DATA MODUL

eMotion NT2:3

Product Specification

This document might be changed without prior notice

12033811 eMotionNT2:3 – LVDS

12033626 eMotionNT2:3 – eDP

Revision: 003
Date: 2024-03-28

Revision History

Rev.	Date	Author	Modifications
000	08.01.2019	R. Muhler	Initial revision
001	22.07.2020	M. Schmidt	Chapter 3: connector pitch data removed, Chapter 5.2: EMI standards actualized
002	27.06.2022	R. Muhler	Operating temperature range extended to -20° - +70° after internal qualification (Chapter 5.1)
002	28.03.2024	R. Muhler	Update in several chapters
003			

Change History (Optional)

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1. Preamble

1.1. *Purpose of this document*

The purpose of this document is the definition of the technical parameters, the electrical connections and the mechanical dimensions for the development of the eMotionNT2:3-board.

1.2. *Abbreviations*

I²C	INTER-IC
EMI	ELECTRO MAGNETIC INTERFERENCE
EMC	ELECTRO MAGNETIC COMPATIBILITY
EN	EUROPEAN NORM
ESD	ELECTRO STATIC DISCHARGE
UL	UNDERWRITER LAB
PCB	PRINTED CIRCUIT BOARD
SMT	SURFACE MOUNT TECHNOLOGY
ROHS	RESTRICTION FOR THE USE OF HAZARDOUS SUBSTANCES
NC	NOT CONNECTED
T.B.D.	TO BE DEFINED
TMDS	TRANSITION MINIMIZED DIFFERENTIAL SIGNALING
DVI	DIGITAL VIDEO INTERFACE
DP	DISPLAY PORT
EDP	EMBEDDED DISPLAY PORT
RBR	REDUCED BIT RATE (1.62 GBIT/S PER LANE)
HBR	HIGH BIT RATE (2.7 GBIT/S PER LANE)
HBR2	HIGH BIT RATE 2 (5.4 GBIT/S PER LANE)
OSD	ON SCREEN DISPLAY
DPMS	DISPLAY POWER MANAGEMENT SIGNALING
VESA	VIDEO ELECTRONICS STANDARDS ASSOCIATION
DDC / CI	DISPLAY DATA CHANNEL / COMMAND INFERFACE
VGA	VIDEO GRAPHICS ARRAY
UXGA	ULTRA EXTENDED GRAPHICS ARRAY
USB	UNIVERSAL SERIAL BUS

2. Product description

2.1. *Functionally description of the product*

Based on the latest design of highly integrated LCD controller NT68862, the eMotionNT2:3 board is able to control panels from VGA up to WUXGA. The eMotionNT2:3-LVDS (12033811) can drive panels with LVDS interface.

The eMotionNT2:3-eDP (12033626) can drive panels with eDP interface.

The eMotionNT2:3 graphic controller board can be connected to input signals coming from DP and DVI-I sources.

The board can be controlled by a 5-key OSD keyboard and IR-controller.

The interface board is compatible with VESA DPMS, DDC2B, DDC/ CI and can be controlled by RS232.

2.2. *Special Features*

- DP 1.2 compliant input (HBR)
- DVI-I (analoge 205MHz / digital 165MHz)
- Up to WUXGA with 170MHz to the panel (8bit)
- 10-bit color processing
- Built in backlight control
- Built in power on/off sequencing controller for panel power
- Support of 3.3V, 5.0V, 12V* panel voltage and 12V/ 24V* backlight voltage
- Multilingual OSD
- Panel file in separate EEPROM (option)

*: 12V panel voltage and 24V backlight voltage are only available if input voltage is 24V!

2.3. *Variants of eMotionNT2:3*

Due to connectors footprint and pin arrangement it is not possibly to have LVDS-out and eDP-out on the same layout by mounting options.

To drive TFTs with LVDS-input or eDP-input there are 2 variants of eMotionNT2:3 with different layout necessary!

The variants are called as following:

- eMotionNT2:3-LVDS (Hirose connector DF14-30P-1.25H is mounted on J3)
- eMotionNT2:3-eDP (JAE connector FI-RE41S-HF is mounted on J3)

