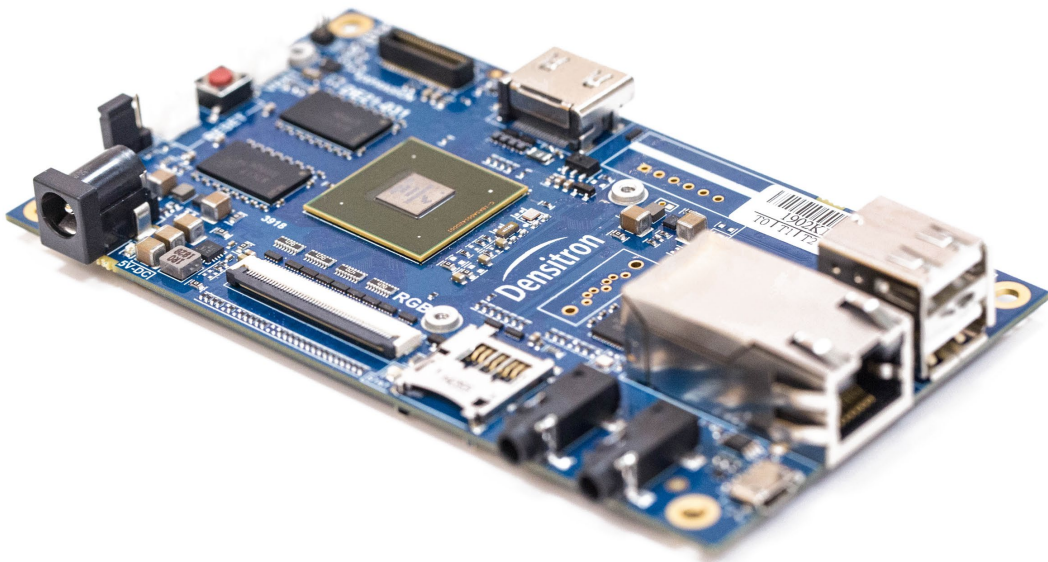




Aurora
SBX

Aurora SBX

EMBEDDED SINGLE BOARD COMPUTER Product Datasheet



Revision History

Rev.	Date	Notes	Ref. ID
0.1	2019/01/31	Initial Draft	RS-EMB
0.8	2019/03/25	Release revision	RS-EMB
1.0	2019/04/02	Initial release version	RS-EMB

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1. INTRODUCING AURORA SBX™ SBC

The Aurora SBX™ is a family of single board computers (SBC) based on NXP i.MX6 family of applications processors (APU or Applications Processing Unit). Utilising up to four ARM® Cortex-A9 based cores with frequencies up to 1GHz, the APU paired with onboard DDR3 RAM provides the performance required to support modern multimedia applications, rich GUI (Graphical User Interface) and applications requiring also parallel and high processing power. With the advantages of the ARM architecture we have created a small footprint, high performance, low power all-in-one embedded solution that is especially designed to support and speed up the development of your HMI (Human Machine Interface) based products.

For this purpose, the SBC is also fully capable of supporting displays based on most of the current display interfaces as all supported interfaces by the NXP i.MX6 APU (RGB, LVDS, MIPI and HDMI) have been made available through connectors on the board. In order to utilize the SBC to the fullest, Aurora SBX™ is available in three different variants differing in APU performance and number of cores, graphics processing unit (GPU) and DDR (Double Data Rate) memory providing the right performance and cost for your application.

Aurora SBX™ provides you also with a ready-to-go development platform to create a variety of feature rich modern GUI (Graphical User Interface) applications, drive a fully operational HMI solution and accelerate your time-to-market. With these challenges for engineers in mind, we provide also a unique development kit complemented by a preconfigured development virtual machine (VM) that provides easy access and quick setup of an integrated development environment (IDE) additionally expanded by the inclusion of some helpful tools (for example the Aurora SBX™ Radar application).

