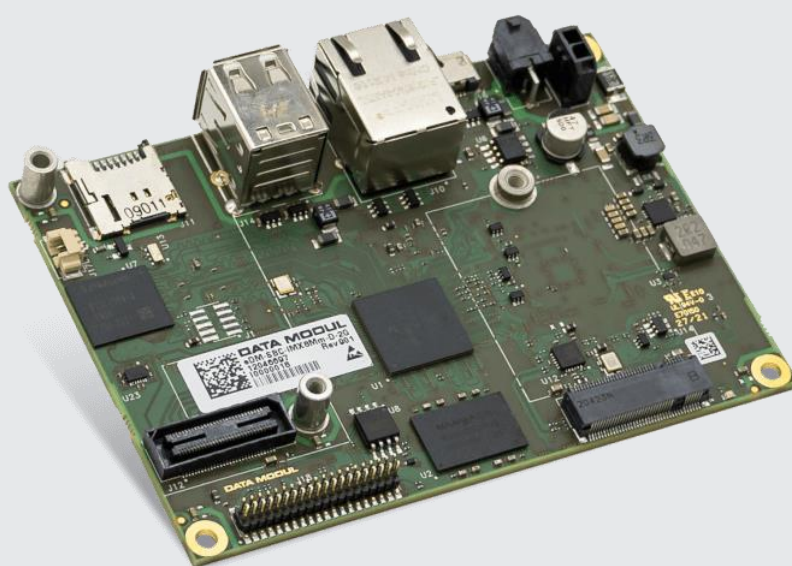


eDM-SBC-iMX8Mm



Document Revision History

Revision	Revision History	Date
00	Draft version	07.10.2020
01	Updated "Ordering Information" and minor editorial changes	20.11.2020
02	Some editorial changes	26.01.2021
03	Information for add-on modules included plus editorial changes	28.02.2022
04	Added information for GPIO signals at add-on module FIO1 plus editorial changes	05.12.2022
05	Editorial changes concerning standards and certifications	13.12.2022
06	Name of Dual USB Type-A connector corrected	04.01.2023
07	Improved wording concerning named standards and part number updates for variants	15.05.2023

Reference to this Operating Manual

The purpose of all the figures and illustrations in this User Manual is merely to provide a better explanation and can differ to the actual appearance of the devices. They are to be understood as schematic representations.

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Preface

Using this Document

- In this Document, the eDM-SBC-iMX8Mm is also referred to as „SBC“.
- Please read this Document before using this Single Board Computer (SBC).
- This Document contains information about the hardware, software and configuration of the SBC.
- Awareness of the safety instructions and instructions for use in this Document will ensure the safe and correct use of the SBC.
- In addition to the information given here, you should comply with the local regulations for the prevention of accidents and generally applicable safety regulations.




Purpose of this Document

The purpose of this document is the definition of the technical parameters, the electrical connections and the mechanical dimensions of the eDM-SBC-iMX8Mm.

Danger Symbols & Levels

In this Document, symbols are used to highlight important safety instructions and any advice relating to the board. The instructions should be followed very carefully to avoid any risk of accident, personal injury or property damage.



Danger Symbols

	Dangerous Voltage, danger of electric shock
	Hazard point
	All DATA MODUL AG products are electrostatic sensitive devices and are packaged accordingly. Do not open or handle a DATA MODUL AG product except at an electrostatic-free workstation. Additionally, do not ship or store DATA MODUL AG products near strong electrostatic, electromagnetic, magnetic, or radioactive fields unless the device is contained within its original manufacturer's packaging. Be aware that failure to comply with these guidelines will void the DATA MODUL AG Limited Warranty.

Danger Levels

DANGER	Indicates a hazardous situation, which will result in death or serious injury.
WARNING	Indicates a hazardous situation, which could result in death or serious injury.
CAUTION	Indicates a hazardous situation, which may result in minor or moderate injury.
NOTICE	Indicates a property damage.

General Symbols

	Additional support or useful information.
	The crossed-out refuse bin indicates that the products have to be properly recycled or disposed of in accordance with national legislation in the respective EU countries. If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the local regulations.

Technical Support

DATA MODUL's technicians and engineers are committed to provide the best possible technical support for our customers to enable an easy use and implementation of our products. We recommend visiting our website at www.data-modul.com first for the latest documentation, utilities and drivers, which have been made available to assist you. If you need further assistance after visiting our website, please contact our technical support department by email at support@data-modul.com.

List of Abbreviations

Abbreviation	Description
EMI	Electro Magnetic Interference
EN	European Norm
FFC	Flat Foil Cable
HDMI	High Definition Multimedia Interface
I2C	Inter-Integrated Circuit Bus
LCD	Liquid Crystal Display
LVDS	Low Voltage Differential Signal
NA	Not Available
NC	Not Connected
PCB	Printed Circuit Board
PWM	Pulse Width Modulation
SBC	Single Board Computer
TBD	To Be Defined
TTL	Transistor Transistor Logic
USB	Universal Serial Bus

Technical Data

Supported Operating Systems

- Linux (Yocto)

Standards & Certifications

Environmentalism

- 2011/65/EU (of 8. June 2011 directive of the European parliament and of the council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS))
- 2006/1907/EU (of 18. December 2006 of the European parliament and of the council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH))
- 2012/19/EC (of 04. July 2012 directive of the European parliament and of the council on waste electrical and electronic equipment (WEEE))
- The board is designed and manufactured to meet ISO 14001
- The packing complies with directive 1994/62/EU

EMI/EMC Standards

Designed to meet EN55022

Electrical Safety

Designed to meet EN62368

Shock & Vibration

Designed to meet IEC/EN60068-2-6 and IEC/EN60068-2-27

Functional Block Diagram

Interfaces on the front:

- Dual USB 2.0 Type A connector
- Micro-USB 2.0 Type B with OTG support
- 10BASE-T /100BASE-TX /1000BASE-T Ethernet (RJ45 connector)
- Micro SD card slot

Interfaces on the board:

- M.2 Key-B
- i.MX8M Mini processor JTAG interface (optional)
- Graphic interface connector (with MPI-DSI, I2C, I2S, GPIO, USB)

Internal interfaces:

- 2-pin battery connector
- SPI, I2C, GPIOs, UARTs on pin header (Feature Connector)
- RS232, RS485, CAN, GPIO via optional I/O Module (eDM-SBC-iMX8Mm-FIO1)

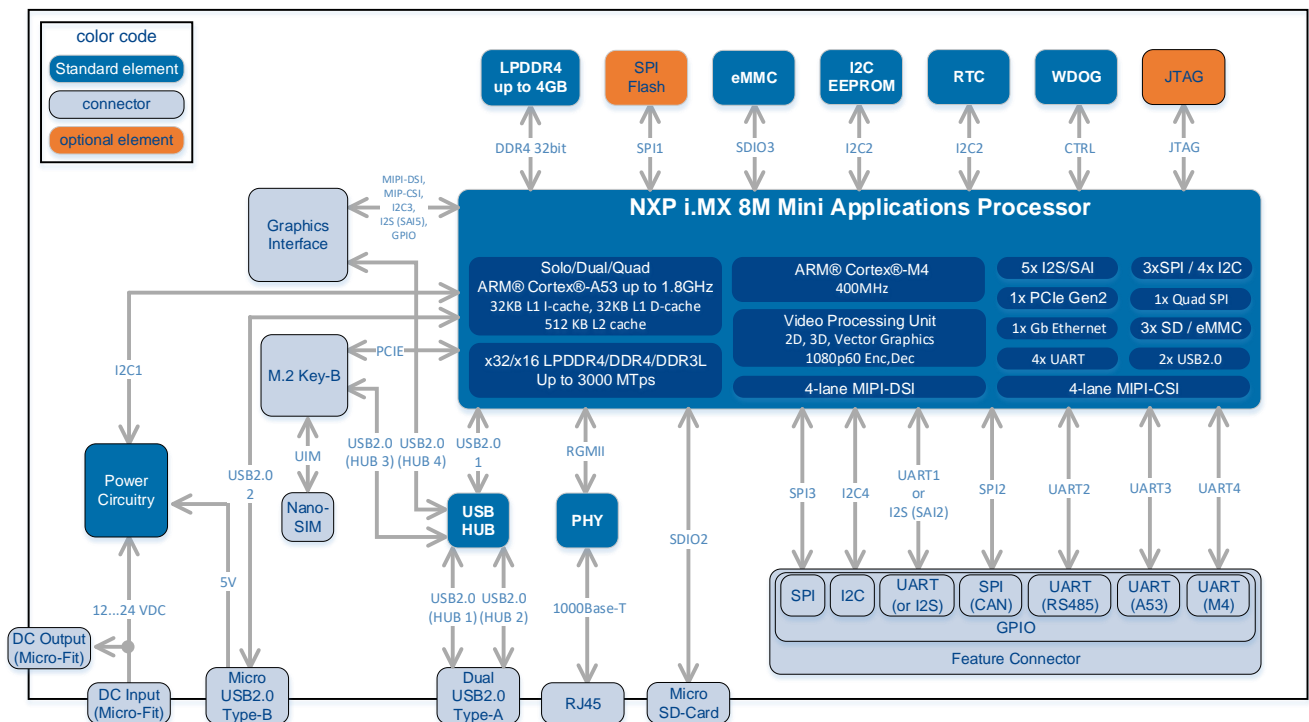


Figure 1 Functional Block Diagram

Ordering Information

Model Name	Part No.	Description
eDM-SBC-iMX8Mm-D-2G	12059030	SBC with i.MX8M Mini Dual 1800MHz, 2GB RAM, 16GB eMMC, micro-SD, 2 + 1 USB2.0, Gigabit Ethernet, Graphics Connector, M.2 Key-B Socket, RTC, Feature Connector, 12...24VDC, 0°C...+70°C
eDM-SBC-iMX8Mm-D-2G-E	12059031	SBC with i.MX8M Mini Dual 1600MHz, 2GB RAM, 16GB eMMC, micro-SD, 2 + 1 USB2.0, Gigabit Ethernet, Graphics Connector, M.2 Key-B Socket, RTC, Feature Connector, 12...24VDC, -20°C...+80°C
eDM-SBC-iMX8Mm-Q-4G	12059032	SBC with i.MX8M Mini Quad 1800MHz, 4GB RAM, 16GB eMMC, micro-SD, 2 + 1 USB2.0, Gigabit Ethernet, Graphics Connector, M.2 Key-B Socket, RTC, Feature Connector, 12...24VDC, 0°C...+70°C
eDM-SBC-iMX8Mm-Q-4G-E	12059033	SBC with i.MX8M Mini Quad 1600MHz, 4GB RAM, 16GB eMMC, micro-SD, 2 + 1 USB2.0, Gigabit Ethernet, Graphics Connector, M.2 Type-B Socket, RTC, Feature Connector, 12...24VDC, -20°C...+80°C
eDM-SBC-iMX8Mm-MIPI	12045641	Graphics Module with 4-Lane MIPI-DSI, USB or I2C Touch, I2S Audio, -20°C... +85°C <i>Example solution, supporting 5.0" Display Ortustech COM50H5N17ULC</i>
eDM-SBC-iMX8Mm-LVDS	12045244	Graphics Module with Dual-Channel LVDS, Backlight, USB or I2C Touch, I2S Audio, -20°C...+85°C <i>Hint: Each module requires a display-specific programming</i>
eDM-SBC-iMX8Mm-HDMI	12046330	Graphics Module with HDMI 1.2a Type A connector, -20...+85°C
eDM-SBC-iMX8Mm-FIO1	12047960	I/O Module with 3 x RS232, 1 x RS485 (isolated), 1 x CAN (isolated), 1 x SPI, 1 x I2C, 3 x GPIO, Buzzer, 0°C...+70°C
eDM-SBC-iMX8Mm-SK	12049886	Starterkit with eDM-SBC-iMX8Mm-Q-4G, eDM-MOD-iMX8Mm-HDMI Modul, eDM-MOD-iMX8Mm-FIO1 IO-Module, µSD-Card, DM-USB-Stick, Power Supply 12V 75W, RTC-Battery, Interface-set (Adapter-cable, Power-cable), 0°C...+70°C
eDM-SBC-iMX8Mm-SK1	12058498	Starterkit with eDM-SBC-iMX8Mm-Q-4G, eDM-MOD-iMX8Mm-HDMI Modul, µSD-Card, DM-USB-Stick, Power Supply 12V 75W, RTC-Battery, Interface-set (Adapter-cable, Power-cable), 0°C...+70°C
eDM-SBC-iMX8Mm-SK2	12052037	Starterkit with eDM-SBC-iMX8Mm-D-2G, eDM-MOD-iMX8Mm-HDMI Modul, eDM-MOD-iMX8Mm-FIO1 I/O-Module, µSD-Card, DM-USB-Stick, Power Supply 12V 75W, RTC-Battery, Interface-set (Adapter-cable, Power-cable), 0°C...+70°C
eDM-SBC-iMX8Mm-SK3	12058500	Starterkit with eDM-SBC-iMX8Mm-D-2G, eDM-MOD-iMX8Mm-HDMI Modul, µSD-Card, DM-USB-Stick, Power Supply 12V 75W, RTC-Battery, Interface-set (Adapter-cable, Power-cable), 0°C...+70°C
eDM-SBC-iMX8Mm-DSPK2	12050257	Display-Kit including 7.0" LVDS Display, Touch and eDM-iMX8Mm-LVDS Adapter, 0°C...+70°C <i>Add-on kit for eDM-SBC-iMX8Mm-SK / -SK1 / -SK2 / -SK3</i>

