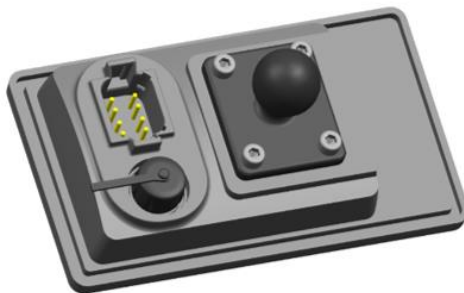
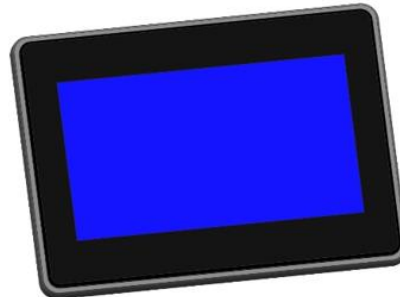
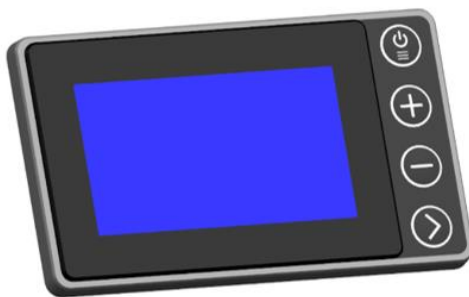
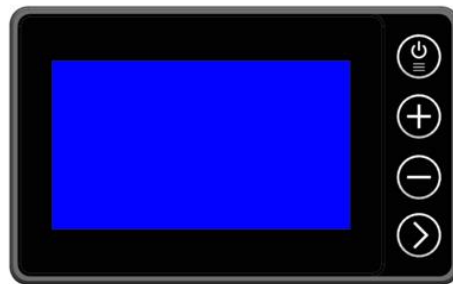


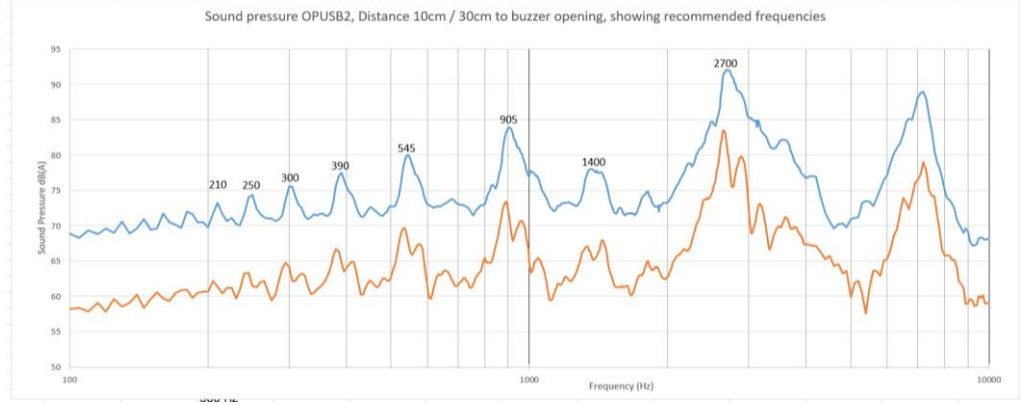
TDS OPUS B2 - Draft


TDS OPUS B2, 10.05.2021

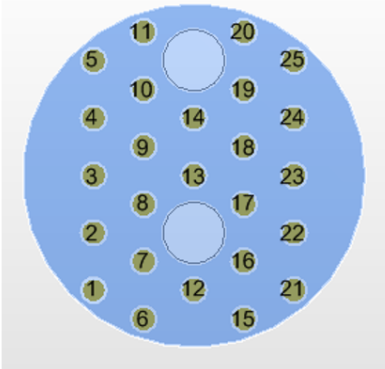


OPUS B2 STD

OPUS B2 ECO

1 Order Numbers	OPUS B2 ECO Basic	OPUS B2 ECO Full	OPUS B2 STD Basic	OPUS B2 STD Full	OPUS B2 STD Max
OPUS...	B2EN1CANB000	B2EN1CANF000	B2SN1CANB000	B2SN1CANF000	B2SN1CANX000
2 Mechanical					
2.1 Dimensions	~123x89x35mm		~ 144x89x35 mm		
2.2 Housing	Glas, PC/ABS		Glas, PC/ABS, Autotex XEF200		
2.3 Mounting	<ul style="list-style-type: none"> • landscape or portrait • standalone, e.g. with RAM-Mount (additional accessory) • in-dash, e.g. with in-dash-mounting frame (additional accessory) 				
3 Display					
Type	TFT Color Graphic LCD, LED backlight, optical bonded, all view, normal black, 45° polarized, chemically strengthen glass, hardness 7H				
Size	4,3"				
Resolution	480 x 272				
Colors	16.7 Mio				
Brightness	typ. 850cd/m ²	typ. 800cd/m ²	typ. 850cd/m ²	typ. 800cd/m ²	typ. 800cd/m ²
Contrast Ratio	typ. 800				
4 In-/Output Devices					
4.1 Touch	-	PCT, Multi (5) Gloves support	-	PCT, Multi (5) Gloves support	PCT, Multi (5) Gloves support
4.2 Keys on Keypad	-		4 keys with fluorescent print w/o Backlight		8 keys Backlight
4.3 Indicators on Keypad	-				3 LEDs or 1 MultiColorLED
4.4 Sensors on Keypad	-				Phototransistor
4.5 Buzzer, frequency programmable	-	92 db(A) 10cm@2700Hz	-	92 db(A) 10cm@2700Hz	92 db(A) 10cm@2700Hz
<p>Sound pressure OPUSB2, Distance 10cm / 30cm to buzzer opening, showing recommended frequencies</p> 					
5 Electronics					
5.1 Processor platform					
CPU	NXP MCIMX6Y2CVM05AB-i.MX 32-bit MPU, ARM Cortex-A7 core, 528MHz				i.MX-08AB 800 MHz
Mass storage	2 GB (4GB eMMC in pSLC-Mode)				16 GB (32GB)