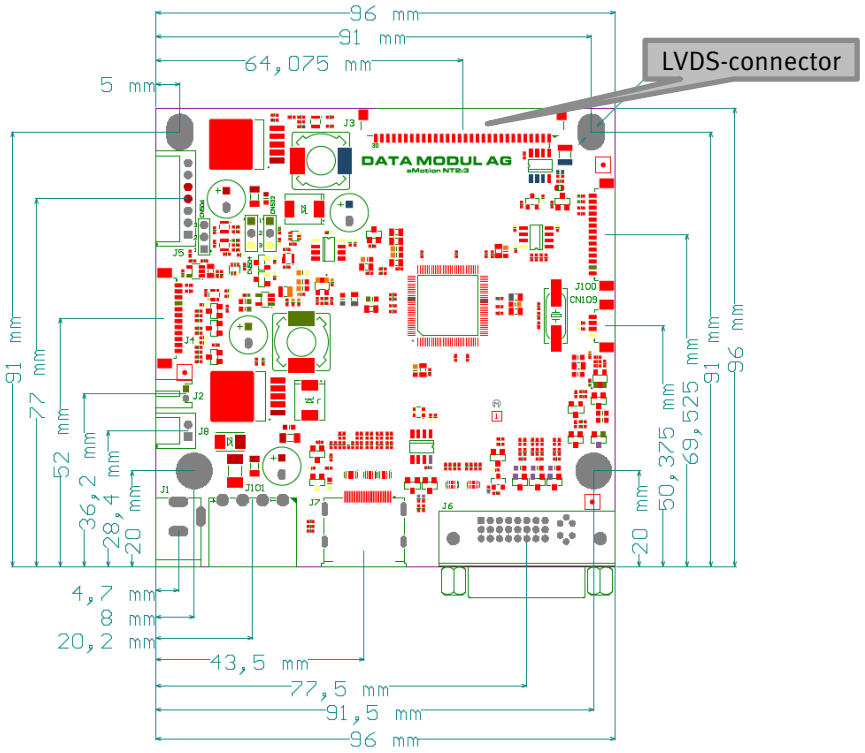
The differences between these variants are very small and can be seen in next chapter

3. PCB description

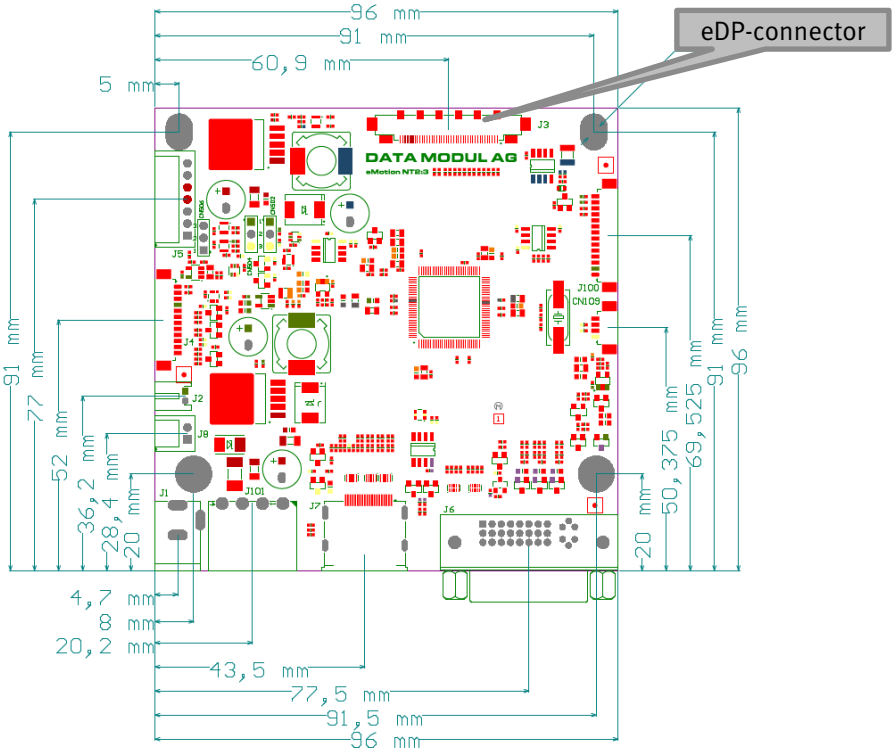
3.1. *Dimensions of eMotionNT2:3*

Dimensions of both variants: 96mm (L) x 96mm (W) x 17mm (H). Mounting holes diameter: 4 x 3.5mm

(Remark: The dimensions of eMotionNT2:3 (both variants) are the same as of eMotionST2:3. Most of the connectors will have the same position as on the eMotionST2:3)