Table 1 Ordering Information for SBCs, Add-on Modules and Starterkits

Connector Positions

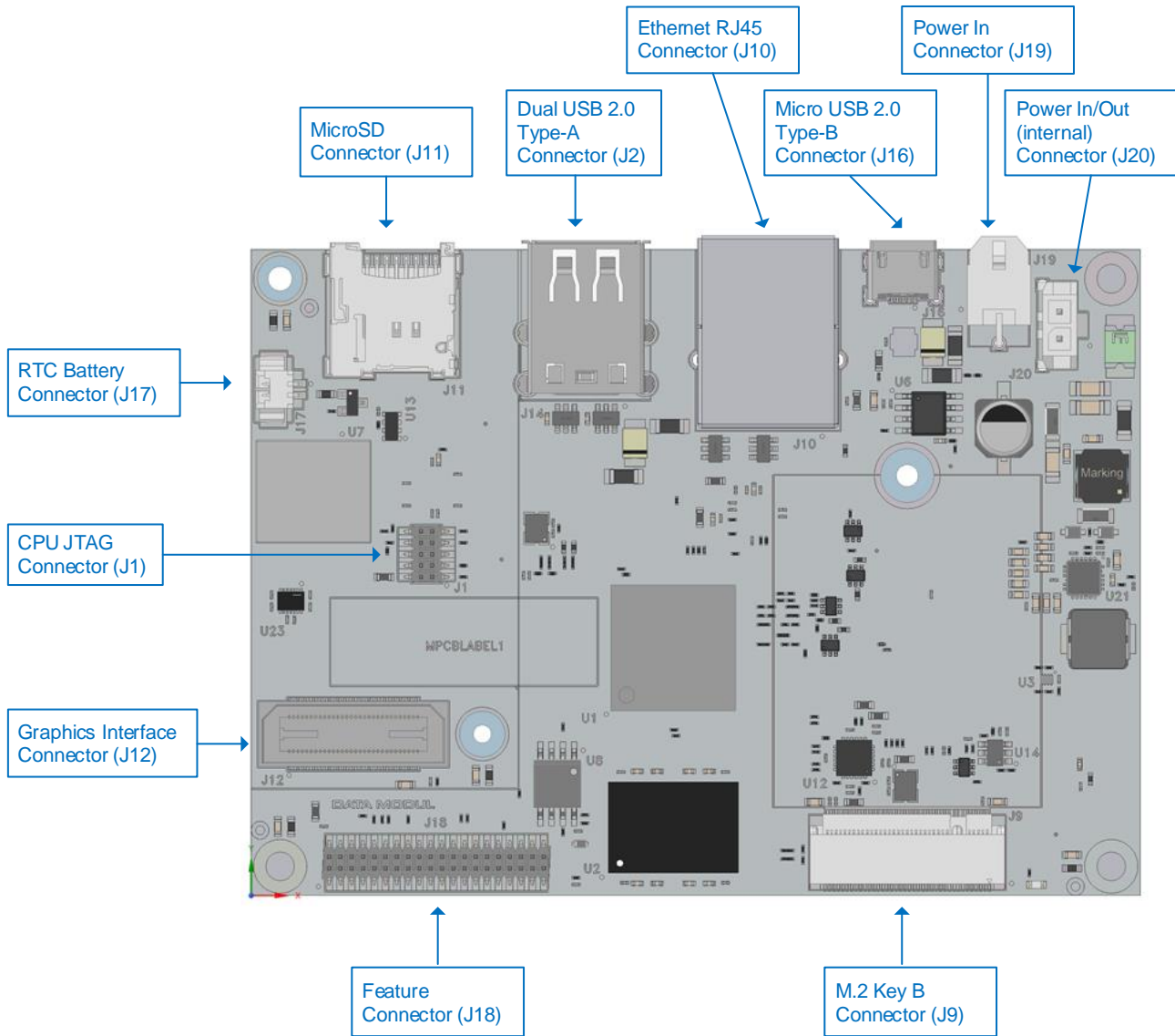


Figure 2 Connector Positions (Top View)

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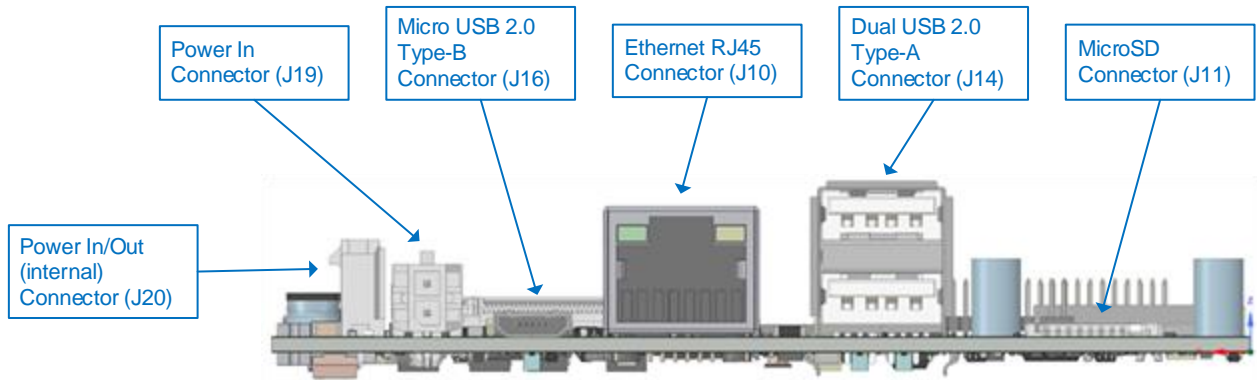


Figure 3 Connector Positions (Front View)

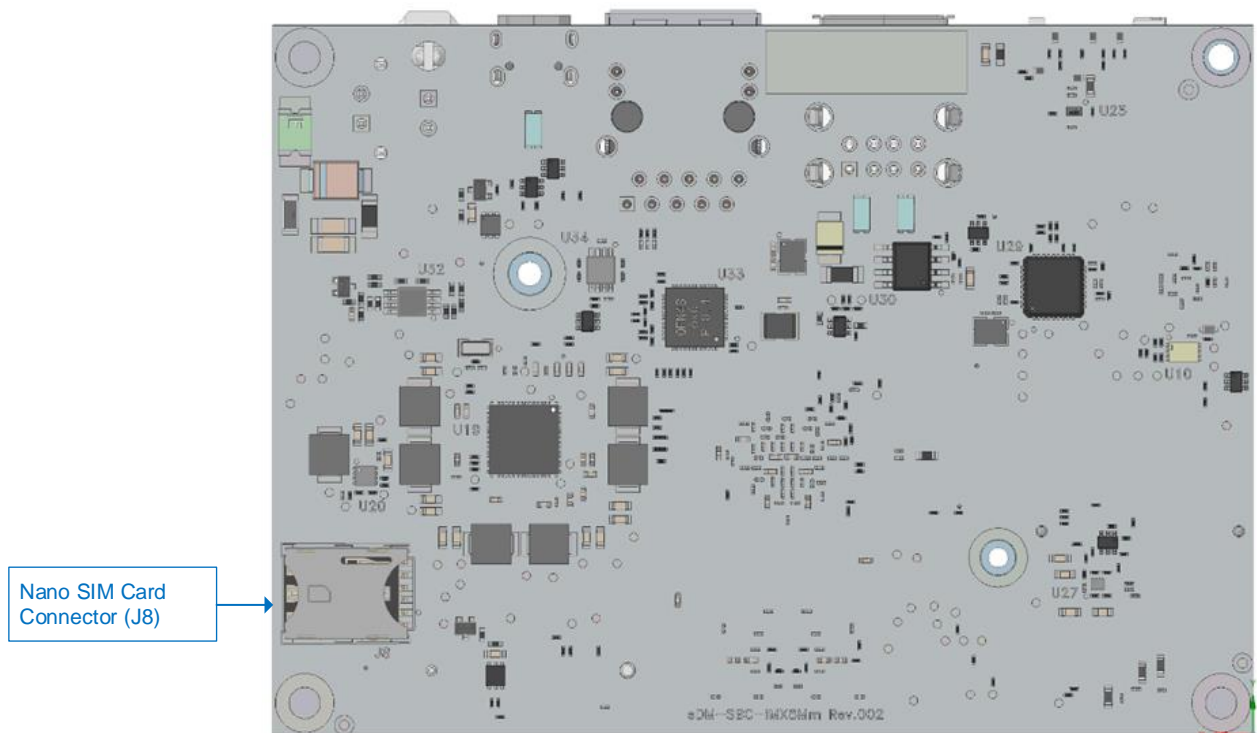


Figure 4 Connector Positions (Bottom View)

