „inactive“
	voltages between 6 and 18V	→ status „active“
	voltages below 6V	→ status „active error“
1F0 →	voltages above 18V	→ status „active“
	voltages between 6 and 18V	→ status „active error“
	or	→ status „inactive error“
	voltages below 6V	→ status „inactive“

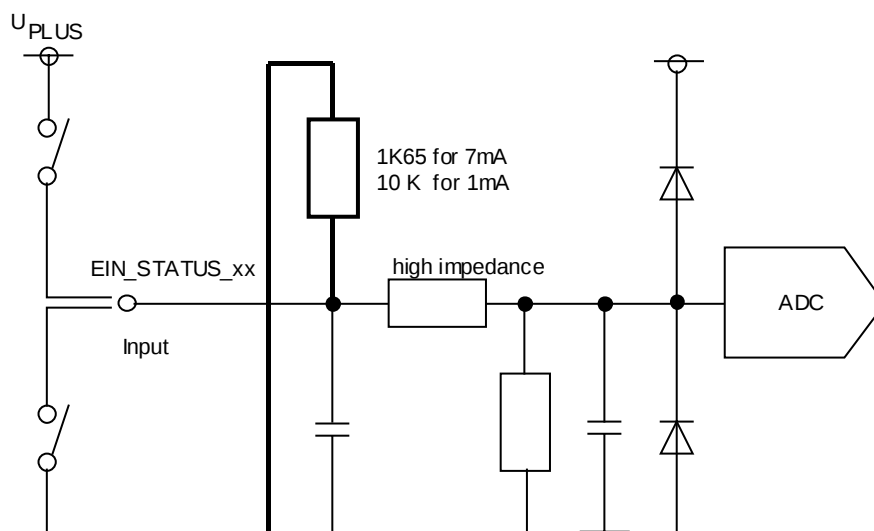
Example : (error time : 3 → t = 30ms)



Note:

The Status Inputs are directly assigned by the Firmware (without software filter).
Noise peaks at the inputs will be suppressed using a hysteresis.

5.6.1.1.1 Characteristics during PowerDown

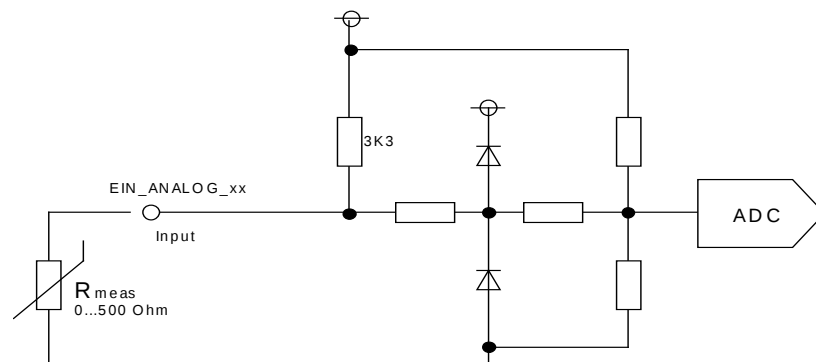


5.6.1.2 Analog inputs

Name	Connector pin	R_{meas}	Note
EIN_ANALOG_01	E-24	0 ... 500 Ohm	optional
EIN_ANALOG_02	E-25	0 ... 500 Ohm	optional

Setting parameters for **EIN_ANALOG_xx**

- R** **Resistance measurement** in the range 0...500Ω,
Linear transmission of the measured value, which means
constant resolution over the complete measuring range.
No compensation of a possibly existing ground offset.



5.6.1.2.1 Specification

	PARAMETER			Measuring range	Resolution
	Value1	Value2	Value3		
R	0	500	-	0...500Ω	2Ω

5.6.2 Interface outputs

For wiring use cables approved for automotive application with a minimum nominal wire cross-section of 0.75mm².

Voltage drop and warming have to be taken into account when specifying the wire cross-section.

All HighSide outputs are short circuit protected.

5.6.2.1 HighSide – Interface Outputs

Name	Connector pin	Load current	Note
AUS_01_G1_HS	A-1	60 mA	optional
AUS_02_G1_HS	A-2	60 mA	optional
AUS_03_G1_HS	A-3	60 mA	optional
AUS_04_G1_HS	A-4	60 mA	optional
AUS_05_G1_HS	A-5	60 mA	optional
AUS_06_G1_HS	A-6	60 mA	optional
AUS_07_G1_HS	A-7	60 mA	optional
AUS_08_G1_HS	A-8	60 mA	optional
AUS_09_G1_HS	A-9	60 mA	optional
AUS_10_G1_HS	A-10	60 mA	optional