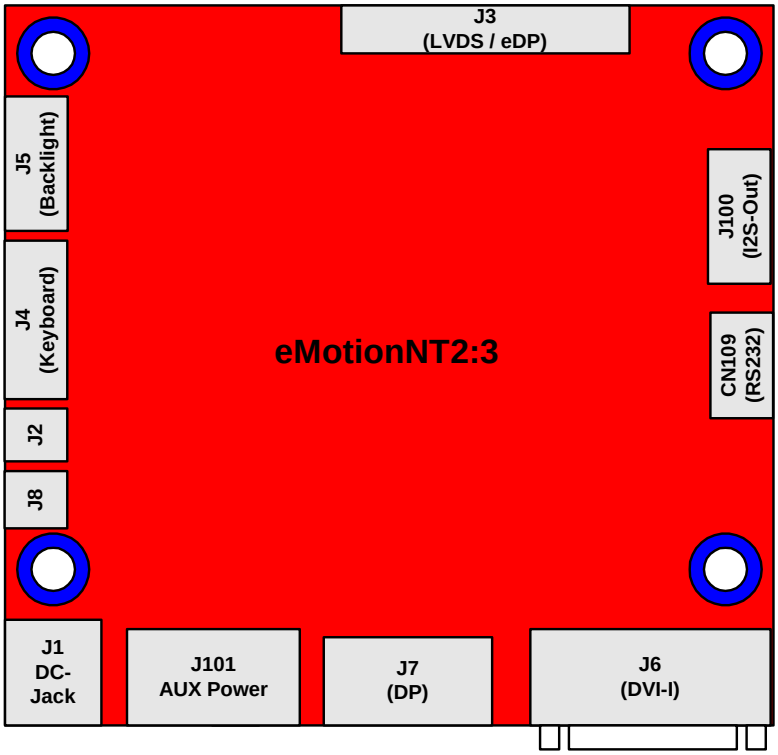


eMotionNT2:3 with LVDS-output



eMotionNT2:3 with eDP-output

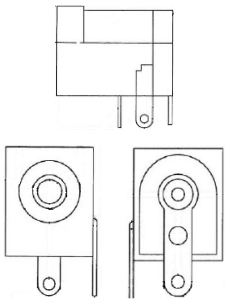
3.2. *Connector overview*



Item	Description	Remark
J1	Power connector	DC-Jack , 2.5mm max 5A
J2	Power out	2pin, 5V power output, max 100mA
J3	LVDS Dual link out / eDP (4 lanes)	30pin (LVDS) resp. 41pin (eDP), Display Interface Connector
J4	External OSD connector	12pin, OSD, IR, LED, etc.
J5	Inverter / Backlight connector	7pin, Power supply / dimming Note: inverter input voltage must fit to the input voltage of the board
J6	DVI-I Input	24+5pin DVI-I connector female
J7	DP Input	20pin, DP connector
J8	AUX power connector	2pin connector, max 3A
J100	I2S Audio	14 pin I2S Audio
J101	Alternative power connector	4pin connector, max 5A
CN109	RS232	4pin, LVTTL signal level

3.3. *Power connector, J1*

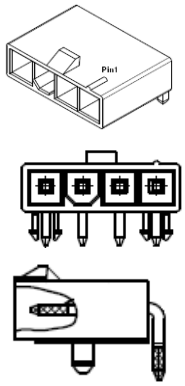
Type: W+P Products, W+P-No.: 649-2-2.5-20-5A, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Side-, Front-, Rear-View	1	+Vin	I	+12V/5A* or +24V/5A*
	2	GND	I/O	GND / 5A
	3	GND	I/O	GND / 5A

*: 5A is max current capability of connector. Real input current depends on connected display and backlight inverter!

3.4. *Alternative power connector, J101*

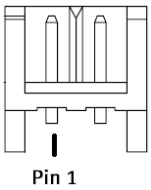
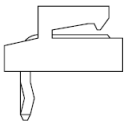
Type: Molex-Ref.-No: 0039303045, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top-, Front-, Side-View	1	GND	I/O	GND / 4A
	2	GND	I/O	GND / 4A
	3	+Vin	I	+12V/4A* or +24V/4A*
	4	+Vin	I	+12V/4A* or +24V/4A*

*: both pins of CN104 can carry 4A => in total 8A are available! But 8A is max current capability of connector. Real input current depends on connected display and backlight inverter!

3.5. *AUX power connector, J8*

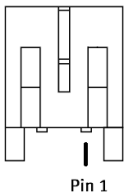
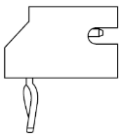
Type: JST-Ref.-No. S2B-EH, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top view  Side view	1	+Vin	O	+12V/3A* or +24V/3A*
	2	GND	I/O	GND

*: if supply voltage is only connected to J8 only 3A for whole unit is available!

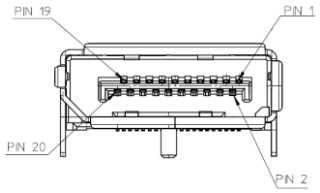
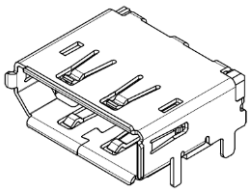
3.6. *Power out connector, J2*

Type: JST-Ref.-No. S2B-PH-K-S, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top view  Side view	1	+5V	O	+5V DC ± 5%, 100mA
	2	GND	I/O	GND

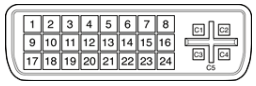
3.7. *Display-Port input connector, J7*

Type: W+P: 8470-2-2-1-80-TR, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Front-View 	1	ML_L3N	I	Main Link Ch. 3 Differential Input negative
	2	GND	I/O	Ground
	3	ML_L3P	I	Main Link Ch. 3 Differential Input positive
	4	ML_L2N	I	Main Link Ch. 2 Differential Input negative
	5	GND	I/O	Ground
	6	ML_L2P	I	Main Link Ch. 2 Differential Input positive
	7	ML_L1N	I	Main Link Ch. 1 Differential Input negative
	8	GND	I/O	Ground
	9	ML_LN1P	I	Main Link Ch. 1 Differential Input positive
	10	ML_LN0N	I	Main Link Ch. 0 Differential Input negative
	11	GND	I/O	Ground
	12	ML_LN0P	I	Main Link Ch. 0 Differential Input positive
	13	Config 1	O	Config Pin1, connect to GND with 1M
	14	Config 2	O	Config Pin2, connect to GND with 1M
	15	AUXP	I	Auxiliary Ch. Differential Input positive
	16	DP_IN.DET	I	Detect pin for cable connection
	17	AUXN	I	Auxiliary Ch. Differential Input negative
	18	HPD	I/O	Hot Plug Detect
	19	POR	I/O	Connected to Ground
	20	PO	O	Not connected to internal circuits