Mechanical Design

PCB Size

Mechanical dimensions: 100mm x 72mm

Mounting Holes

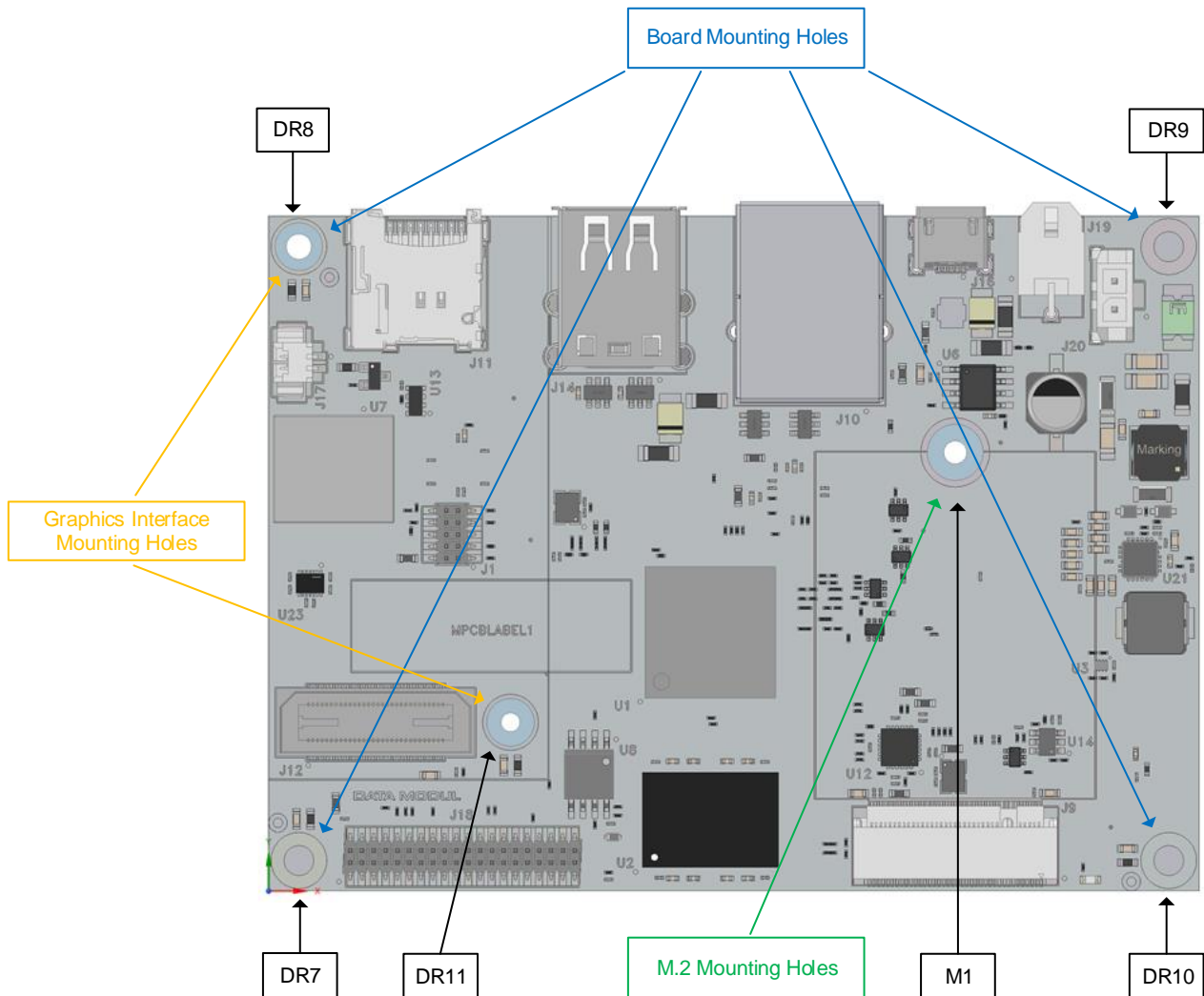


Figure 5 Mounting Holes Positions

Reference Designator	Type	Recommended Screw Type
DR7	Hole \varnothing 3.2mm	M3 x 5 mm (Din 7985, ISO 7045)
DR8	Würth WA-SMST SMD Steel Spacer \varnothing 2.7mm Internal non-stop (9774080951)	M2.5 x 14 mm (DIN 7985, ISO 7045)
DR9	Hole \varnothing 3.2mm	M3 x 5 mm (DIN 7985, ISO 7045)
DR10	Hole \varnothing 3.2mm	M3 x 5 mm (DIN 7985, ISO 7045)
DR11	Würth WA-SMST SMD Steel Spacer M2.5 Thread Internal (9774080151)	M2.5 x 5 mm (DIN 7985, ISO 7045)
M1	Würth WA-SMI SMT Steel Spacer, M3 Thread Internal (9774025360R)	M3 x 4 mm (DIN 7985, ISO 7045)

Table 2 Mounting Holes Description

Refer to the step file for detailed information.

If you need assistance, please contact our technical support department by email at support@data-modul.com.

Cooling Solution

A cooling solution is usually depending from the system environment where the Single Board Computer is used. For environmental temperatures up to a maximum of +40°C a standard heatsink, together with a thermal pad on top of the processor case, can be considered as sufficient in most cases.

For example: Fischer Elektronik ICK BGA 14x14x10 + WLFT 8926 02 14x14

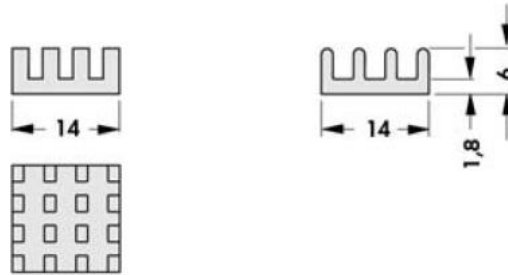


Figure 6 Heatsink

For higher environmental temperatures, a heat spreader is recommended to be used, which is either connected to a larger heatsink, or any other cooling solution being appropriate for the individual use case.

Platform Features

CPU Variants

- NXP® i.MX8M mini Dual, Cortex-A53 1800 MHz, 2C, 512KB L2 Cache, GCNanoUltra (commercial grade)
- NXP® i.MX8M mini Dual, Cortex-A53 1600 MHz, 2C, 512KB L2 Cache, GCNanoUltra (industrial grade)
- NXP® i.MX8M mini Quad, Cortex-A53 1800 MHz, 4C, 512KB L2 Cache, GCNanoUltra (commercial grade)
- NXP® i.MX8M mini Quad, Cortex-A53 1600 MHz, 4C, 512KB L2 Cache, GCNanoUltra (industrial grade)

- Graphics
 - integrated Graphics Processing Unit with 2D, 3D accelerator
 - integrated Video Processing Unit for video encode and decode

Memory

One 32-bit LPDDR4 device supported:

- Memory type: LPDDR4
- Speed: 1066 MT/s
- Size: up to 4GB

Mass Storage

- Onboard eMMC up to 64GB

Ethernet

- 1000Base-T interface with Qualcomm AR8031 PHY

Micro-SD Card Socket

- According to SD Card specification. SD/SDHC/SDXC cards up to 2TB supported.

RTC (Real-Time-Clock)

- STMicroelectronics M41T62 low-power serial real-time clock with alarm. The battery can be used to provide power backup to the external RTC circuits when external power supply is not available. The battery needs to provide a 3V of power and has to be connected to J17. The specified battery type is CR2032.

Watchdog

- Texas Instruments TPS3813 processor supervisory circuit with window-watchdog.

I/O Interfaces¹⁾

- 2 x USB2.0 (Type-A), 1 x USB2.0 (micro Type-B)
- Up to 4 x UART (1 x R485 over UART optional via I/O module)
- 1x Micro-SD card slot
- 1 x PCIe 2.0 Lane on M.2 Key-B socket
- 2 x SPI (1 x CAN over SPI optional)
- 1 x I²C, 1 x I²S, 3 x GPIO
- 1 x M.2 Key-B socket for wireless connection
- 1x Nano SIM card socket

Display/Monitor Interfaces

Customizable Graphics interface via mezzanine module

- 4-lane MIPI DSI, dual-channel 24-bit LVDS, 24-bit RGB, HDMI 1.2a (Type A),
- Up to Full HD 1920 x 1080 Pixel @ 60fps

¹⁾ Some interfaces require the optional eDM-MOD-iMX8Mm-FIO1 I/O module

Environmental Conditions

The eDM-SBC-iMX8Mm is able to be operated and stored under the following environmental conditions:

- Temperature (operating): 0°C ... +70°C (commercial grade variants)
- Temperature (operating): -20°C ... +80°C (extended temperature range variants)¹
- Temperature (storage): -40°C ... +85°C
- Relative humidity: < 90% RH non-condensing
- Tolerable air pressure: > 708 hPa (approx. altitude 2000m)

Power Supply

Input Voltage J19

- VCC: 12.0 V ... 24.0 V ± 10%

Power over Micro USB 2.0 Type-B Connector J16

- VCC: 5.0 V ± 5% (higher voltages will not be generated, for example 12V)

Specifications

- Voltage Ripple: max. 100mV peak to peak 0 ... 20 MHz
- Rise Time: 0.1 ... 20ms from input voltage < 10% nominal VCC
- Max. Inrush Current VCC: 5A

Power Features

The typical power consumption is below 5 Watts (measurement done with eDM-SBC-iMX8Mm-Q-4G, eDM-SBC-iMX8Mm-HDMI Graphics Module assembled on J12, MicroSD card (4GB) used as boot device assembled on J11, Ethernet 1Gb connected to J10, three USB Sticks (each 8GB) connected to J16, J14 and VIN 24V).

¹ SBC variants with extended temperature range perfectly fit for applications with 24/7 operation. The upper temperature value is limited by the M.2 Type-B connector specification

Connector Pinning

General Connector Signal Description

Type	Description
I/O-1.8	Bi-directional 1.8V Input/Output-Signal
I/O-3.3	Bi-directional 3.3V Input/Output-Signal
I/O-5	Bi-directional 5 V Input/Output-Signal
I-1.8	1.8V Input
I/OD-1.8	Bi-directional 1.8V Input/Output Open Drain
I-3.3	3.3V Input
I/OD-3.3	Bi-directional 3.3V Input/Output Open Drain
I-5	5V Input
I/OD-5	Bi-directional 5V Input/Output Open Drain
OA	Output Analog
OD	Output Open Drain
O-1.8	1.8V Output
O-3.3	3.3V Output
O-5	5V Output
DP-I/O	Differential Pair Input/Output
DP-I	Differential Pair Input
DP-O	Differential Pair Output
PU	Pull-Up Resistor
PD	Pull-Down Resistor
PWR	Power Connection

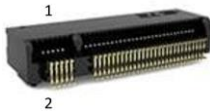
Table 3 General Connector Signal Description

Internal Connectors

M.2 Key-B J9

- M.2 Key-B compliant socket connector with mounting hole to support card sizes 3042
- M.2 connector with 0.5mm pitch, 4.2mm height, KEY-B
- Connector type: TE part number 2199230-3
- Pinout

Pin assignment	Pin	Signal	Type	Termination	Comment
	1	NC_M2-B_CONFIG3			
	2	V_3V3_M2_S0			
	3	GND	PWR GND		
	4	V_3V3_M2_S0			
	5	GND	PWR GND		
	6	M2-B_FULL_CARD_PWROFF_1V8#			
	7	USBHUB_DN3_P			
	8	M2-B_W_DISABLE1_WWAN_1V8#			
	9	USBHUB_DN3_N			
	10	M2-B_LED#			
	11	GND	PWR GND		
	12	NC_M2-B_12	-	-	-
	13	NC_M2-B_13	-	-	-
	14	NC_M2-B_14	-	-	-
	15	NC_M2-B_15	-	-	-
	16	NC_M2-B_16	-	-	-
	17	NC_M2-B_17	-	-	-
	18	NC_M2-B_18	-	-	-
	19	NC_M2-B_19	-	-	-
	20	NC_M2-B_20	-	-	-
	21	NC_M2-B_CONFIG0	-	-	-
	22	NC_M2-B_22	-	-	-
	23	M2-B_WAKE_WWAN_1V8#			
	24	NC_M2-B_24	-	-	-
	25	M2-B_DPR_1V8			
	26	M2-B_W_DISABLE2_GPS_1V8#	O-1.8 (S0)		
	27	GND	PWR GND	-	-
	28	NC_M2-B_28	-	-	-
	29	NC_M2-B_29	-	-	-
	30	M2-B_UIM_RESET			
	31	NC_M2-B_31	-	-	-
	32	M2-B_UIM_CLK			
	33	GND	PWR GND	-	-
	34	M2-B_UIM_DATA			
	35	NC_M2-B_35	-	-	-

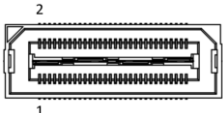


Pin assignment	Pin	Signal	Type	Termination	Comment
	36	M2-B_UIM_PWR			
	37	NC_M2-B_37	-	-	-
	38	NC_M2-B_38	-	-	-
	39	GND	PWR GND	-	-
	40	NC_M2-B_40	-	-	-
	41	PCIE_RX_N			
	42	NC_M2-B_42	-	-	-
	43	PCIE_RX_P			
	44	NC_M2-B_44	-	-	-
	45	GND	PWR GND	-	-
	46	NC_M2-B_46	-	-	-
	47	PCIE_TX_N			
	48	NC_M2-B_48	-	-	-
	49	PCIE_TX_P			
	50	M2-B_PCIE_RST#	O-3.3 (S0)	PD 10K	-
	51	GND	PWR GND	-	-
	52	M2-B_PCIE_CLKREQ#	I-3.3 (S0)	PU 10K (S0)	-
	53	PCIE_CLK_M2_R_N			
	54	M2-B_PCIE_WAKE#	I-3.3 (S0)	PU 10K (S0)	-
	55	PCIE_CLK_M2_R_P			
	56	NC_M2-B_56	-	-	-
	57	GND	PWR GND	-	-
	58	NC_M2-B_58	-	-	-
	59	NC_M2-B_59	-	-	-
	60	NC_M2-B_60	-	-	-
	61	NC_M2-B_61	-	-	-
	62	NC_M2-B_62	-	-	-
	63	NC_M2-B_63	-	-	-
	64	NC_M2-B_64	-	-	-
	65	NC_M2-B_65	-	-	-
	66	M2-B_UIM_SIM-DETECT			
	67	M2-B_RESET_1V8#			
	68	CLK_M2_32K768			
	69	NC_M2-B_CONFIG2	-	-	-
	70	V_3V3_M2_S0			
	71	GND	PWR GND	-	-
	72	V_3V3_M2_S0			
	73	GND	PWR GND	-	-
	74	V_3V3_M2_S0			
	75	NC_M2-B_CONFIG2	-	-	-

Table 4 M.2 Key-B Connector Pinout Assignment

Graphics Interface Connector J12

- Connector Micro Socket SKT 60 POS 0.5mm Solder ST SMD T/R
- Connector type: Samtec part number BSH-030-01-F-D-A
- Pinout


Pin assignment	Pin	Signal	Type	Termination	Comment
	1	GND	PWR GND	-	-
	2	GND	PWR GND	-	-
	3	CSI_D3_P	I-1.8 (S0)	-	-
	4	DSI_D3_P	O-1.8 (S0)	-	-
	5	CSI_D3_N	I-1.8 (S0)	-	-
	6	DSI_D3_N	O-1.8 (S0)	-	-
	7	GND	PWR GND	-	-
	8	GND	PWR GND	-	-
	9	CSI_D2_P	I-1.8 (S0)	-	-
	10	DSI_D2_P	O-1.8 (S0)	-	-
	11	CSI_D2_N	I-1.8 (S0)	-	-
	12	DSI_D2_N	O-1.8 (S0)	-	-
	13	GND	PWR GND	-	-
	14	GND	PWR GND	-	-
	15	CSI_CLK_P	I-1.8 (S0)	-	-
	16	DSI_CLK_P	O-1.8 (S0)	-	-
	17	CSI_CLK_N	I-1.8 (S0)	-	-
	18	DSI_CLK_N	O-1.8 (S0)	-	-
	19	GND	PWR GND	-	-
	20	GND	PWR GND	-	-
	21	CSI_D1_P	I-1.8 (S0)	-	-
	22	DSI_D1_P	O-1.8 (S0)	-	-
	23	CSI_D1_N	I-1.8 (S0)	-	-
	24	DSI_D1_N	O-1.8 (S0)	-	-
	25	GND	PWR GND	-	-
	26	GND	PWR GND	-	-
	27	CSI_D0_P	I-1.8 (S0)	-	-
	28	DSI_D0_P	O-1.8 (S0)	-	-
	29	CSI_D0_N	I-1.8 (S0)	-	-
	30	DSI_D0_N	O-1.8 (S0)	-	-
	31	GND	PWR GND	-	-
	32	GND	PWR GND	-	-
	33	CLK_CCM_CLKO1_1V8	O-1.8 (S0)	PU 34K8 (S0) PD 34K8 (S0)	-
	34	DSI_IRQ_1V8#	I-1.8 (S0)	PU 10K (S0)	-
	35	CSI_RESET_1V8#	O-1.8 (S0)	-	-
	36	BL_PWM_1V8	O-1.8 (S0)	-	-
	37	CSI_PD_1V8	O-1.8 (S0)	-	-

Pin assignment	Pin	Signal	Type	Termination	Comment
	38	BL_ENABLE_1V8	O-1.8 (S0)	-	-
	39	GRAPHICS_GPIO_1V8	I/O-1.8 (S0)	PU 10K (S0)	-
	40	TFT_ENABLE_1V8	O-1.8 (S0)	-	-
	41	NC_RSVD_J12P41	-	-	-
	42	USBHUB_DN4_P	DP-I/O	-	-
	43	NC_RSVD_J12P43	-	-	-
	44	USBHUB_DN4_N	DP-I/O	-	-
	45	I2C3_SDA_1V8	I/O-1.8	PU 4.75K (S0)	-
	46	GND	PWR GND	-	-
	47	I2C3_SCL_1V8	O-1.8	PU 4.75K (S0)	-
	48	I2S_5_MCLK	O-1.8	Series resistor 33R	-
	49	GND	PWR GND	-	-
	50	I2S_5_RXD0_R	I-1.8	Series resistor 33R PU 10K (S0)	PU on SOC
	51	V_1V8_VDD_S0	PWR 1.8V (S0), I _{max.} = 100mA	-	-
	52	I2S_5_TXD0	O-1.8	Series resistor 33R	-
	53	V_3V3_S5	PWR 3.3V (S5), I _{max.} = 100mA	-	-
	54	I2S_5_BCLK	O-1.8	Series resistor 33R	-
	55	V_3V3_VDD_S0	PWR 3.3V (S0), I _{max.} = 300mA	-	-
	56	I2S_5_WCLK	O-1.8	Series resistor 33R	-
	57	V_5V0_S0	PWR 5.0V (S0), I _{max.} = 300mA	-	-
	58	DSI_RESET_1V8#	O-1.8	-	-
	59	V_IN_VAR_S5	PWR 12V/24V (S5), I _{max.} = 2000mA	-	-
	60	GRAPHICS_PRNT_1V8#	I-1.8	PU 10K (S0)	-

Table 5 Graphics Interface Connector Pin Assignment

Feature Connector J18

- SMT Pin Header, 1.27mm Pitch, Straight, Double Row, 40 pol with 1.5mm body height and 3,0 ... 3,8mm pin height
- Connector type: Würth 62104021021 or Amphenol 20021121-00040T2LF
- Pinout



Pin assignment	Pin	Signal	Type	Termination	Comment
	1	V_5V0_S0_FCON	PWR 5.0V (S0), I _{max} = 500mA		-
	2	GND	PWR GND	-	-
	3	V_3V3_S5_FCON	PWR 3.3V (S5), I _{max} = 100mA	-	-
	4	I2C4_SCL_3V3	O-3.3	PU 4.75k (S0)	-
	5	V_3V3_VDD_S0_FCON	PWR 3.3V (S0), I _{max} = 200mA	-	-
	6	I2C4_SDA_3V3	I/O-3.3	PU 4.75k (S0)	-
	7	V_1V8_VDD_S0_FCON	PWR 1.8V (S0), I _{max} = 100mA	-	-
	8	GND	PWR GND	-	-
	9	UART2_CTS Optional: (GPIO5_IO29, SAI3_RXC)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	(Note: UART for RS485) ¹
	10	UART2_TXD Optional: (GPIO5_IO00, SAI3_TXC)	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	(Note: UART for RS485) ¹
	11	UART2_RTS Optional: (GPIO4_IO30, SAI3_RXD)	I-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	PU 10K (S0)	(Note: UART for RS485) ¹
	12	UART2_RXD Optional: (GPIO4_IO31, SAI3_TXFS)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	PU 10K (S0)	(Note: UART for RS485) ¹
	13	SPI2_CLK Optional: (GPIO5_IO10, UART4_RX)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	(Note: SPI to CAN) ¹
	14	GND	PWR GND	-	-
	15	SPI2_MOSI Optional: (GPIO5_IO11, UART4_TX)	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	(Note: SPI to CAN) ¹
	16	GPIO5_IO04 Optional: (SDIF1_IN (SDIF_RX), PWM2_OUT)	I/O-3.3 (S0) I-3.3 (S0) O-3.3 (S0)	-	-
	17	SPI2_MISO Optional: (GPIO5_IO12, UART4_CTS_B)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	PU 10K (S0)	(Note: SPI to CAN) ¹
	18	CAN_INT# Optional: (GPIO4_IO25, SAI2_TX_BCLK (SAI2_TXC), SAI5_TX_DATA2)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0) O-3.3 (S0)	PU 10K (S0)	(Note: CAN CTRL Signals) ¹
	19	SPI2_CS# Optional: (GPIO5_IO13, UART4_RTS_B)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	(Note: SPI to CAN) ¹
	20	GPIO5_IO03 Optional: (SDIF_OUT (SDIF_TX), PWM3_OUT)	I/O-3.3 (S0) O-3.3 (S0) O-3.3 (S0)	-	-
	21	GND	PWR GND	-	-

Pin assignment	Pin	Signal	Type	Termination	Comment
	22	GND	PWR GND	-	-
	23	UART1_CTS Optional: (GPIO4_IO24, SAI2_TX_SYNC (SAI2_TXFS))	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	-
	24	UART1_TXD Optional: (GPIO4_IO21, SAI2_RX_SYNC (SAI2_RXFS))	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	-
	25	UART1_RTS Optional: (GPIO4_IO23, SAI2_TX_RXD0 (SAI2_RXD0))	I-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	PU 10K (S0)	-
	26	UART1_RXD Optional: (GPIO4_IO22, SAI2_RX_BCLK (SAI2_RXC))	I-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	PU 10K (S0)	-
	27	GPIO_EXPANDER_INT Optional: (GPIO4_IO27, SAI2_MCLK)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	(Note: GPIO Expander INT Signals) ¹
	28	CAN_RST# Optional: (GPIO4_IO26, SAI2_TX_DATA0(SAI2_TXD0))	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	(Note: CAN CTRL Signals) ¹
	29	SPI3_MISO Optional: (GPIO5_IO24, UART2_RXD)	I-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	PU 10K (S0)	-
	30	SPI3_SCLK Optional: (GPIO5_IO22, UART1_RXD)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	-
	31	SPI3_MOSI Optional: (GPIO5_IO23, UART1_TXD)	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	-
	32	SPI3_CS# Optional: (GPIO5_IO25, UART2_TXD)	O-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	-
	33	UART3_TXD Optional: (GPIO5_IO27, UART1_RTS_B)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	(Note: A53 debug console)
	34	UART4_TXD Optional: (GPIO5_IO29, UART2_RTS_B)	O-3.3 (S0) I/O-3.3 (S0) I-3.3 (S0)	-	(Note: M4 debug console)
	35	UART3_RXD Optional: (GPIO5_IO26, UART1_CTS_B)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	-	(Note: A53 debug console)
	36	UART4_RXD Optional: (GPIO5_IO28, UART2_CTS_B)	I-3.3 (S0) I/O-3.3 (S0) O-3.3 (S0)	PU 10K (S0)	(Note: M4 debug console)
	37	GND	PWR GND	-	-
	38	PWRBTN_KEY#	I-1.8 (S0)	PU 100K (S0)	CPU ON/OFF Button
	39	GND	PWR GND	-	-
	40	RSRBTN_KEY#	I-5.0 (S5)	PU 100K (S5)	System Reset Button

Note:

1. Used with the eDM-MOD-iMX8Mm-FIO1 (I/O Module).
2. Refer to the NXP "Pins Tool for i.MX_Applications Processors" for detailed pin IO mux configuration of NPX iMX8M Mini Processor.