RAM	256 MB, DDR3L, 1600Mbps		1GB, DDR3L,									
EEPROM	64Kbit (internal use)											
RTC	run time counter, without buffer											
5.2 Interfaces												
5.2.1 Power supply												
Operating voltage range	9-36V		5-36V									
Protection	overvoltage, inverse polarity											
Overvoltage resistance	yes 48V @5m, load dump pulse 5b (clipped)											
Inverse polarity protection	Yes -48V @5m											
Current consumption (normal mode without USB power delivery)	ON: < 165mA@12V (<2W)		ON: <200mA@12V									
	Low-Power: ~ 40mA@12V (< 0,5 W)											
	Sleep: ~ 30mA@12V (< 0,35 W)											
	OFF: ~ 0,08mA@12V (< 1 mW)											
5.2.2 CAN Interfaces	2 x ISO 11898, CAN-specification 2.0 B active, CAN FD tolerant											
5.2.3 USB Interface	USB 2.0, Type C, high speed, min. 1A, short protected against Vbus, thermal protected, fault flag											
5.2.4 Ignition (Clamp 15)	Yes, over voltage protected up to 48V, required to power up the device											
5.2.5 Service Enable (Digital Input)	Low: Device is starting in normal mode High: Device is booting in service mode											
5.2.6 Service Connector	Backside, Covered with rubber plug, for engineering purpose only											
6 Connections/Pinout												
Main connector Customer side: Deutsch DT06-08SA	Klemme 30, V _{Bat}	4		5	CAN 2 L							
	Klemme 31, GND	3		6	CAN 2 H							
	Klemme 15, Zündungsplus	2		7	CAN 1 L							
	Service Enable	1		8	CAN 1 H							
USB Connector Type C	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
	GND			V _{Bus}		D+	D-		V _{Bus}			GND
	GND			V _{Bus}		D-	D+		V _{Bus}			GND
	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1

Service Connector Requires engineering adapter	Pin	Bezeichnung	View from rear side to connector 
	1	GND	
	2	+3V3	
	3	CPU_MOD	
	4	POR#	
	5	GND	
	6	CPU_TDI	
	7	CPU_TDO	
	8	CPU_TMS	
	9	CPU_TCK	
	10	UPDATE /Extboot	
	11	Service Enable	
	12	GND	
	13	CPU_TRSTB	
	14	GND	
	15	CPU_RX	
	16	CPU_TX	
	17	n.c.	
	18	GND	
	19	GND	
	20	GND	
	21	GND	
	22	n.c.	
	23	n.c.	
	24	n.c.	
	25	GND	
7 Software			
7.1 Operating System	Linux		
7.2 Application Programming	C++ or Projektor/PClient		

8 Testing and Verification	
8.1 CE-Compliance	<p>EU Directive 2014/30/EU (EMC) according to</p> <ul style="list-style-type: none"> • EN 13766-1: Earth-moving and building construction machinery (EMC) • EN ISO 14982: Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria • DIN EN 50498: Electromagnetic compatibility (EMC) - Product family standard for aftermarket electronic equipment in vehicles • Tbd: EN 12895: Industrial Trucks – Electromagnetic compatibility • Optional: EN 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments • Optional: EN 61000-6-4: Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
8.2 E1 - Type approval	EU Directive ECE R 10
8.3 Protection Level	IP66 according to ISO 20653: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access
8.4 Electrical	<p>12V and 24V systems according to:</p> <ul style="list-style-type: none"> • ISO 16750-2: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
8.5 Mechanical	<ul style="list-style-type: none"> • According to ISO 16750-3: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions • Mechanical Shock: Level 2 • Random Vibration: Level 2 • Sinusoidal Vibration: Level 2
8.6 Climate	<ul style="list-style-type: none"> • According to ISO 16750-4: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads <ul style="list-style-type: none"> - Operating Temperature Range: -30 ... +65°C - Storage Temperature Range: -40 ... +85°C • ISO 15003: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions