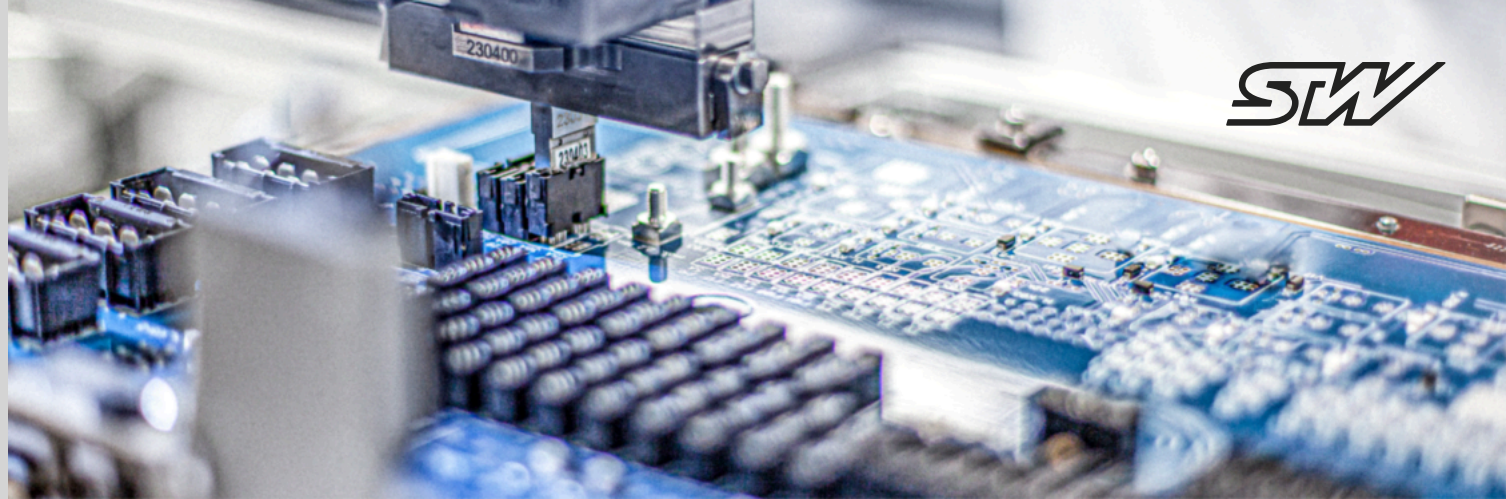PRELIMINARY

STW

BCX.4cs-ag

BCX body control units

KEY FEATURES

- High current outputs

- Control specially designed for use in harsh mobile applications

- Flexible programming in C or IEC61131-3 (logi.CAD)