Table 6 Feature Connector Pin Assignment

RTC Battery Connector J17

- 1.25mm Pitch Molex PicoBlade Wire-to-Board Header, Single Row, right-angle, 2 circuits
- Connector type: Molex 053261-0271 or Würth 653102131822 or Nexus 2127H02TR
- Pinout


Pin assignment	Pin	Signal	Type	Termination	Comment
	1	V_BAT_CONN	PWR 3.3V (VBAT)	-	-
	2	GND	PWR GND	-	-

Table 7 RTC-Battery Connector Pin Assignment

CPU JTAG Connector J1 (optional, debug connector)

- 1,27mm Pitch, Two Rows, Pin Header, Surface Mount, Vertical, 10 Circuits
- Connector type: Würth part number 62101021021
- Pinout

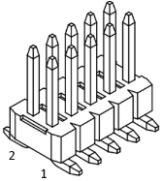
Pin assignment	Pin	Signal	Type	Termination	Comment
	1	JTAG_TMS	I-1.8	PU 10k 1.8V (S0)	-
	2	V_1V8_S0_JTAG	PWR 1.8V (S0)	-	-
	3	JTAG_TCK	I-1.8	PD 10k	-
	4	GND	PWR GND	-	-
	5	JTAG_TDO	O-1.8 (S0)	-	-
	6	GND	PWR GND	-	-
	7	JTAG_TDI	I-1.8	PU 10k 1.8V (S0)	-
	8	JTAG_MOD	I-1.8	-	-
	9	JTAG_RST#	I-1.8	PU 10k 1.8V (S0)	-
	10	JTAG_TRST#	I-1.8	PD OR	-

Table 8 CPU JTAG Connector Pin Assignment

External Connectors

MicroSD Connector J11

- RJ-45 connector with integrated magnetics compliant to Ethernet 1000base-Tx and 2 LEDs
- Connector type: TRP Connector 2250015-3 or LINK-PP LPJG16414A37NL or W+P 655-08-2-60-5-1-8-E
- Pinout


Pin assignment	Pin	Signal	Type	Termination	Comment
	1	SD2_DATA2	PWR 1.8V (S0)	-	-
	2	SD2_DATA3	I/O-3.3/1.8	-	-
	3	SD2_CMD	I/O-3.3/1.8	-	-
	4	V_3V3_SD	PWR 3.3 (SD)	-	-
	5	SD2_CLK	I-3.3/1.8	-	-
	6	GND	PWR GND	-	-
	7	SD2_DATA0	I/O-3.3/1.8	-	-
	8	SD2_DATA1	I/O-3.3/1.8	-	-
	9	SD2_CD1_N	O-3.3/1.8	OR series resistor and PU 100K (3.3/1.8)	PU on SOC
	10	SD2_CD2	GND	-	Connected to GND

Table 9 MicroSD Connector Pin Assignment

Dual USB 2.0 Connector Type-A J14

- Dual USB 2.0 Conn Type-A
- Connector type: Würth 614 008 260 21 or Foxconn UB11121-8FD3-4F
- Pinout


Pin assignment	Pin	Signal	Type	Termination	Comment
	1	V_5V0_USBHUB_DN1	PWR 5.0V (S5)	-	-
	2	USBHUB_DN1_J_N	DP-I/O	-	-
	3	USBHUB_DN1_J_P	DP-I/O	-	-
	4	GND_USBHUB_DN	PWR GND	-	-
	5	V_5V0_USBHUB_DN2	PWR 5.0V (S5)	-	-
	6	USBHUB_DN2_J_N	DP-I/O	-	-
	7	USBHUB_DN2_J_P	DP-I/O	-	-
	8	GND_USBHUB_DN	PWR GND	-	-

Table 10 Dual USB 2.0 Type-A Connector Pin Assignment

Micro USB 2.0 Type-B Connector J16

- MICRO USB 2.0 TYPE-B -HORIZONTAL- SMT
- Connector type: Würth part number 629105150521
- Pinout


Pin assignment	Pin	Signal	Type	Termination	Comment
	1	V_5V0_S5_USB2	PWR 5.0V (S5)	-	-
	2	USB2_J_D_N	DP-I/O	-	-
	3	USB2_J_D_P	DP-I/O	-	-
	4	USB_OTG_ID	I-5.0	-	-
	5	GND_USB2	PWR GND	-	-

Table 11 Micro USB 2.0 Type-B Connector Pin Assignment

Power over Micro USB 2.0 Type-B Connector J16

The eDM-SBC-iMX8Mm can be powered with 5V over the micro USB 2.0 Type-B connector, the current is max. 3A.

Ethernet RJ-45 Connector J10

- RJ-45 connector with integrated magnetics compliant to Ethernet 1000base-Tx and 2 LEDs
- Connector type: TRP Connector 2250015-3 or LINK-PP LPJG16414A37NL or W+P 655-08-2-60-5-1-8-E
- Pinout

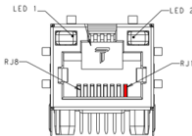
Pin assignment	Pin	Signal	Type	Termination	Comment
	1	GND	PWR 1.8V (S0)	-	-
	2	ETH_CTREF		-	center tab reference
	3	ETH_TRX3_P	DP-I/O	-	-
	4	ETH_TRX3_N	DP-I/O	-	-
	5	ETH_TRX2_P	DP-I/O	-	-
	6	ETH_TRX2_N	DP-I/O	-	-
	7	ETH_TRX1_P	DP-I/O	-	-
	8	ETH_TRX1_N	DP-I/O	-	-
	9	ETH_TRX1_P	DP-I/O	-	-
	10	ETH_TRX1_N	DP-I/O	-	-
	11	ETH_LED_LINK10_100_J	O-2.5	-	-
	12	ETH_LED_LINK1000_J	O-2.5	-	-
	13	ETH_LED_ACT_J	O-2.5	-	-
	14	GND	PWR GND	-	-

Table 12 Ethernet RJ-45 Connector Pin Assignment

During Ethernet link the yellow LED is on and blinking during activity. With 1Gb link the second LED glows orange, with 100Mb link it glows green and with 10Mb it is off.

Nano SIM Card Connector J8

- Connector type: Würth 693043020611 or ATTEND 115U-A000
- Pinout

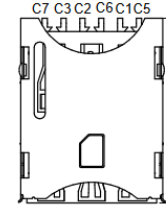
Pin assignment	Pin	Signal	Type	Termination	Comment
	C1	M2-B_UIM_PWR	PWR 3.3V/1.8V	-	-
	C2	M2-B_UIM_RESET	I-3.3V/1.8V	-	-
	C3	M2-B_UIM_CLK	I-3.3V/1.8V	-	-
	C5	GND	PWR GND	-	-
	C6	M2-M-UIM_VPP	PWR	PU OR (1.8V)	-
	C7	M2-B_UIM_DATA	I/O-3.3V/1.8V	-	-

Table 13 Nano SIM Card Connector Pin Assignment

Power Connectors

DC Power In Connector J19

- DC Power In Micro-Fit connector
- Connector type: MOLEX 43045-0200
- Pinout



Pin assignment	Pin	Signal	Type	Termination	Comment
	1	GND	PWR GND	-	-
	2	V_IN_VAR	V_in: 12V ... 24V I_max: 2 A P_max: 24W (12V) / 48W (24V)	-	-

Table 14 Power In Connector Pin Assignment

CAUTION: If a power supply is connected to J20, an external power supply shall not be connected to J19.

DC Power Out/In Connector J20

- DC Power Out Micro-Fit Connector
- Connector type: Molex 43650-0228
- Pinout

Pin assignment	Pin	Signal	Type	Termination	Comment
	1	GND	PWR GND	-	-
	2	V_IN_VAR	V_in: 12V ... 24V I_max: 2 A P_max: 24W (12V) / 48W (24V)	-	Note 1,2

Note:

1. Connector J20 can be used to connect a system-internal power supply voltage to power the eDM-SBC-iMX8Mm. In this case the Connector J19 shall not be used as power supply input.
2. Connector J20 can be used to connect the power input voltage to a connected module or IO Board.

Table 15 Power Out/In Connector Pin Assignment

Board Support Package

A collection of the Board Support Package (BSP) source codes is available at [Data Modul GitLab repository](#).

The below list presents existing Data Modul GitLab repositories.

- <https://git.data-modul.com/i.mx8mm-std-mirror/bsp>
- <https://git.data-modul.com/i.mx8mm-std-mirror/meta-dmo-imx8>
- <https://git.data-modul.com/i.mx8mm-std-mirror/components/kernel>
- <https://git.data-modul.com/i.mx8mm-std-mirror/components/barebox>
- https://git.data-modul.com/i.mx8mm-std-mirror/components/kmod-ilitek_lim

Graphics Modules

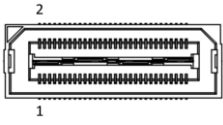
The SBC offers a flexible graphics interface (see page 21), which allows connecting different types of graphics modules to bridge the 4-lane MIPI-DSI signals from the processor to different display interfaces and monitors (e.g. HDMI, LVDS, MIPI, RGB etc.).

The same graphics connector from Samtec is used on all graphics modules.

The mechanical dimensions for all subsequently listed graphics modules are 30mm x 60mm.

Graphics Interface Connector

- Connector type: Samtec BTH-030-02-L-D-A-TR
- Pinout

Pin assignment	Pin	Signal	Type	Termination	Comment
	1	GND	PWR GND	-	-
	2	GND	PWR GND	-	-
	3	CSI_D3_P	I-1.8 (S0)	-	-
	4	DSI_D3_P	O-1.8 (S0)	-	-
	5	CSI_D3_N	I-1.8 (S0)	-	-
	6	DSI_D3_N	O-1.8 (S0)	-	-
	7	GND	PWR GND	-	-
	8	GND	PWR GND	-	-
	9	CSI_D2_P	I-1.8 (S0)	-	-
	10	DSI_D2_P	O-1.8 (S0)	-	-
	11	CSI_D2_N	I-1.8 (S0)	-	-
	12	DSI_D2_N	O-1.8 (S0)	-	-
	13	GND	PWR GND	-	-
	14	GND	PWR GND	-	-
	15	CSI_CLK_P	I-1.8 (S0)	-	-
	16	DSI_CLK_P	O-1.8 (S0)	-	-
	17	CSI_CLK_N	I-1.8 (S0)	-	-
	18	DSI_CLK_N	O-1.8 (S0)	-	-
	19	GND	PWR GND	-	-
	20	GND	PWR GND	-	-
	21	CSI_D1_P	I-1.8 (S0)	-	-
	22	DSI_D1_P	O-1.8 (S0)	-	-
	23	CSI_D1_N	I-1.8 (S0)	-	-
	24	DSI_D1_N	O-1.8 (S0)	-	-
	25	GND	PWR GND	-	-
	26	GND	PWR GND	-	-
	27	CSI_D0_P	I-1.8 (S0)	-	-
	28	DSI_D0_P	O-1.8 (S0)	-	-
	29	CSI_D0_N	I-1.8 (S0)	-	-
	30	DSI_D0_N	O-1.8 (S0)	-	-
	31	GND	PWR GND	-	-
	32	GND	PWR GND	-	-

Pin assignment	Pin	Signal	Type	Termination	Comment
	33	CLK_CCM_CLKO1_1V8	O-1.8 (S0)	PU 34K8 (S0) PD 34K8 (S0)	-
	34	DSI_IRQ_1V8#	I-1.8 (S0)	PU 10K (S0)	-
	35	CSI_RESET_1V8#	O-1.8 (S0)	-	-
	36	BL_PWM_1V8	O-1.8 (S0)	-	-
	37	CSI_PD_1V8	O-1.8 (S0)	-	-
	38	BL_ENABLE_1V8	O-1.8 (S0)	-	-
	39	GRAPHICS_GPIO_1V8	I/O-1.8 (S0)	PU 10K (S0)	-
	40	TFT_ENABLE_1V8	O-1.8 (S0)	-	-
	41	NC_RSVD_J12P41	-	-	-
	42	USBHUB_DN4_P	DP-I/O	-	-
	43	NC_RSVD_J12P43	-	-	-
	44	USBHUB_DN4_N	DP-I/O	-	-
	45	I2C3_SDA_1V8	I/O-1.8	PU 4.75K (S0)	-
	46	GND	PWR GND	-	-
	47	I2C3_SCL_1V8	O-1.8	PU 4.75K (S0)	-
	48	I2S_5_MCLK	O-1.8	Series resistor 33R	-
	49	GND	PWR GND	-	-
	50	I2S_5_RXD0_R	I-1.8	Series resistor 33R PU 10K (S0)	PU on SOC
	51	V_1V8_VDD_S0	PWR 1.8V (S0), I _{max} .= 100mA	-	-
	52	I2S_5_TXD0	O-1.8	Series resistor 33R	-
	53	V_3V3_S5	PWR 3.3V (S5), I _{max} .= 100mA	-	-
	54	I2S_5_BCLK	O-1.8	Series resistor 33R	-
	55	V_3V3_VDD_S0	PWR 3.3V (S0), I _{max} .= 300mA	-	-
	56	I2S_5_WCLK	O-1.8	Series resistor 33R	-
	57	V_5V0_S0	PWR 5.0V (S0), I _{max} .= 300mA	-	-
	58	DSI_RESET_1V8#	O-1.8	-	-
	59	V_IN_VAR_S5	PWR 12V/24V (S5), I _{max} .= 2000mA	-	-
	60	GRAPHICS_PRNT_1V8#	I-1.8	PU 10K (S0)	-

Table 16 Graphics Interface Connector Pin Assignment

DATA MODUL

eDM-MOD-iMX8Mm-MIPI (MIPI Module)

MIPI displays do not offer standardized display interfaces and require individual designs of dedicated modules for proper connection to each display. Therefore, the subsequent description just shows the existing example, which is interfacing to an Ortustech COM50H5N03ULC 5" display with USB Touch.