3.8. *DVI-I input connector, J6*

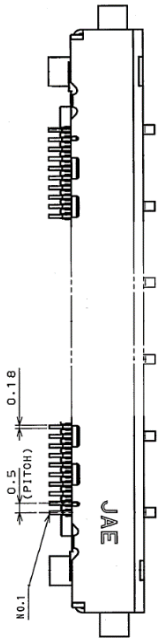
Type: DVI-socket W+P: 507-29-2-2-20, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Front view	1	DT2-	In	TMDS Data2-
	2	DT2+	In	TMDS Data2+
	3	TX2/4-SHLD	I/O	TMDS Data2 Shield (Ground)
	4	N.C.		
	5	N.C.		
	6	DDC-CLK	In	I2C-Clock, +5V level
	7	DDC-Data	I/O	I2C-Data, +5V level
	8	AVS	In	Analog Vertical Sync
	9	DT1-	In	TMDS Data1-
	10	DT1+	In	TMDS Data1+
	11	TX1/3-SHLD	I/O	TMDS Data1 Shield (Ground)
	12	N.C.		
	13	N.C.		
	14	+5V_DVI	In	+5V Power*
	15	Ground (for +5V)	I/O	
	16	HP Detect	Out	Hot Plug Detect
	17	DT0-	In	TMDS Data0-
	18	DT0+	In	TMDS Data0+
	19	TX0/5-SHLD	I/O	TMDS Data0 Shield (Ground)
	20	N.C.		
	21	N.C.		
	22	TXC-SHLD	I/O	TMDS Clock Shield (Ground)
	23	CLK+	In	TMDS Clock +
	24	CLK-	In	TMDS Clock –
	C1	ARED	In	Analog Red
	C2	AGRN	In	Analog Green
	C3	ABLU	In	Analog Blue
	C4	AHS	In	Analog Horizontal Sync
	C5	GND	I/O	Analog RGB Ground

*: +5V_DVI is delivered from signal source (e.g. PC), it is only used for EDID- and Hot-Plug circuit. Max. current is 20mA

3.9. *eDP output connector, J3*

Type: JAE FI-RE41S-HF, 41pin, SMT, right angle, or equivalent

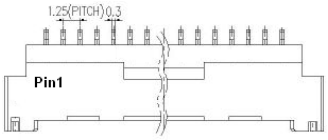
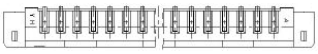
Pin arrangement	Pin	Signal	I/O	Description
 Top-View	1	NC - RESERVED		Reserved for LCD manufacturer's use
	2	GND	I/O	Ground
	3	EDP_L3_N	O	eDP data lane3 negative
	4	EDP_L3_P	O	eDP data lane3 positive
	5	GND	I/O	Ground
	6	EDP_L2_N	I/O	eDP data lane2 negative
	7	EDP_L2_P	O	eDP data lane2 positive
	8	GND	I/O	Ground
	9	EDP_L1_N	O	eDP data lane1 negative
	10	EDP_L1_P	O	eDP data lane1 positive
	11	GND	I/O	Ground
	12	EDP_L0_N	O	eDP data lane0 negative
	13	EDP_L0_P	O	eDP data lane0 positive
	14	GND	I/O	Ground
	15	AUX_CH_P	I/O	Auxiliary Channel positive
	16	AUX_CH_N	I/O	Auxiliary Channel negative
	17	GND	I/O	Ground
	18	Panel VCC*	O	Panel VCC
	19	Panel VCC*	O	Panel VCC
	20	Panel VCC*	O	Panel VCC
	21	Panel VCC*	O	Panel VCC
 Front-View	22	NC		No connection
	23	GND	I/O	Ground
	24	GND	I/O	Ground
	25	GND	I/O	Ground
	26	GND	I/O	Ground
	27	HPD	I/O	HPD signal pin
	28	GND	I/O	Ground
	29	GND	I/O	Ground
	30	GND	I/O	Ground
	31	GND	I/O	Ground
	32	B_EN	O	Backlight On/Off (Optional)
	33	B_PWM	O	PWM diming output
	34	B_ADIM	O	Analog diming output
	35	NC - RESERVED		Reserved for LCD manufacturer's use
	36	BLT_VCC**	O	Backlight power
	37	BLT_VCC**	O	Backlight power
	38	BLT_VCC**	O	Backlight power
	39	BLT_VCC**	O	Backlight power
	40	NC - RESERVED		RESERVED for LCD manufacturer's use
	41	NC		No connection

* Note: Pin18, 19, 20, 21: Output voltage can be set to 3.3V / 5.0V / 12.0V – selected by firmware. For details about current consumption on Panel VCC see chapter 4.4.

** Note: BLT_VCC follows the board supply voltage (+12V or +24V). Board supply should always match with the inverter supply voltage!