2. TECHNICAL SPECIFICATIONS

Item	Contents
Processor (APU)	NXP® i.MX6 APU family up to 1GHz i.MX6S Solo processor i.MX6D Dual processor i.MX6Q Quad processor
Memory	i.MX6S Solo processor 512MB DDR3 RAM i.MX6D Dual processor 1GB DDR3 RAM i.MX6Q Quad processor Quad: 2GB DDR3 RAM
Operating Systems	Embedded Linux® BSP** Android™ (vanilla) BSP**
Main interfaces	3x USB 2.0 (1 x USB 2.0 available through extension header) 1x USB OTG port 1x Ethernet port 2x uSD Card Slot (boot and storage) 2x UART (optional on expansion header) 2x I ² C (optional on expansion header) 1x SPI (optional on expansion header) 2x CAN (optional on expansion header)
Video interfaces	1x LVDS single channel 24 bit interface 1x RGB 24 bit interface 1x MIPI 2-lane CSI/DSI 24 bit interface 1x HDMI interface - supports HDMI 1.4 standard
Graphics processor (GPU)	3D GPU - Vivante GC2000 (supports OpenGL ES 3.0 and Halti) 2D GPU (Vector) – Vivante GC335 (supports Open VG 1.1) 2D GPU (Composition) – Vivante GC320 Hardware Video Decoding Hardware Video Encoding
Audio	1x Audio Mic (Line-In) 1x Audio Line-Out (Stereo left / right channels)

Expansion options	Expansion Header providing:
	2x UART (1x debug UART with set pins)
	2x I ² C
	1x SPI (Quad / Dual only)
	2x CAN (FlexCAN)
	1x USB 2.0 (fixed)
Environmental	Operating Temperature: 0~50°C (commercial version)*
	Operating Humidity: 5~95% @40°C, non-condensing
Certifications	CE/FCC Class A*
Power Supply Voltage	5V DC
General Dimensions	122.00 x 67.00 mm

*** The provided values have been established within internal parameters and testing conditions and reports are available on request. As these values may vary depending on the used custom or non-standard thermal (heatsink) solution, enclosure, application and environment these values are for reference only. It is required from the customer to take into account these considerations when planning a product and to integrate and test thermal and mechanical (enclosure) solutions based on his specific requirements as well as perform the required testing and certifications of the final product.**

**** For the latest available BSP version please enquire with your sales representative or visit www.densitron.com.**

3. AURORA SBX™ FAMILY

The Aurora SBX™ family of single board computers consists of 3 models – Solo, Dual and Quad – providing scalability and choice of performance and value. All models are built on the NXP i.MX6 family of APUs with ARM® Cortex-A9 based cores therefore allowing easy transition and software migration from one model to the other. Ranging from most power efficient to high performance the Aurora SBX™ family gives you the option to select or easily replace your chosen model with the one most suited to either your software requirements or performance needs.