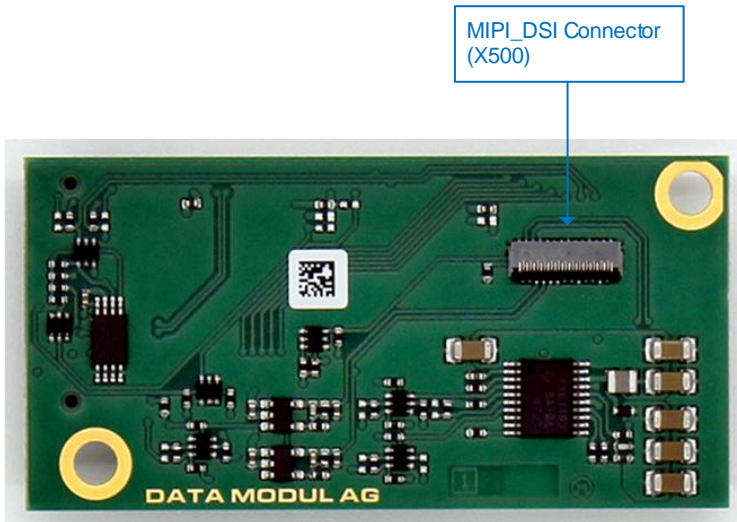


Figure 7 MIPI Graphics Module (Top)

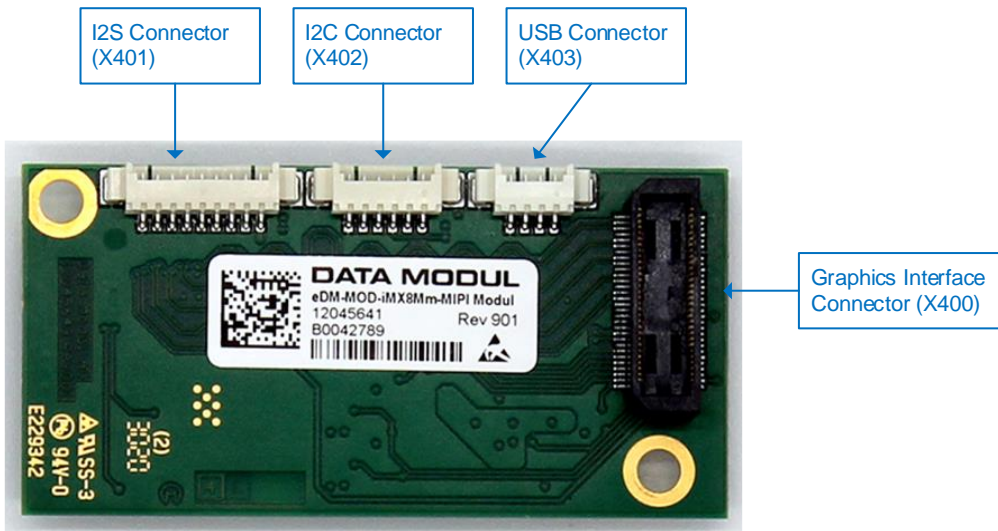


Figure 8 MIPI Graphics Module (Bottom)

MIPI-DSI Connector (X500)

- Connector type: Hirose FH35C-27S-0.3SHW
- Pinout


Pin assignment	Pin	Signal	Type
	1	GND	PWR +5V
	2	N.C.	Not Connected
	3	LED1_A	Backlight LED Anode
	4	N.C.	Not Connected
	5	LED1_K	Backlight LED Kathode
	6	+2.9V	PWR +2.9V
	7	GND	GND
	8	+1.9V	PWR +1.9V
	9	PANEL_RST#	Panel Reset# (+1.9V)
	10	GND	GND
	11	CABC_PWM	Connected with 10K Resistor to GND
	12	GND	GND
	13	MIPI_DSI.L3_P	MIPI DSI Positive Data Lane 3
	14	MIPI_DSI.L3_N	MIPI DSI Negative Data Lane 3
	15	GND	GND
	16	MIPI_DSI.L2_P	MIPI DSI Positive Data Lane 2
	17	MIPI_DSI.L2_N	MIPI DSI Negative Data Lane 2
	18	GND	GND
	19	MIPI_DSI.CLK_P	MIPI DSI Positive Clock
	20	MIPI_DSI.CLK_N	MIPI DSI Negative Clock
	21	GND	GND
	22	MIPI_DSI.L1_P	MIPI DSI Positive Data Lane 1
	23	MIPI_DSI.L1_N	MIPI DSI Negative Data Lane 1
	24	GND	GND
	25	MIPI_DSI.L0_P	MIPI DSI Positive Data Lane 0
	26	MIPI_DSI.L0_N	MIPI DSI Negative Data Lane 0
	27	GND	GND

Table 17 MIPI-DSI Connector Pin Assignment

Graphics Interface Connector (X400)

- Connector type: Samtec BTH-030-02-L-D-A-TR
- Pinout: Please refer to Table 16

I²S Connector (X401)

- Connector type: Molex PicoBlade 53261-0971
- Pinout


Pin assignment	Pin	Signal	Type
	1	+5V	PWR +5V (optional +3.3V)
	2	I2S_MCLK	I2S Master Clock (+1.8V)
	3	I2S_DIN	I2S Data In (+1.8V)
	4	I2S_DOUT	I2S Data Out (+1.8V)
	5	I2S_BCLK	I2S Serial Clock (+1.8V)
	6	I2S_WCLK	I2S Word Clock (+1.8V)
	7	I2C_EXT_SDA	I2C Serial Data (+1.8V/+3.3V/+5V)
	8	I2C_EXT_SCL	I2C Clock (+1.8V/+3.3V/+5V)
	9	GND	GND

Table 18 I²S Connector Pin Assignment

I²C Connector (X402)

- Connector type: Molex PicoBlade 53261-0671
- Pinout

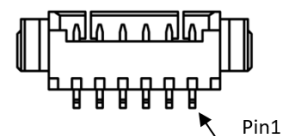
Pin assignment	Pin	Signal	Type
	1	+5V	PWR +5V (optional +3.3V)
	2	TOUCH_RESET#	Touch Reset (Low Active)
	3	TOUCH_INT	Touch Interrupt
	4	I2C_EXT_SCL	I2C Clock (+1.8V/+3.3V/+5V)
	5	I2C_EXT_SDA	I2C Serial Data (+1.8V/+3.3V/+5V)
	6	GND	GND

Table 19 I²C Connector Pin Assignment

USB Connector (X403)

- Connector type: Molex PicoBlade 53261-0471
- Pinout

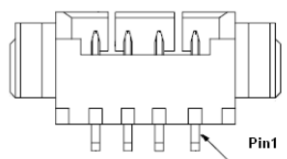
Pin assignment	Pin	Signal	Type
	1	+5V	PWR +5V
	2	USB.D_P	USB Positive Lane
	3	USB.D_N	USB Negative Lane
	4	GND	GND

Table 20 USB Connector Pin Assignment

eDM-MOD-iMX8Mm-LVDS (LVDS Module)

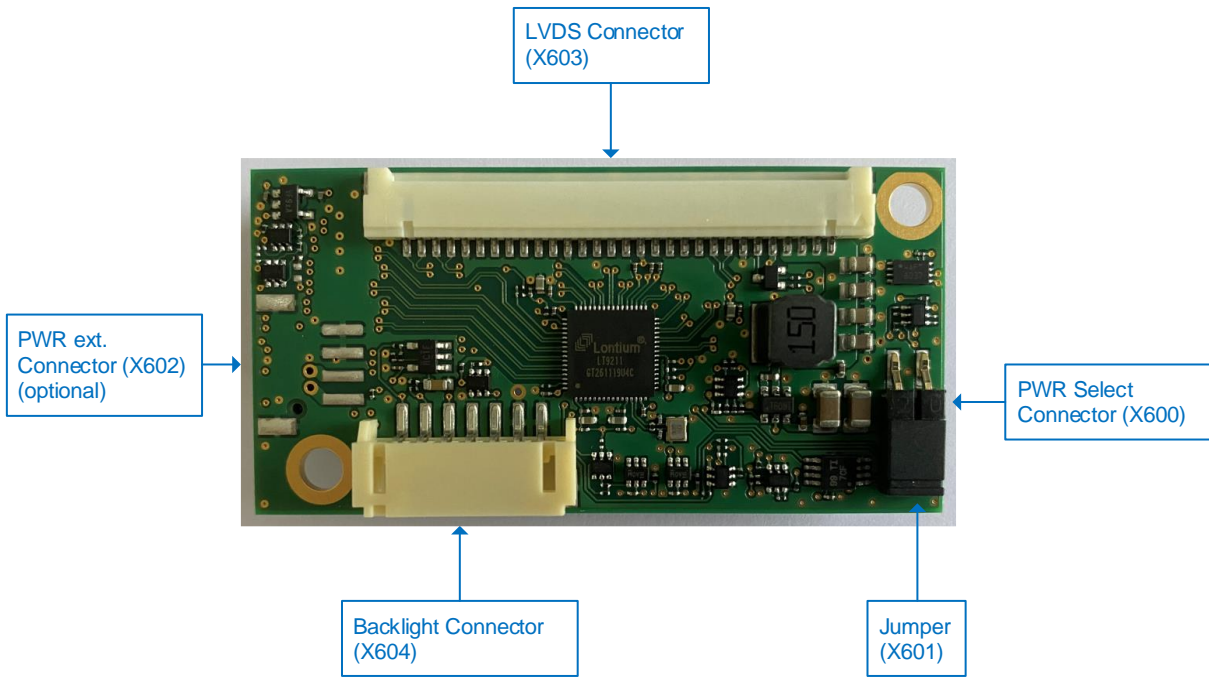


Figure 9 LVDS Graphics Module (Top)

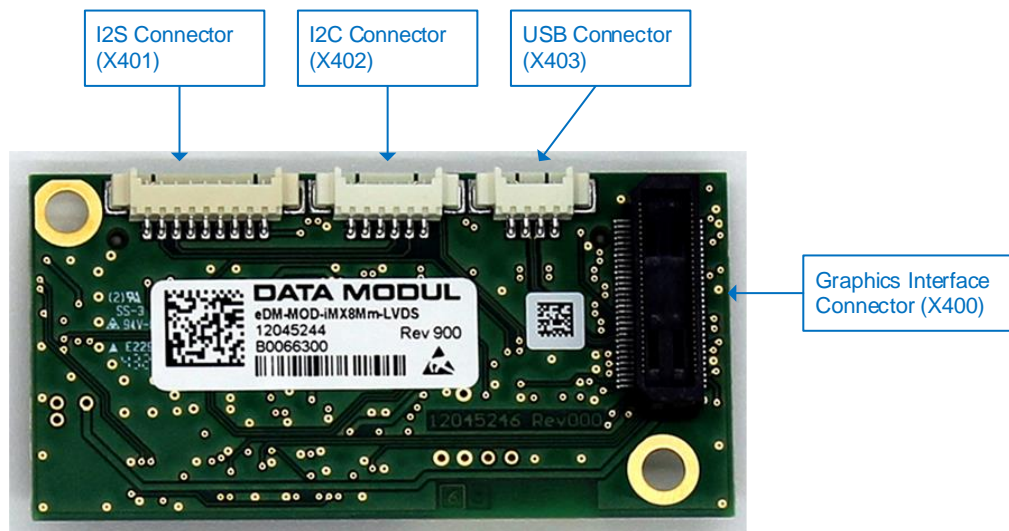


Figure 10 LVDS Graphics Module (Bottom)

External Voltage Supply via Power Connector (X602, optional)

As the individual pins of the Backlight Connector cannot fully support the required maximum currents (Backlight 12...24V @ 2A + TCON voltage), an additional Power Connector (X602) exists on the LVDS Module, where an external voltage supply is possible via cable (part number 12010000).

- Connector type: JST S4B-PH-SM4-TB (The connector pinout is identical to the ones from eMotionNT5:3 and eMotionST5:3).
- Pinout

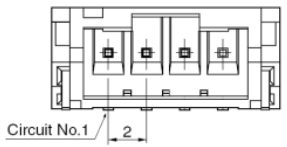
Pin assignment	Pin	Signal	Type
	1	GND	GND
	2	GND	GND
	3	+V_SEL	+12V or +24V
	4	+V_SEL	+12V or +24V

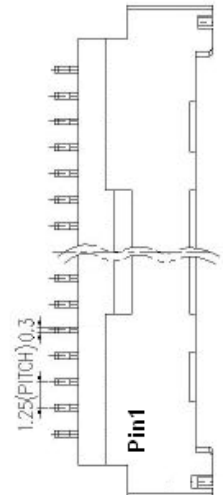
Table 21 External Power Connector Pin Assignment

In case of using the on-board supply voltage V_{IN}, the pins of the pin-header X600 (connector type: Harwin M20-8890245) have to be connected (short-circuit) by Jumper X601.