3.10. *LVDS output connector, J3*

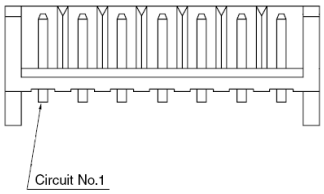
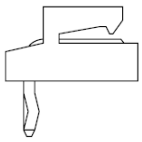
Type: Hirose-Ref.-No. DF14-30P-1.25H, (YEON-HO 12507WR-30), or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top-View	1	Panel VCC*	O	Panel VCC
	2	Panel VCC*	O	Panel VCC
	3	Panel VCC*	O	Panel VCC
	4	Panel VCC*	O	Panel VCC
	5	GND	I/O	Ground
	6	REVERSE_SCAN	O	Digital out (3V3 or 0V)
	7	GND	I/O	Ground
	8	TXA3_P	O	TX3 odd positive
	9	TXA3_N	O	TX3 odd negative
 Front-View	10	TCLKA_P	O	Clock odd positive
	11	TCLKA_N	O	Clock odd negative
	12	TXA2_P	O	TX2 odd positive
	13	TXA2_N	O	TX2 odd negative
	14	GND	I/O	Ground
 Rear-View	15	TXA1_P	O	TX1 odd positive
	16	TXA1_N	O	TX1 odd negative
	17	TXA0_P	O	TX0 odd positive
	18	TXA0_N	O	TX0 odd negative
	19	GND	I/O	Ground
	20	TXB3_P	O	TX3 even positive
	21	TXB3_N	O	TX3 even negative
	22	TCLKB_P	O	Clock even positive
	23	TCLKB_N	O	Clock even negative
	24	TXB2_P	O	TX2 even positive
	25	TXB2_N	O	TX2 even negative
	26	GND	I/O	Ground
	27	TXB1_P	O	TX1 even positive
	28	TXB1_N	O	TX1 even negative
	29	TXB0_P	O	TX0 even positive
	30	TXB0_N	O	TX0 even negative

* Note: Pin1, 2, 3, 4: Output voltage can be set to 3.3V / 5.0V / 12.0V – selected by firmware. For details about current consumption on Panel VCC see chapter 4.4.

3.11. *Backlight Supply Voltage, J5*

Type: JST-Ref.-No. S7B-EH, or equivalent

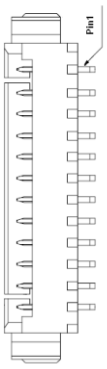
Pin arrangement	Pin	Signal	I/O	Description
 Top-View  Side-View	1	ADIM	O	Analog dimming voltage
	2	PWM	O	PWM diming output
	3	EN	O	Backlight ON/OFF
	4	BLT_VCC*	O	Operating voltage +12V / +24V
	5	BLT_VCC*	O	Operating voltage +12V / +24V
	6	GND	I/O	Ground
	7	GND	I/O	Ground

* Note: BLT_VCC follows the board supply voltage (+12V or +24V). Board supply should always match with the inverter supply voltage!

For details about current consumption on BLT_VCC see chapter 4.5.

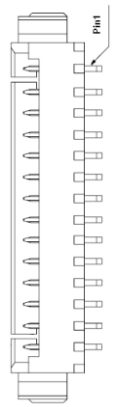
3.12. *OSD-Keyboard-Connector, J4*

Type 53261-1271 by Molex, SMT Side entry type, 12pin, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
	1	LED1	O	LED Green
	2	LED2	O	LED RED
	3	IR	I	IR remote / not connected
	4	Vcc	O	5V / max. 20mA
	5	GND	I/O	Ground
	6	SW3	I	Button3 (UP)
	7	SW2	I	Button2 (DOWN)
	8	SW4	I	Button4 (SELECT)
	9	SW6	I	Button6 (POWER)
	10	SW1	I	Button1 (MENU)
	11	SW5	I	Button5 (SPECIAL)
	12	GND	I/O	Ground

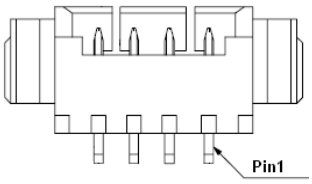
3.13. *I2S-Audio Connector, J100*

Type: MOLEX: 53261-1471, SMT Side entry type, 14pin, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top view	1	GND	I/O	Ground
	2	5V	O	Power / max. 100mA
	3	I2S_WS	O	I2S Word Select
	4	GND	I/O	Ground
	5	I2S_Data	O	I2S Data
	6	GND	I/O	Ground
	7	I2S_BCLK	O	I2S Clock
	8	GND	I/O	Ground
	9	I2S_MCLK	O	I2S MCLK
	10	GND	I/O	Ground
	11	MUTE	O	MUTE
	12	AUDIO_GPIO	I/O	GPIO
	13	I2C SDA	I/O	I2C SDA (3V3 level)
	14	I2C SCL	O	I2C SCL (3V3 level)