3.1 Models overview

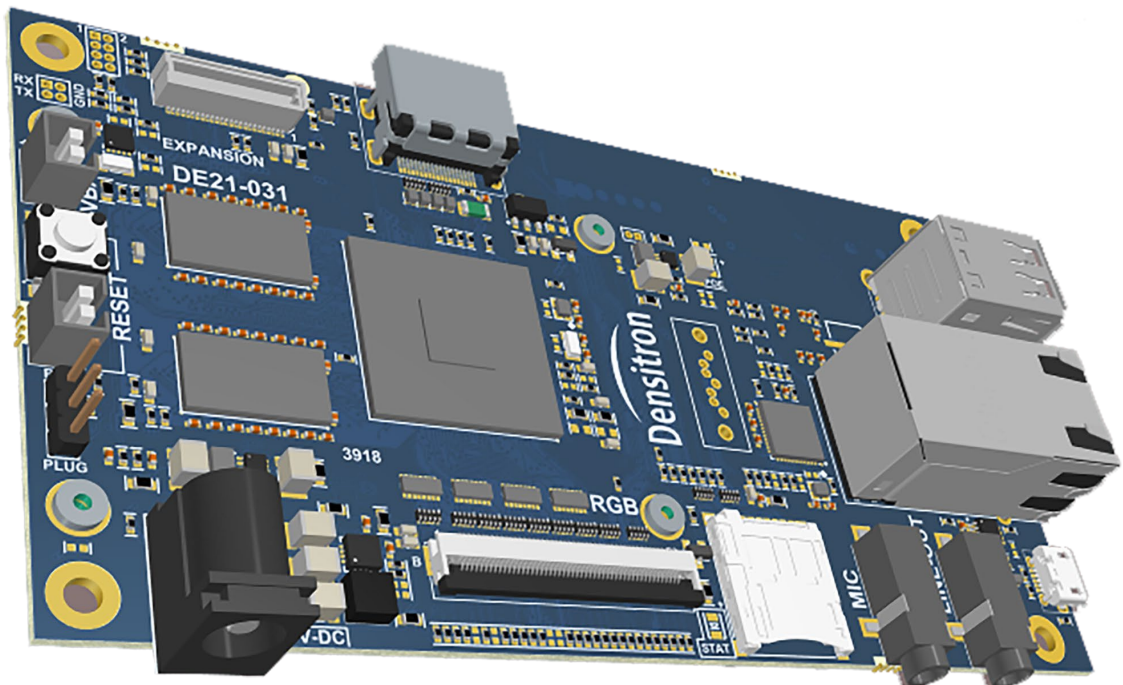
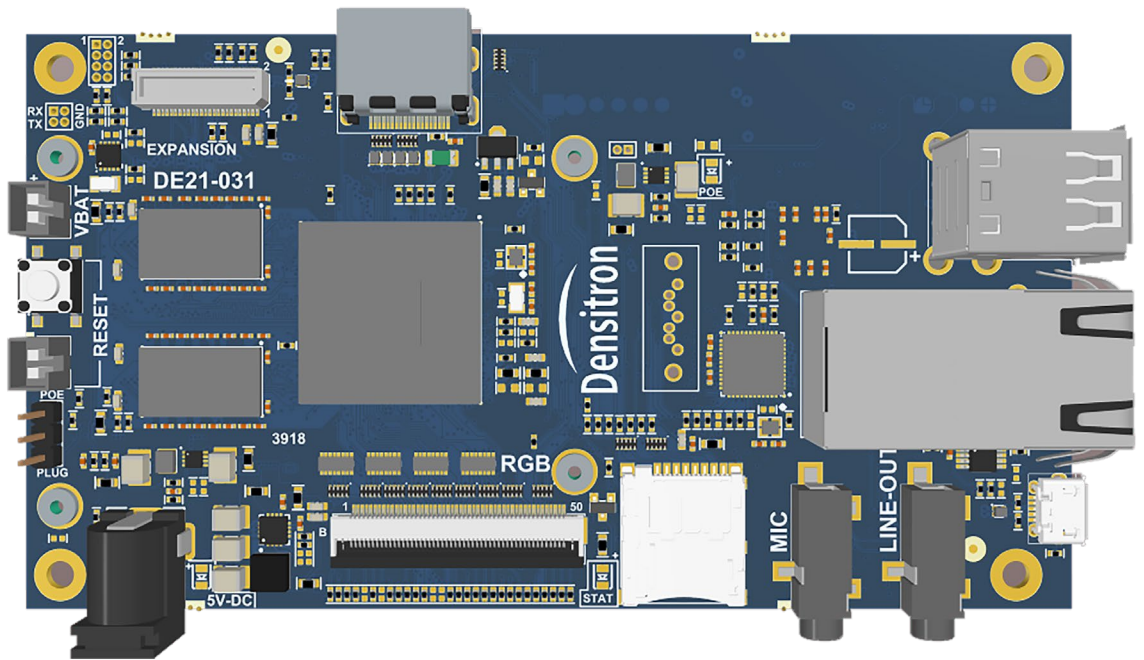
Features	Solo	Dual	Quad
APU	<ul style="list-style-type: none"> 1x Arm Cortex-A9 core 512MB L2 cache 32kB L1 instruction cache 32kB L1 data cache 	<ul style="list-style-type: none"> 2x Arm Cortex-A9 core 1MB L2 cache 32kB L1 instruction cache 32kB L1 data cache 	<ul style="list-style-type: none"> 4x Arm Cortex-A9 core 1MB L2 cache 32kB L1 instruction cache 32kB L1 data cache
Memory	<ul style="list-style-type: none"> 512MB DDR3-1066 onboard soldered 2x 32-bit DDR3 	<ul style="list-style-type: none"> 1GB DDR3-1066 onboard soldered 4x 64-bit DDR3 	<ul style="list-style-type: none"> 2GB DDR3-1066 onboard soldered 4x 64-bit DDR3
Graphics Hardware Accelerators	<ul style="list-style-type: none"> 3D Graphics Processing Unit with one shader – GPU3Dv5 1x 2D graphics Image Processing Subsystem - IPUv3H 1x 2D Graphics Processing Unit – GPU2D 	<ul style="list-style-type: none"> 3D Graphics Processing Unit with four shaders – GPU3Dv4 2x 2D graphics Image Processing Subsystem - IPUv3H OpenVG Processing Unit - GPUVG 1x 2D Graphics Processing Unit – GPU2D 	<ul style="list-style-type: none"> 3D Graphics Processing Unit with four shaders – GPU3Dv4 2x 2D graphics Image Processing Subsystem - IPUv3H OpenVG Processing Unit - GPUVG 1x 2D Graphics Processing Unit – GPU2D
Video Hardware Accelerators	<ul style="list-style-type: none"> 1x Video Processing Unit – VPU Hardware Video Decoding – 1080p at 30 frames h.264 Hardware Video Encoding – 1080p at 30 frames 	<ul style="list-style-type: none"> 1x Video Processing Unit – VPU Hardware Video Decoding – 1080p at 60 frames h.264 Hardware Video Encoding – 1080p at 30 frames 	<ul style="list-style-type: none"> 1x Video Processing Unit – VPU Hardware Video Decoding – 1080p at 60 frames h.264 Hardware Video Encoding – 1080p at 30 frames