TECHNICAL DATA

- Aurix TC367 Multicore 32 bit, 300 MHz

- Internal: 576 kB RAM, 4 MB Flash

- External: 32 kB EEPROM

- 1 CAN interface, ISOBUS ISO 11783-31

- 12 inputs SENT, NAMUR

- 20 outputs, 8 half briges up to 10 A, 4 high side switches with up to 15 A,
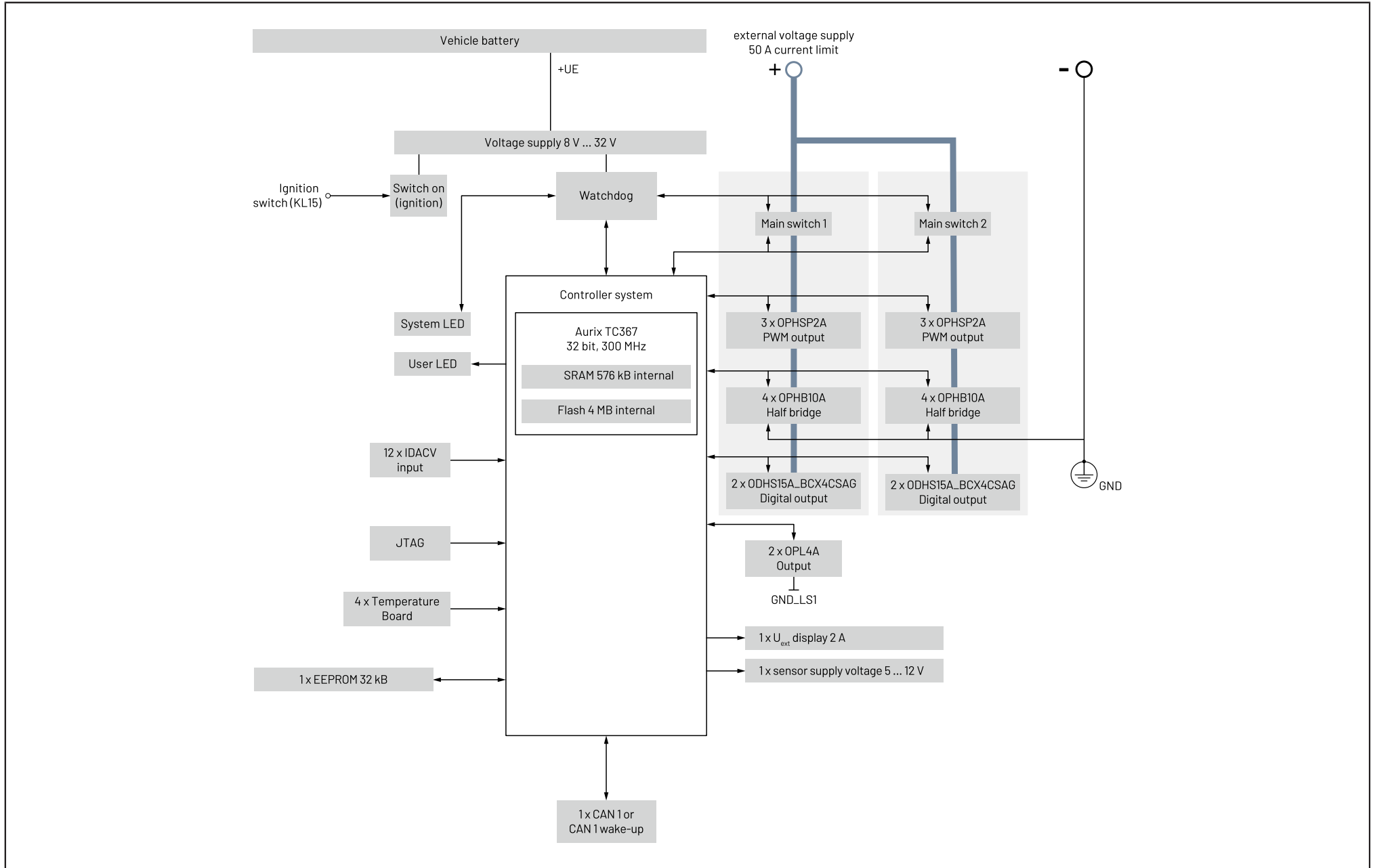
- 1 U_{ext} display 2A

- 1 sensor supply

ACCESSORIES

- Debugger

- Compiler for C and logi.CAD 3 IEC61131-3

- Component Deployment C and IEC61131-3 (logi.CAD 3)

- Mating Plug

- Integrated into STW's openSYDE software platform

BLOCK DIAGRAM

Vehicle battery

external voltage supply
50 A current limit

+UE

Voltage supply 8 V … 32 V

Ignition switch (KL15)

Switch on (ignition)

Watchdog

Main switch 1

Main switch 2

System LED

User LED

Controller system

Aurix TC367
32 bit, 300 MHz

SRAM 576 kB internal

Flash 4 MB internal

3 x OPHSP2A
PWM output

3 x OPHSP2A
PWM output

4 x OPHB10A
Half bridge

4 x OPHB10A
Half bridge

12 x IDACV
input

JTAG

4 x Temperature
Board

1 x EEPROM 32 kB

2 x ODHS15A_BCX4CSAG
Digital output

2 x ODHS15A_BCX4CSAG
Digital output

GND

2 x OPL4A
Output

GND_LS1

1 x U_{ext} display 2 A

1 x sensor supply voltage 5 … 12 V

1 x CAN 1 or
CAN 1 wake-up

TECHNICAL DATA

Processor and memory

Type	Properties	Features
Aurix TC367	32 bit, multicore processor, @ 300 MHz	• External system supervisor with programmable watchdog • 12 bit A/D converter for analog signal processing
Flash	4 MB	Memory allocation between Application Core and Safety Core: • Application Core: 1632 KiB • Safety Core: 2048 KiB
SRAM	576 kB	On-chip SRAM This memory mainly serves as system memory for BIOS stack and data, but also includes a heap for the customer application.

Communication interfaces

Type	Maximal available counts	Configuration
CAN	1	CAN 2.0B, baud rate from 100 kbit/s to 1 Mbit/s

TECHNICAL DATA

Inputs

Type	Maximal available counts	Possible configuration	Measurement
Digital Analog Input IDSACV	12	Analog voltage programmable	0 … 35 V 0 … 12 V 0 … 5 V
		Analog current	0 … 24 mA
		Programmable pull-up resistor	1.1 kΩ to +8.5 V 10 kΩ to +5 V
		Programmable pull-down resistor	1 kΩ to GND
		NAMUR sensor	NAMUR sensor compatible
		Digital (voltage mode)	Active high Achtive low
		Frequency	0.6 Hz … 20 kHz
		Incremental encoder interface	Change of position or angular change
		SENT	Full SENT interface at voltage measuring range 0 … 5 V

Outputs

Type	Maximal available counts	Possible configuration	Range	Characteristics	Feature
Digital/PWM high side output OPHSP2A	6	PWM	0 … 2.5 A	0 … 100 % duty cycle resolution < 0.1 % PWM frequency 20 … 1000 Hz	• high side switch • precise current measurement, accuracy is ±2.3 % (gain) ±35 mA (offset) • supports current control mode • digital feedback, open load detection in OFF state • automated shutdown on overcurrent 4.6 A ±0.9 A • combine several outputs for parallel operation
		Digital	-	ON/OFF	

TECHNICAL DATA

Outputs

Type	Maximal available counts	Possible configuration	Range	Characteristics	Feature
Digital Output ODHS15A_BCX4CSAG	4	Digital	0 ... 15 A	ON/OFF	• high side switch • digital feedback, open load detection in OFF state • automated shutdown on overcurrent 20.5 A (–4.5 A, +7 A) • precise current measurement, accuracy is ±2.3 % (gain) ±35 mA (offset)
Digital/PWM low side output OPL4A	2	PWM	0 ... 4 A	0 ... 100 % duty cycle resolution < 0.1 % PWM frequency 20 ... 1000 Hz	• low side switch • precise current measurement, accuracy is ±2.3 % ±120 mA • supports current control mode • digital feedback, open load detection in OFF state • automated shutdown on overcurrent > 7.5 A ±0.9 A • output voltage feedback, accuracy is ±4.5 % ±200 mV
		Digital	–	ON/OFF	
Digital/PWM half bridge output OPHB10A	8	PWM	0 ... 10 A	0 ... 100 % duty cycle resolution < 0.1 % PWM frequency 5 ... 20000 Hz	• push–pull output • current measurement ±2.3 % ±400 mA • supports current control mode • digital feedback • output voltage feedback, accuracy is 3 % ±150 mV • automated shutdown on overcurrent > 32 A ±15 A • automated shutdown on overtemperature • two half-bridge outputs might be combined as full-bridge
U_{ext} display supply	1	–	–	ON/OFF	Maximal output current 2 A Accuracy voltage output is +2 ... –2.5 % Accuracy voltage feedback is ±3 % (gain) ±0.15 V (offset)

TECHNICAL DATA

Outputs

Type	Maximal available counts	Possible configuration	Range	Characteristics	Feature
Sensor supply voltage 5 ... 12 V	1	Voltage	5 ... 12 V	Accuracy voltage output is ±0.9 % ±50 mV This is valid under the following conditions: • Capacitive load ≤470 μF • Settling time 100 ms Accuracy voltage feedback: ±0.9 % ±50 mV	Maximal output current I_{MAX} = 250 mA programmable output needs derating for output voltages U_{EXT} < 10 V: I_{MAX} = 0.875 / (13.5 - U_{EXT}) A

Mechanical data

| Component	Description	Value
Connectors	—	1 x TE-LEAVYSEAL 39 pin
Indicators	2 LED, dual color (red/green or mixed colors)	System LED and User LED
Housing	Die-cast aluminum plate with plastic cover	-
Degree of Protection	—	IP69K
Dimensions	—	200 mm 180 mm x 50 mm
Operating temperature, housing temperature	—	-40 ... +85 °C (-40 ... +185 °F)

TECHNICAL DATA

Power supply

Component	Description	Range	
		Minimum Value	**Maximum Value**
DC voltage supply	Voltage at +UE ECU supply and +UB power supply	8 V DC	32 V DC
Current consumption	External power supply	-	50 A
	2 x low side output OPL4A	-	8 A, fully loaded
Standby	Sum of input currents at +UE and +UB (U_{KL15} = 0 V, ignition off) Without external load		< 100 µA
ECU active	+UE supply current (U_{KL15} > $U_{KL15HIGH}$, no external load)		≈ 500 mA at +UE = 12 V ≈ 300 mA at +UE = 28 V
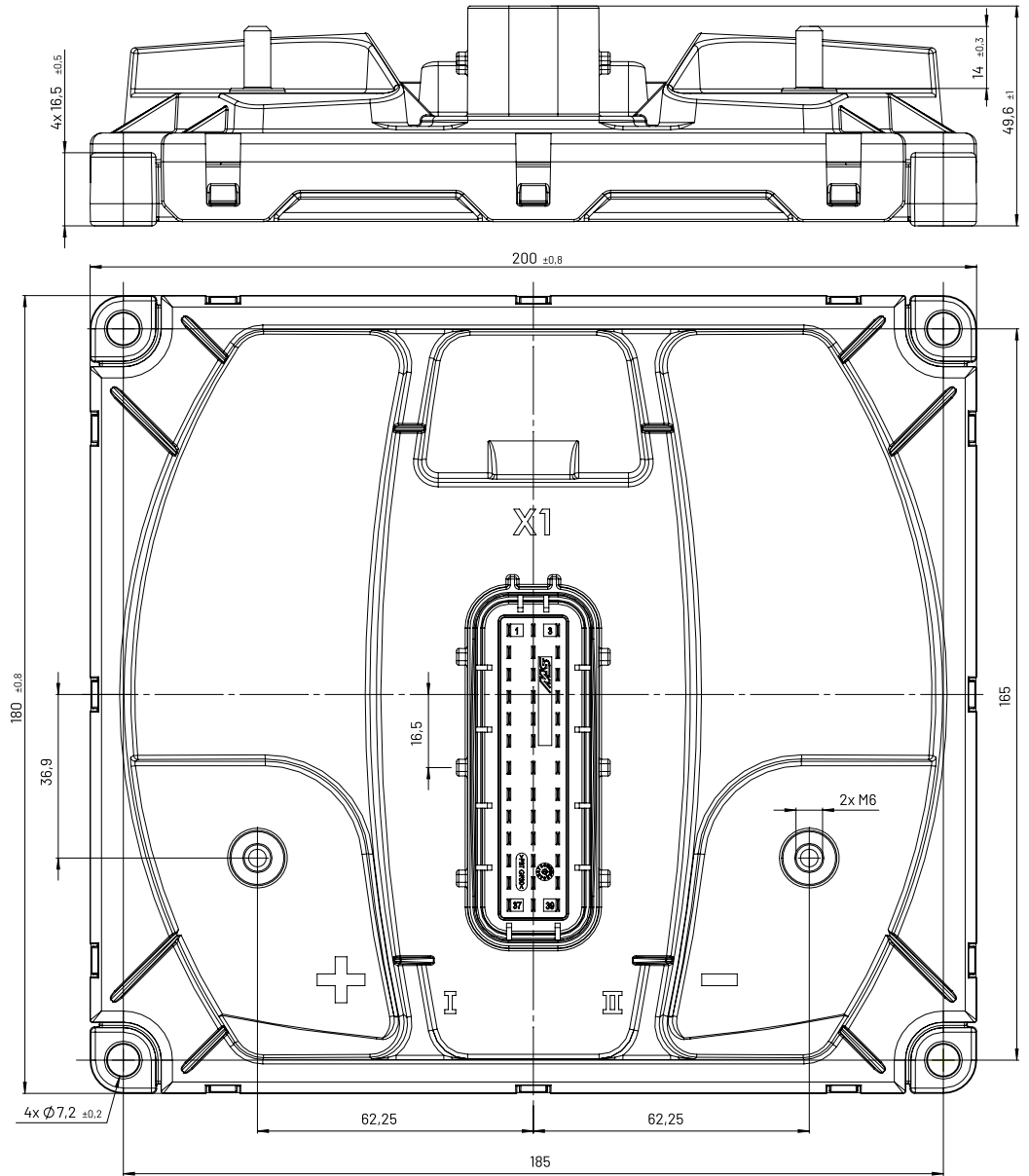
PIN ASSIGNMENT