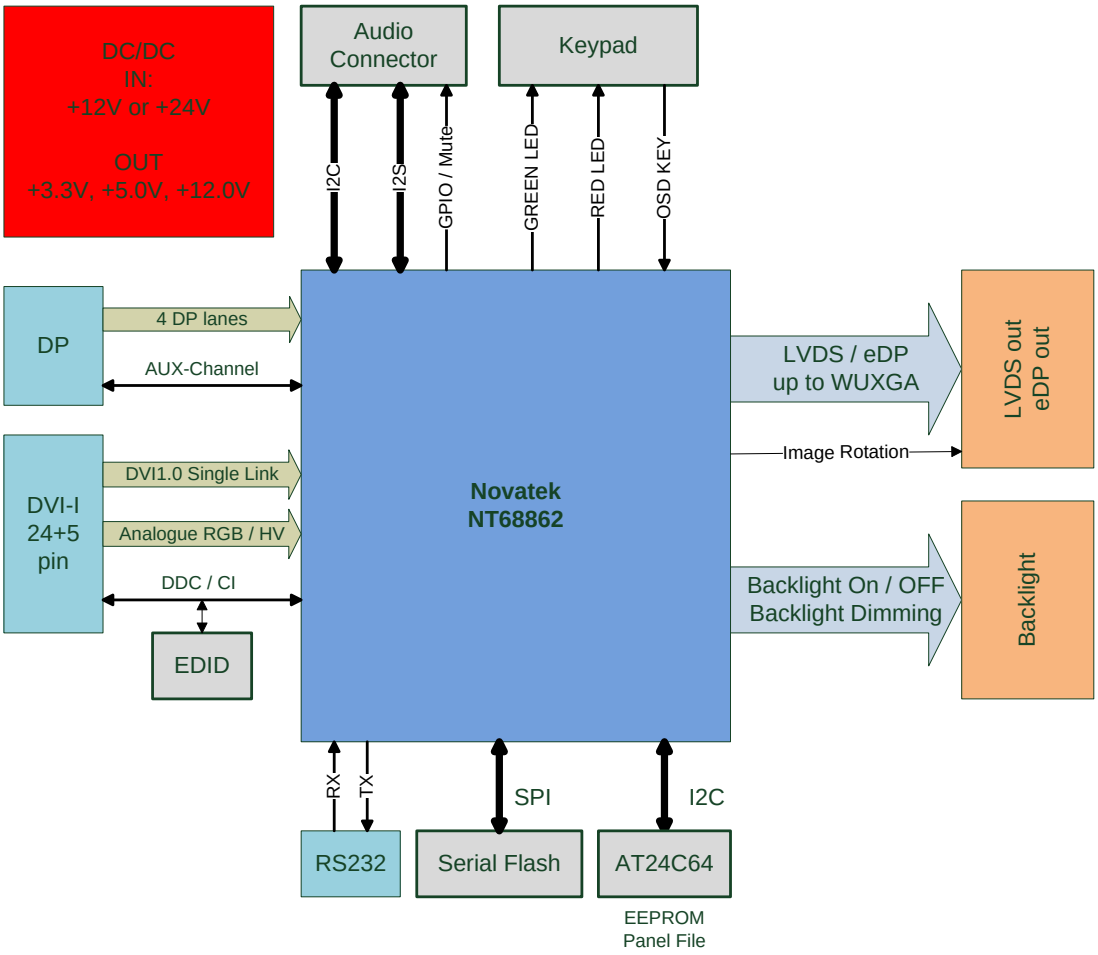
3.14. *RS232-connector 4pin, CN109*

Type: Molex: 53261-0471 or YEONHO: 12505WR-04, SMT Side entry type, 4pin, or equivalent

Pin arrangement	Pin	Signal	I/O	Description
 Top-View	1	DVDD33	O	3.3V / max. 20mA
	2	UART_EXT.TxD	O	Transmit Data (LVTTL)
	3	UART_EXT.RxD	I	Receive Data (LVTTL)
	4	GND	I/O	Ground

4. Technical Details

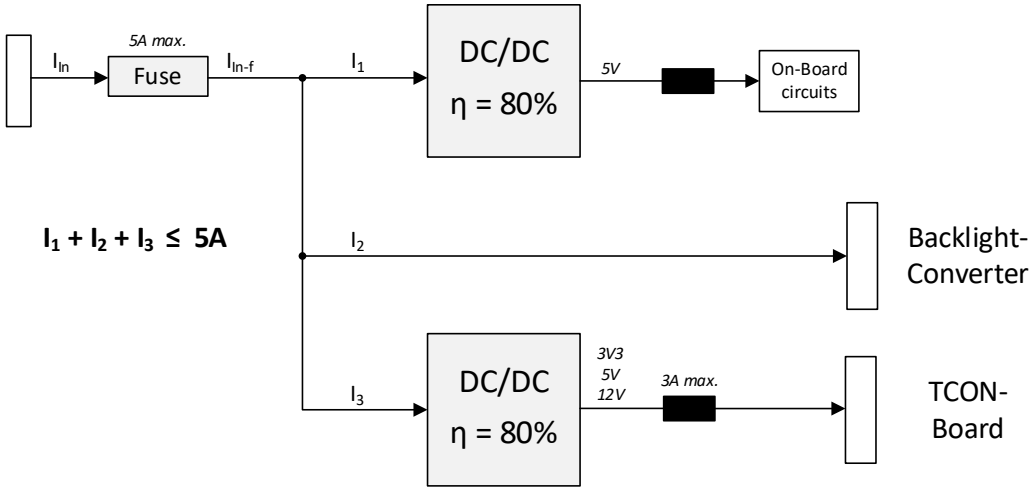
4.1. Block diagram



eMotionNT2:3 Block Diagram

4.2. *Supply voltages, fuse rating and current consumption*

Power distribution on eMotionNT2:3 (details in following chapters):



The eMotionNT2:3 can handle 12V or 24V DC input voltage. The inverter output voltage (J5) is always equivalent to the DC input voltage of the eMotionNT2:3 (J1 or J8 or J101). The board is designed for a single power supply. All other supply voltages are generated on the eMotionNT2:3.

Note: The backlight inverter must fit to the input voltage.

The eMotionNT2:3 is protected by an onboard fuse.
Fuse rating (valid for both mounting options): the nominal current rating of the fuse is 5A@25°C. The temperature rerating of the fuse causes that the fuse will open at currents lower than 5A when temperature increases, e.g. 4.5A@125°C => total input current should not exceed 4.5A

Onboard current consumption:

Supply voltage	Nominal value	Regulation	Ripple & noise	Onboard current consumption	
				Operating	Stand-By / Power-Off
+12V	+12V	+/-10%	0.3V	200mA max.	30mA max.
+24V	+24V	+/-10%	0.3V	100mA max.	15mA max.

4.3. *Configuration Options on eMotionNT2:3*

eMotionNT2:3 can drive panels with different values for TCON-supply-voltage. Additionally backlight inverters with different values for backlight PWM-voltage / backlight enable-voltage and backlight logic-level can be driven.

Values for TCON-supply-voltage / backlight PWM-voltage and backlight enable voltage will be set by firmware on eMotionNT2:3! I.e. to ensure functionality of connected TFT it is necessary to program the correct firmware on eMotionNT2:3 first!

Possible adjustments:

Value	Can be set to...		
TCON-supply-voltage	+3V3	+5V	+12V*
Backlight PWM-voltage	+3V3	+5V	
Backlight enable voltage	+3V3	+5V	
Backlight enable-logic-level	Active high (default)	Active low (mounting option)	

*: +12V for TCON-supply is only possible when input voltage is +24V

4.4. *TCON-current capability of eMotionNT2:3*

eMotionNT2:3 can deliver the following supply currents to a connected TCON-board

TCON Voltage	Nominal value	Max Current (total)	Ripple & noise
+3V3	3V3	3A	0.15V
+5V	5V	3A	0.15V
+12V	12V	3A	0.15V

TCON-voltage is suppled to TCON-board by pins with signal Panel VCC on J3

4.5. *Backlight-current capability of eMotionNT2:3*

Max. backlight supply current is limited by maximum input current capability, onboard current consumption and current consumption of TCON-board. For an application with eMotionNT2:3 the onboard current consumption and the TCON-board current consumption has to be determined. For backlight supply the difference of maximum input current and determined value (onboard-, TCON-board-consumption) is available.

4.6. *Input and output signals*

4.6.1st DP input

According to DisplayPort V1.2,

DP input supports:

- RBR/HBR with 1,2 or 4 lanes
- AUX CH 1 Mbps
- HDCP 1.1 Compliant
- HPD out

4.6.2nd DVI input

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Termination Supply Voltage AV_{CC}	3,135	3.3	3,465	V	
Differential Input Voltage	150		1200	mV	
Input Common Mode Voltage	AV_{CC} -300		AV_{CC} -37	mV	
Input Clock frequency	20		165	MHz	

4.6.3rd VGA input

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Conversion rate	10		205	MHz	
ADC resolution	8		10	bit	Up to 165MHz sample rate 10 bits per color are used, up to 205MHz sample rate 8 bits per color are used
Input levelrange	0,64	0,7	0,9	Vpp	at 75R
SOG level		0,3		V	at 75R

4.6.4th LVDS connector

PARAMETER	MIN	TYP	MAX	UNIT	Remark
Differential Output Voltage	300	500	700	mV	
Common Mode Voltage		1.25		V	
Clock Frequency			100 90	MHz	Single Channel Dual Channel

4.6.5th eDP connector

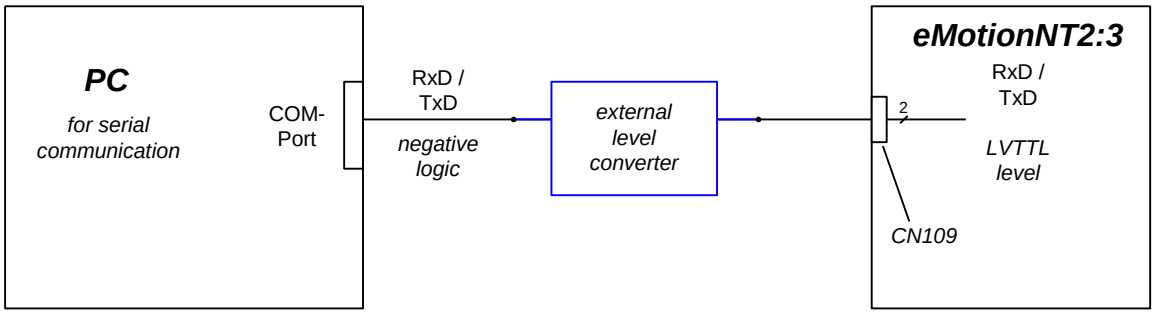
supports eDP TX HBR (2.7Gbit/s per lane) / RBR (1.62 Gbit/s per lane) with 1/2/4 lanes according DP 1.2

4.7. *Serial Communication with eMotionNT2:3*

The eMotionNT2:3 can be controlled by RS232 commands which can be send by COM-port of PC e.g..

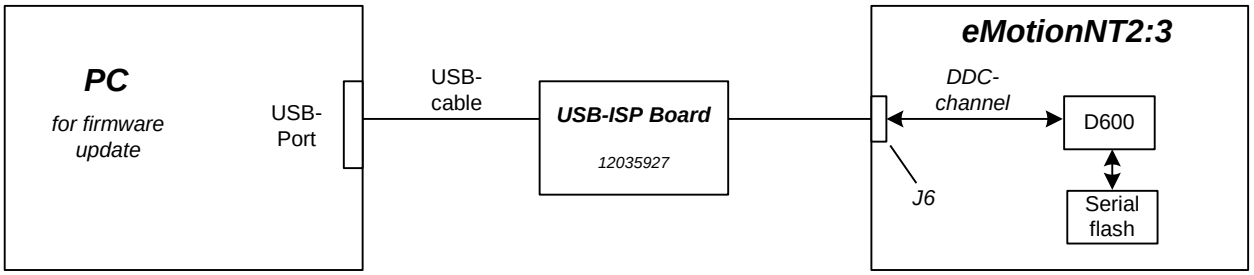
RS232-signals RxD and TxD at CN109 should have LVTTL-level.

⇨ External level converter is necessary:



4.8. *Firmware Update on eMotionNT2:3*

Firmware update on eMotionNT2:3 is done over DDC-channel of video-input DVI. An USB-ISP Board is necessary for this operation!
This board is connected to PC with USB2.0 cable and to eMotionNT2:3 with normal video cable to DVI-input.



Details for firmware update on request.

5. Qualification

5.1. *Environmental conditions*

Parameter	Min	Max
Operating temperature	-20°C	+70°C
Storage temperature	-20°C	+80°C
Relative humidity		80%
Tolerable air-pressure	708 hPa (approx. Altitude 3000m)	

5.2. *EMI-Standards*

Designed to meet EMC (Electro-Magnetic Compatibility): Emission standard for industrial environments, according to EN 61000-6-4 and Immunity for industrial environments, according to EN 61000-6-2:

Description	Requirements	Test parameter	Criteria
Electromagnetic compatibility of multimedia equipment - Emission Requirements	EN 55032		Class A
Electrostatic discharge immunity test	EN 61000-4-2	±4 kV contact discharge, ±8 kV air discharge	Criteria B
Radiated, radio frequency, electromagnetic field immunity test	EN 61000-4-3	80-1000 MHz 10 V/m, 1,4-6 GHz 3 V/m 80 % AM (1 kHz)	Criteria A
Electrical fast transient/burst immunity test	EN 61000-4-4	±1 kV on I/O lines	Criteria B
Immunity to conducted disturbance, induced by radio-frequency fields	EN 61000-4-6	0,15 – 80 MHz 10 V_{rms} 80 % AM (1 kHz)	Criteria A
Immunity to magnetic field	EN 61000-4-8	30 A/m	Criteria A

Note: To ensure that the board meets the standard mentioned above, an adequate shielding cover must be added. Alternatively, the housing of the monitor must act as shielding cover (e.g. aluminum enclosure).

5.3. *Safety*

- Designed to meet IEC 62368-1
- Designed to meet UL 62368-1

5.4. *Shock and Vibration*

MECHANICAL STRESS

Shock:	20G, 11ms, half sine (x/y direction)
	15G, 11ms, half sine (z direction)
Vibration:	1.2G, 10 – 55Hz, sinus
Sweep:	1 minute/octave
Amplitude:	0.35mmp-p (x-direction)
	0.35mmp-p (y direction)
	0.175mmp-p (z-direction)
Time :	30 minutes
Standard:	Conform to EN60605

5.5. *Reliability, MTBF*

- min. 500.000h at Ta = 40°C, determined according to Telcordia SR-332

6. Warranty, Quality and Environmentalism

6.1. *Warranty*

- Manufacturer warranty: 12 month after delivery

6.2. *Quality*

The producing process of the board is aligned with the guideline according to the DIN ISO 9001 certification.

Workmanship standard: IPC-A-610D Class2

6.3. *Environmentalism*

The list of used materials is based on the parts list, which is available at DATA MODUL ERP-system

The PCB is produced under lead free soldering conditions.

All components are produced according to European RoHS (RoHS-1 = 2002/95/EU, RoHS-2 = 2011/65/EU) and REACh (2006/1907/EU) regulations. The board is designed and manufactured to meet ISO 14001.

The packing complies to directive 1994/62/EU.

7. Label and package

7.1. *Label and material number*

The following points are visible on the label of the eMotionNT2:3 board.

- Material number
- Serial- and Revision-number
- Manufacturing date

7.2. *Marking of PCB*

The following points are visible on the PCB of the eMotionNT2:3 board.

- DATA MODUL Logo
- UL-Sign on PCB
- E-File-No. of PCB manufacturer

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