Attention: An external power supply must not be connected in this case!

LVDS Connector (X603)

- Connector type: Hirose DF14-30P-1.25H (The connector pinout is identical to the ones from eMotionNT5:3 and eMotionST5:3).
- Pinout

Pin assignment	Pin	Signal	Type
	1	PANEL_VCC	Panel PWR: 3.3V, 5V or 12V
	2	PANEL_VCC	Panel PWR: 3.3V, 5V or 12V
	3	PANEL_VCC	Panel PWR: 3.3V, 5V or 12V
	4	PANEL_VCC	Panel PWR: 3.3V, 5V or 12V
	5	GND	GND
	6	REVERSE_SCAN#	Reverse Scan Signal, on GPIO #0
	7	GND	GND
	8	LVDS.E3_P	LVDS Even Lane 3 Positive
	9	LVDS.E3_N	LVDS Even Lane 3 Negative
	10	LVDS.ECLK_P	LVDS Even Clock Positive
	11	LVDS.ECLK_N	LVDS Even Clock Negative
	12	LVDS.E2_P	LVDS Even Lane 2 Positive
	13	LVDS.E2_N	LVDS Even Lane 2 Negative
	14	GND	GND
	15	LVDS.E1_P	LVDS Even Lane 1 Positive
	16	LVDS.E1_N	LVDS Even Lane 1 Negative
	17	LVDS.E0_P	LVDS Even Lane 0 Positive
	18	LVDS.E0_N	LVDS Even Lane 0 Negative
	19	GND	GND
	20	LVDS.O3_P	LVDS Odd Lane 3 Positive
	21	LVDS.O3_N	LVDS Odd Lane 3 Negative
	22	LVDS.OCLK_P	LVDS Odd Clock Positive

Pin assignment	Pin	Signal	Type
	23	LVDS.OCLK_N	LVDS Odd Clock Negative
	24	LVDS.O2_P	LVDS Odd Lane 2 Positive
	25	LVDS.O2_N	LVDS Odd Lane 2 Negative
	26	GND	GND
	27	LVDS.O1_P	LVDS Odd Lane 1 Positive
	28	LVDS.O1_N	LVDS Odd Lane 1 Negative
	29	LVDS.O0_P	LVDS Odd Lane 0 Positive
	30	LVDS.O0_N	LVDS Odd Lane 0 Negative

Table 22 LVDS Connector Pin Assignment

Backlight Connector (X604)

- Connector type: JST S7B-PH-SM4-TB (The connector pinout is identical to the ones from eMotionNT5:3 and eMotionST5:3).
- Pinout

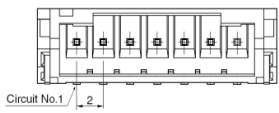
Pin assignment	Pin	Signal	Type
	1	BLT_ADIM	Analog Dimming Voltage
	2	BLT_PWM	PWM Dimming
	3	BLT_EN	Backlight Enable Signal
	4	+V_SEL	Backlight Voltage, equal to Input Voltage
	5	+V_SEL	Backlight Voltage, equal to Input Voltage
	6	GND	GND
	7	GND	GND

Table 23 Backlight Connector Pin Assignment

Attention: The backlight voltage is equal to input voltage (V_{in}) of the SBC.

Graphics Interface Connector (X400)

- Connector type: Samtec BTH-030-02-L-D-A-TR
- Pinout: Please refer to Table 16

I²S (Audio) Connector (X401)

- Connector type: Molex PicoBlade 53261-0971
- Pinout


Pin assignment	Pin	Signal	Type
	1	+5V	5V Power Supply
	2	I2S_MCLK	I ² S Master Clock
	3	I2S_DIN	I ² S Data In
	4	I2S_DOUT	I ² S Data Out
	5	I2S_BCLK	I ² S Serial Clock
	6	I2S_WCLK	I ² S Word Clock
	7	I2C_3V3.SDA	I ² C Serial Data
	8	I2C_3V3.SCL	I ² C Serial Clock
	9	GND	GND

Table 24 I²S (Audio) Connector Pin Assignment

Touch I²C Connector (X402)

- Connector type: Molex PicoBlade 53261-0671
- Pinout

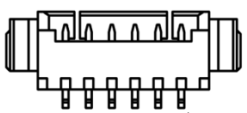
Pin assignment	Pin	Signal	Type
	1	+5V	PWR +5V
	2	I2C_EXT_SCL	I2C Clock (+1.8V/+3.3V/+5V)
	3	I2C_EXT_SDA	I2C Serial Data (+1.8V/+3.3V/+5V)
	4	TOUCH_INT	Touch Interrupt
	5	TOUCH_RESET#	Touch Reset Signal (Low Active)
	6	GND	GND

Table 25 I²C Connector Pin Assignment

Touch USB Connector (X403)

- Connector type: Molex PicoBlade 53261-0471
- Pinout


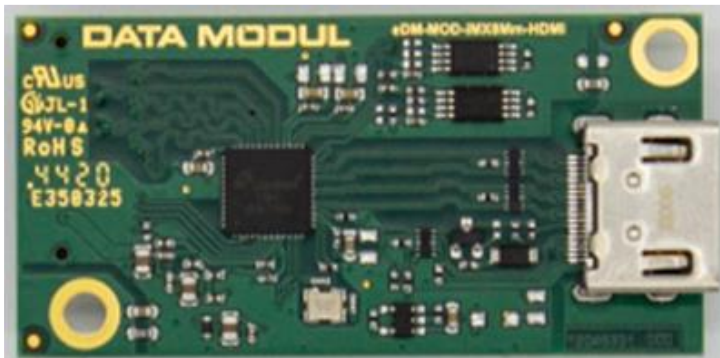
Pin assignment	Pin	Signal	Type
	1	+5V	PWR +5V
	2	USB.D_P	USB Positive Lane
	3	USB.D_N	USB Negative Lane
	4	GND	GND

Table 26 USB Connector Pin Assignment

Attention: Each LVDS display requires a dedicated software initialization to correctly setup the MIPI-DSI to LVDS bridge on Graphics module in reference to the display type.

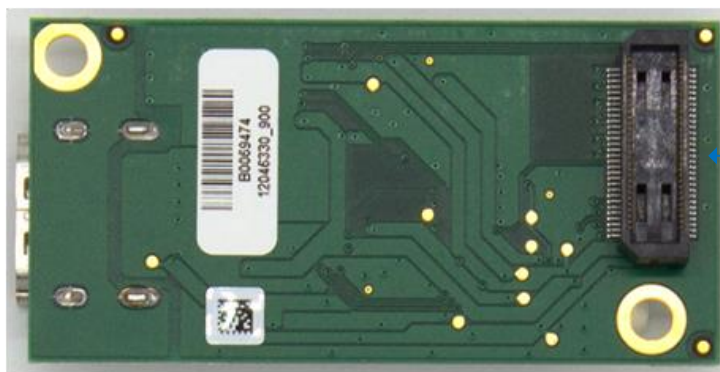
eDM-MOD-iMX8Mm-HDMI (HDMI Module)

The HDMI module provides an easy possibility to connect the Single Board Computer with a standard monitor. In the case that a display is used with the SBC, one of the above-listed Graphics modules or a customized design has to be used.



HDMI Connector (X600)

Figure 11 HDMI Graphics Module (Top)



Graphics Interface Connector (X400)

Figure 12 HDMI Graphics Module (Bottom)

HDMI Connector (X600)

- Connector type: Molex 208658-1061
- Pinout

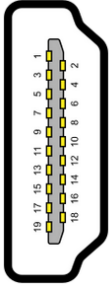
Pin assignment	Pin	Signal	Type
	1	Data 2+	TMDS Data Signal 2+
	2	GND	GND shielding for Data Signal 2
	3	Data 2-	TMDS Data Signal 2-
	4	Data 1+	TMDS Data Signal 1+
	5	GND	GND shielding for Data Signal 1
	6	Data 1-	TMDS Data Signal 1-
	7	Data 0+	TMDS Data Signal 0+
	8	GND	GND shielding for Data Signal 0
	9	Data 0-	TMDS Data Signal 0-
	10	Clock+	TMDS Clock+ Signal
	11	GND	GND shielding for Clock Signal
	12	Clock-	TMDS Clock- Signal
	13	CEC	Consumer Electronics Control Signal
	14	HEC	Reserved
	15	SCL	DDC Clock Signal
	16	SDA	DDC Data Signal
	17	GND	GND Signal
	18	+5V	55mA supply @ +5V for EDID PROM
	19	HPD	Hot Plug Detect

Table 27 HDMI Connector Pin Assignment

Graphics Interface Connector (X400)

- Connector type: Samtec BTH-030-02-L-D-A-TR
- Pinout: Please refer to Table 16

I/O Module

The SBC offers a flexible I/O interface via its feature connector, which supports different functionality based on SPI, UART, I2C and GPIO interfaces. The type of available interfaces is also depending from the configuration of the i.MX8M Mini processor. The I/O module described below is offering isolated CAN and RS485 interfaces as well as RS232 and GPIO interfaces plus an on-board buzzer. The mechanical dimensions are 50mm x 72mm

eDM-MOD-iMX8Mm-FIO1 (I/O Module)

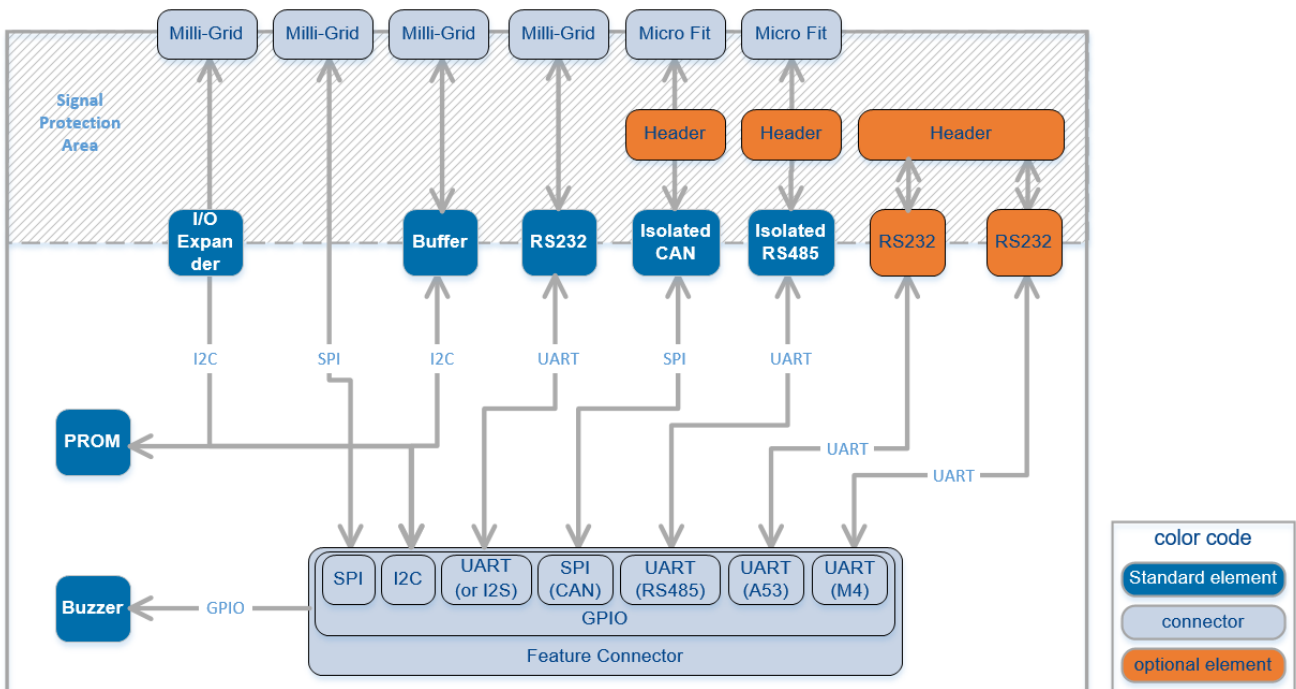


Figure 13 Functional Block Diagram

DATA MODUL

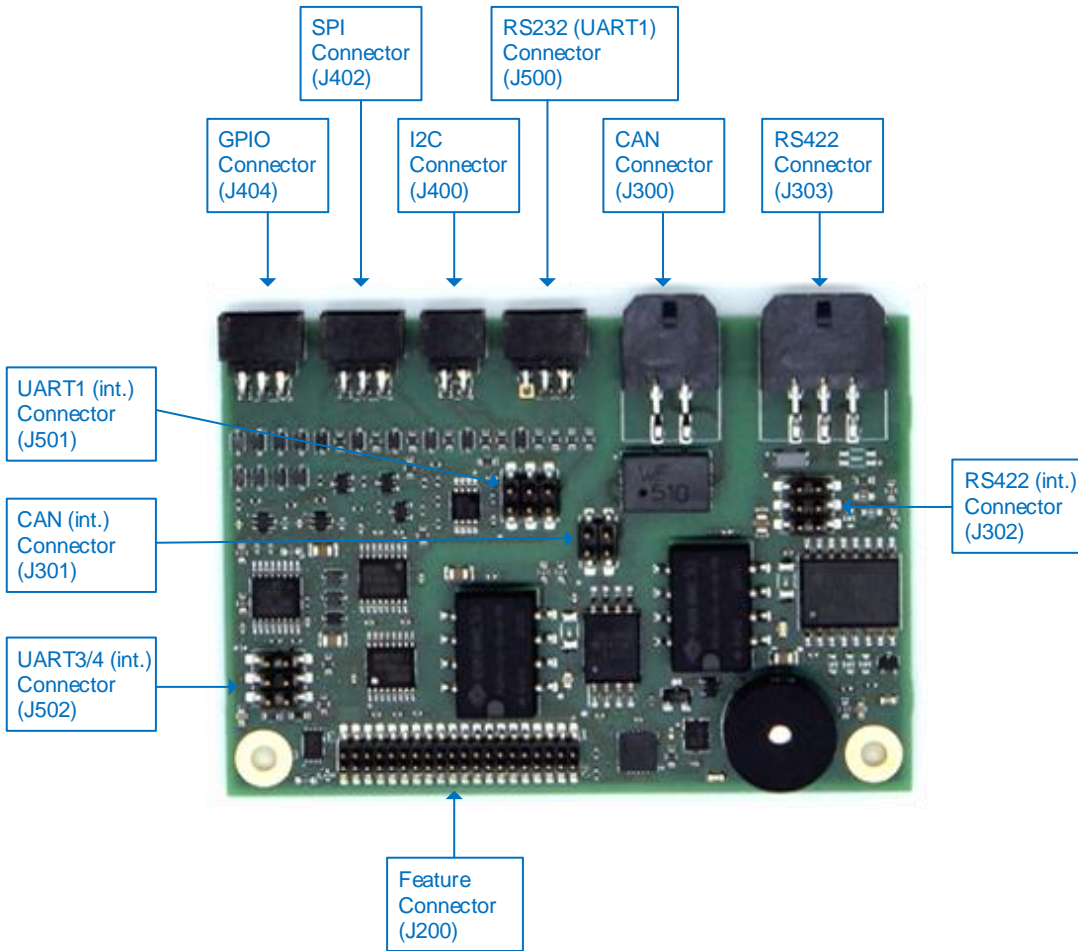


Figure 14 I/O Module (Top)

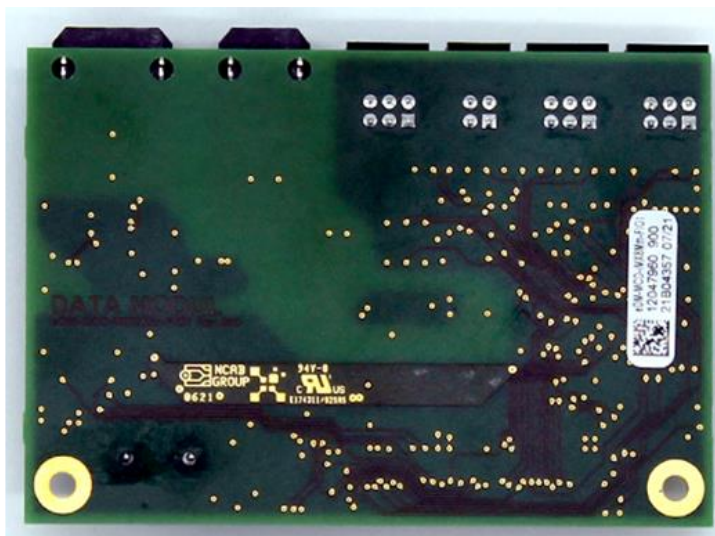


Figure 15 I/O Module (Bottom)

Feature Connector (J200)

- SMT Pin Header, 1.27mm Pitch, Straight, Double Row, 40 pol with 1.5mm body height and 3,0 ... 3,8mm pin height
- Connector type: Würth 62104021021 or Amphenol 20021121-00040T2LF
- Pinout: Please refer to Table 6

CAN Connector (J300)

- Connector type: Molex Micro-Fit 43045-0406
- Pinout

Pin assignment	Pin	Signal	Type
	1	CANH	CAN Positive Signal
	2	GND_ISO_CAN	GND (CAN)
	3	CANL	CAN Negative Signal
	4	GND_ISO_CAN	GND (CAN)

Table 28 CAN Connector Pin Assignment

CAN Connector, internal (J301)

- Connector type: Molex Milli-Grid Header 87759-0464
- Pinout

Pin assignment	Pin	Signal	Type
	1	CANH	CAN Positive Signal
	2	GND_ISO_CAN	GND (CAN)
	3	CANL	CAN Negative Signal
	4	GND_ISO_CAN	GND (CAN)

Table 29 CAN Connector (internal) Pin Assignment

RS485 Connector, internal (J302)

- Connector type: Molex Milli-Grid Header 87759-0664
- Pinout

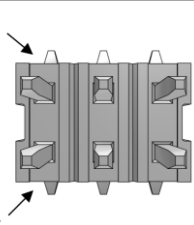
Pin assignment	Pin	Signal	Type
	1	RS422_A	Receiver non-inverting input on the bus side
	2	GND_ISO_RS485	GND (RS485)
	3	RS422_B	Receiver inverting input on the bus side
	4	RS422_Y	Driver non-inverting output
	5	GND_ISO_RS485	GND (RS485)
	6	RS422_Z	Driver inverting output

Table 30 RS485 Connector (internal) Pin Assignment

RS485 Connector (J303)

- Connector type: Molex Micro-Fit 43045-0606
- Pinout

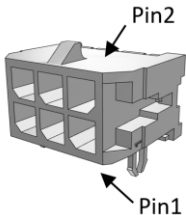
Pin assignment	Pin	Signal	Type
	1	RS422_B	RS422_B
	2	RS422_A	RS422_A
	3	GND_ISO_RS485	GND (RS485)
	4	GND_ISO_RS485	GND (RS485)
	5	RS422_Z	RS422_Z
	6	RS422_Y	RS422_Y

Table 31 RS485 Connector Pin Assignment

I2C Connector (J400)

- Connector type: Molex Milli-Grid 087833-0419
- Pinout

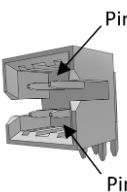
PinoutPin assignment	Pin	Signal	Type
	1	I2C4_SCL	I2C Bus 4 Clock (+3.3V)
	2	VCC3V3	PWR +3.3V
	3	I2C4_SDA	I2C Bus 4 Serial Data (+3.3V)
	4	GND	GND

Table 32 I2C Connector Pin Assignment

SPI Connector (J402)

- Connector type: Molex Milli-Grid 087833-0619
- Pinout

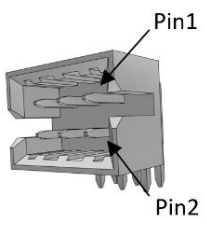
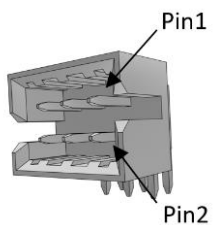
Pin assignment	Pin	Signal	Type
	1	VCC3V3	PWR +3.3V
	2	SPI3_MISO_3V3	SPI Bus 3 Master In Slave Out (+3.3V)
	3	SPI3_MOSI_3V3	SPI Bus 3 Master Out Slave In (+3.3V)
	4	SPI3_CLK_3V3	SPI Bus 3 Clock (+3.3V)
	5	SPI3_CS_N	SPI Bus 3 Chip Select (+3.3V)
	6	GND	GND

Table 33 SPI Connector Pin Assignment

GPIO Connector (J404)

- Connector type: Molex Milli-Grid 087833-0619
- Pinout

Pin assignment	Pin	Signal	Type
	1	RSTBTN_KEY_N	Reset Button Key (Active Low)
	2	PWRBTN_KEY_N	Power Button Key (Active Low)
	3	GPIO1	General Purpose Input Output 1
	4	GPIO2	General Purpose Input Output 2
	5	GPIO3	General Purpose Input Output 3
	6	GND	GND

Note:

1. The GPIOs are controlled by an I2C port expander (PCA9554B). One pin is used for the open-drain output and one pin is used as input. So the output value can be read back.
2. The GPIOs shall work with up to 30V and must be biased externally. Voltages below 0.8V should be detected as low. The output is realized by a MOSFET, controlled by one pin of the port expander.
3. The input is connected to the port expander with a series resistance. The port expander allows a clamping current of up to 20mA.
4. The current is limited to about 2.7mA by a 10k resistance. The dissipated power in the resistor does not exceed 72mW. A low level is detected below $0.3 \cdot 3.3V = 0.99V$

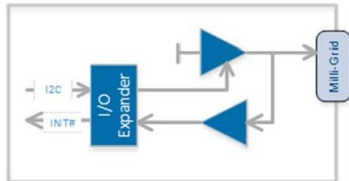


Table 34 GPIO Connector Pin Assignment

RS232 Connector (J500)

- Connector type: Molex Milli-Grid 087833-0619
- Pinout

Pin assignment	Pin	Signal	Type
	1	GND	GND
	2	RS232_RTS_N (UART1)	RS232 UART 1 Request To Send (Low Active)
	3	RS232_TXD (UART1)	RS232 UART 1 Transmit Data
	4	RS232_CTS_N (UART1)	RS232 UART 1 Clear To Send (Active Low)
	5	RS232_RXD (UART1)	RS232 UART 1 Received Data
	6	GND	GND

Table 35 RS232 Connector Pin Assignment

RS232 Connector, internal (J501)

- Connector type: Molex Milli-Grid Header 87759-0664
- Pinout

Pin assignment	Pin	Signal	Type
	1	GND	GND
	2	RS232_RTS_N (UART1)	RS232 UART 1 Request To Send (Low Active)
	3	RS232_TXD (UART1)	RS232 UART 1 Transmit Data
	4	RS232_CTS_N (UART1)	RS232 UART 1 Clear To Send (Active Low)
	5	RS232_RXD (UART1)	RS232 UART 1 Received Data
	6	GND	GND

Table 36 RS232 Connector (internal) Pin Assignment

RS232 Connector, internal (J502)

- Connector type: Molex Milli-Grid Header 87759-0664
- Pinout

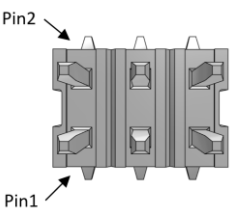
Pin assignment	Pin	Signal	Type
	1	RS232_TXD (UART3)	RS232 UART 3 Transmit Data
	2	RS232_RXD (UART4)	RS232 UART 4 Received Data
	3	GND	GND
	4	GND	GND
	5	RS232_RXD (UART3)	RS232 UART 3 Received Data
	6	RS232_TXD (UART4)	RS232 UART 4 Transmit Data

Table 37 RS232 Connector (internal) Pin Assignment

DATA MODUL

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Italy
Singapore
Spain
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