Pin assigment main connector X1
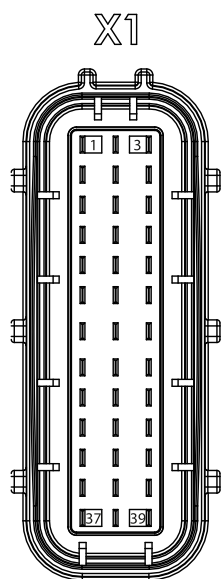
Variant 1	Pin	Type	Current	Pin	Type	Current	Pin	Type	Current
	1	CAN bus 1 high		2	Uext_5-12V	0.25 A	3	KL15	
	4	CAN bus 1 low		5	IDSACV_1		6	AGND	
	7	ODHS15A_BCX4CSAG_1	15 A	8	IDSACV_2		9	ODHS15A_BCX4CSAG_3	15 A
	10	U_{ext} display 12 V, 2 A	2 A	11	IDSACV_3		12	OPHSP2A_4	2.5 A
	13	ODHS15A_BCX4CSAG_2	15 A	14	IDSACV_4		15	ODHS15A_BCX4CSAG_4	15 A
	16	UE	–	17	IDSACV_5		18	OPHSP2A_5	2.5 A
	19	OPHB10A_1	10 A	20	IDSACV_6		21	OPHB10A_5	10 A
	22	OPHSP2A_3	2.5 A	23	IDSACV_7		24	OPHSP2A_6	2.5 A
	25	OPHB10A_2	10 A	26	IDSACV_8		27	OPHB10A_6	10 A
	28	OPHSP2A_2	2.5 A	29	IDSACV_9		30	OPL4A_2	4 A
	31	OPHB10A_3	10 A	32	IDSACV_10		33	OPHB10A_7	10 A
	34	OPHSP2A_1	2.5 A	35	IDSACV_11		36	OPL4A_1	4 A
	37	OPHB10A_4	10 A	38	IDSACV_12		39	OPHB10A_8	10 A

QUALIFICATION

Compliance Information

Standard	Description		Parameter
ISO/IEC 17050-1 REGULATION (EC) No 765/2008	CE	Conformity	See declaration of conformity
UK marking	UKCA	UK Conformity	See declaration of conformity
ISO 25119	Safety of agriculture control parts		AgPL c
KBA (Kraftfahrt-Bundesamt)	E₁	Certification This approved device can be used on any vehicle type with the following restrictions: All vehicle types with a 12 V respectively 24 V - electrical wiring and battery(-) at the body	According UN ECE Regulation No. 10
2011/65/EU 2015/863/EU	RoHS	Restriction of Hazardous Substances	
2006/42/EC	Machinery directive		