Name	Connector pin	Load current	Note
AUS_11_G2_HS	D-9	20 mA	
AUS_12_G2_HS	D-18	20 mA	
AUS_13_G2_HS	D-27	20 mA	
AUS_14_G2_HS	D-36	20 mA	
AUS_15_G2_HS	C-1	20 mA	
AUS_16_G2_HS	C-10	20 mA	
AUS_17_G2_HS	C-19	20 mA	
AUS_18_G2_HS	C-28	20 mA	
AUS_19_G2_HS	C-9	20 mA	
AUS_20_G2_HS	C-18	20 mA	
AUS_21_G2_HS	C-27	20 mA	
AUS_22_G2_HS	C-36	20 mA	
AUS_23_G2_HS	E-1	20 mA	
AUS_24_G2_HS	E-2	20 mA	
AUS_25_G2_HS	E-3	20 mA	optional
AUS_26_G2_HS	E-4	20 mA	optional
AUS_27_G2_HS	E-5	20 mA	optional
AUS_28_G2_HS	E-6	20 mA	optional

5.6.2.1.1 Specification

Group 1 suitable for bulbs 24V/ 1.44W

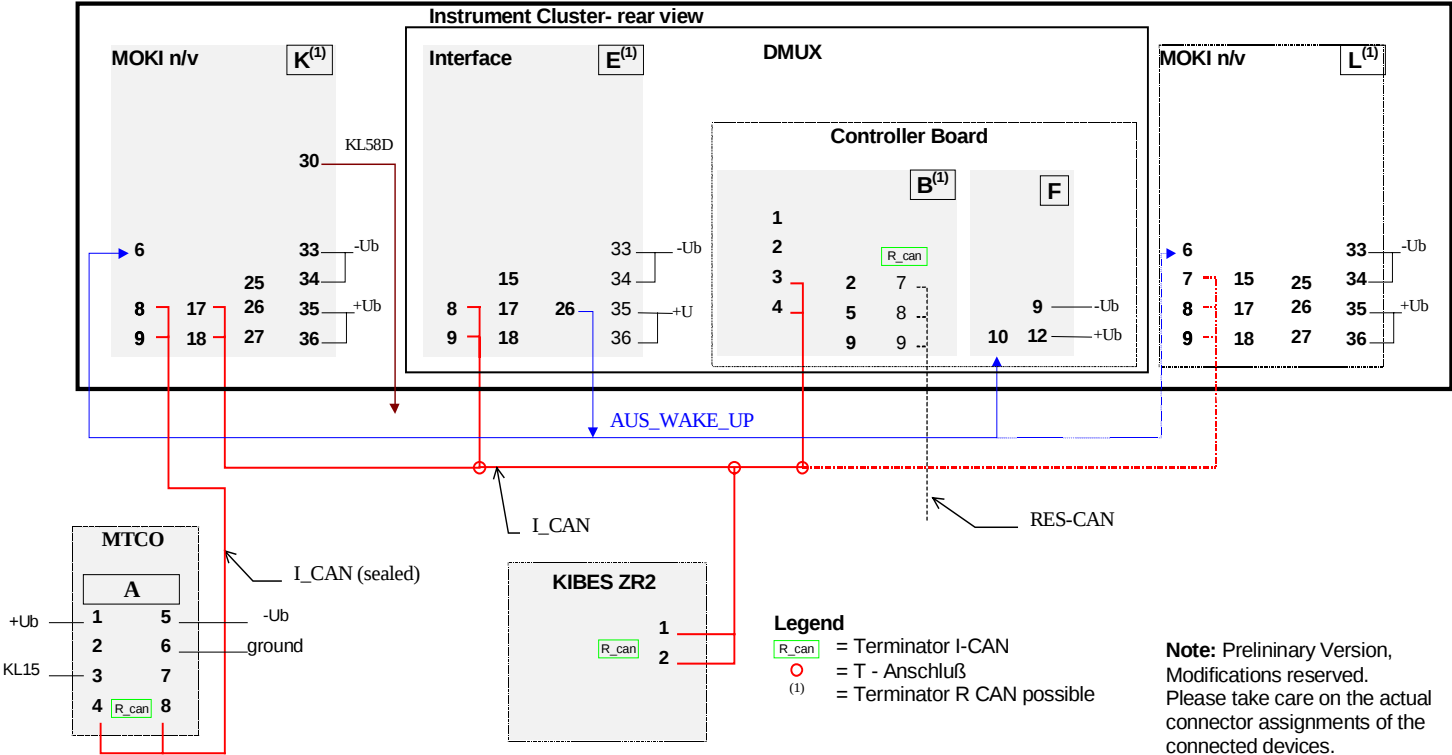
Group 2 to connect LED's

6 Attachment

6.1 CAN wiring

DMUX in combination with Module Combi MOKI 1571/1572 and
Tachograph MTCO

6.1.1 Proposal 1 (using T-Connection without Ground wire)



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6.1.2 Proposal 2 (with Ground wiring)