Display Interfaces	<ul style="list-style-type: none"> ▪ 1 x LVDS single channel 24 bit interface - 1366 x 768 @60Hz 1 channel ▪ 1 x RGB 24 bit interface - 1920 x 1080 @60Hz ▪ 1x MIPI 2-lane CSI/DSI 24 bit interface - 1280x720 @60Hz ▪ 1 x HDMI interface - 1920x1080 @60Hz, supports HDMI 1.4 standard 	<ul style="list-style-type: none"> ▪ 1 x LVDS single channel 24 bit interface - 1366 x 768 @60Hz 1 channel ▪ 1 x RGB 24 bit interface - 1920 x 1080 @60Hz ▪ 1x MIPI 2-lane CSI/DSI 24 bit interface - 1280x720 @60Hz ▪ 1 x HDMI interface - 1920x1080 @60Hz, supports HDMI 1.4 standard 	<ul style="list-style-type: none"> ▪ 1 x LVDS single channel 24 bit interface - 1366 x 768 @60Hz 1 channel ▪ 1 x RGB 24 bit interface - 1920 x 1080 @60Hz ▪ 1x MIPI 2-lane CSI/DSI 24 bit interface - 1280x720 @60Hz ▪ 1 x HDMI interface - 1920x1080 @60Hz, supports HDMI 1.4 standard
Connectivity	<ul style="list-style-type: none"> ▪ 2x USB 2.0 type A port ▪ 1x micro USB OTG port ▪ 1x RJ-45 Ethernet Port ▪ 2x Push-Push uSD Card Slot –(boot and storage) ▪ 1x HDMI port ▪ 1x LVDS 50 pin connector ▪ 1x RGB 50 pin connector ▪ 1x MIPI CSI/DSI 33-pin connector 	<ul style="list-style-type: none"> ▪ 2x USB 2.0 type A port ▪ 1x micro USB OTG port ▪ 1x RJ-45 Ethernet Port ▪ 2x Push-Push uSD Card Slot –(boot and storage) ▪ 1x HDMI port ▪ 1x LVDS 50 pin connector ▪ 1x RGB 50 pin connector ▪ 1x MIPI CSI/DSI 33-pin connector 	<ul style="list-style-type: none"> ▪ 2x USB 2.0 type A port ▪ 1x micro USB OTG port ▪ 1x RJ-45 Ethernet Port ▪ 2x Push-Push uSD Card Slot –(boot and storage) ▪ 1x HDMI port ▪ 1x LVDS 50 pin connector ▪ 1x RGB 50 pin connector ▪ 1x MIPI CSI/DSI 33-pin connector
Audio	<ul style="list-style-type: none"> ▪ NXP SGTL5000 Audio Codec ▪ 1x 3.5mm jack Audio Mic (Line-In) ▪ 1x 3.5mm jack Audio Line-Out (Stereo left / right channels) 	<ul style="list-style-type: none"> ▪ NXP SGTL5000 Audio Codec ▪ 1x 3.5mm jack Audio Mic (Line-In) ▪ 1x 3.5mm jack Audio Line-Out (Stereo left / right channels) 	<ul style="list-style-type: none"> ▪ NXP SGTL5000 Audio Codec ▪ 1x 3.5mm jack Audio Mic (Line-In) ▪ 1x 3.5mm jack Audio Line-Out (Stereo left / right channels)

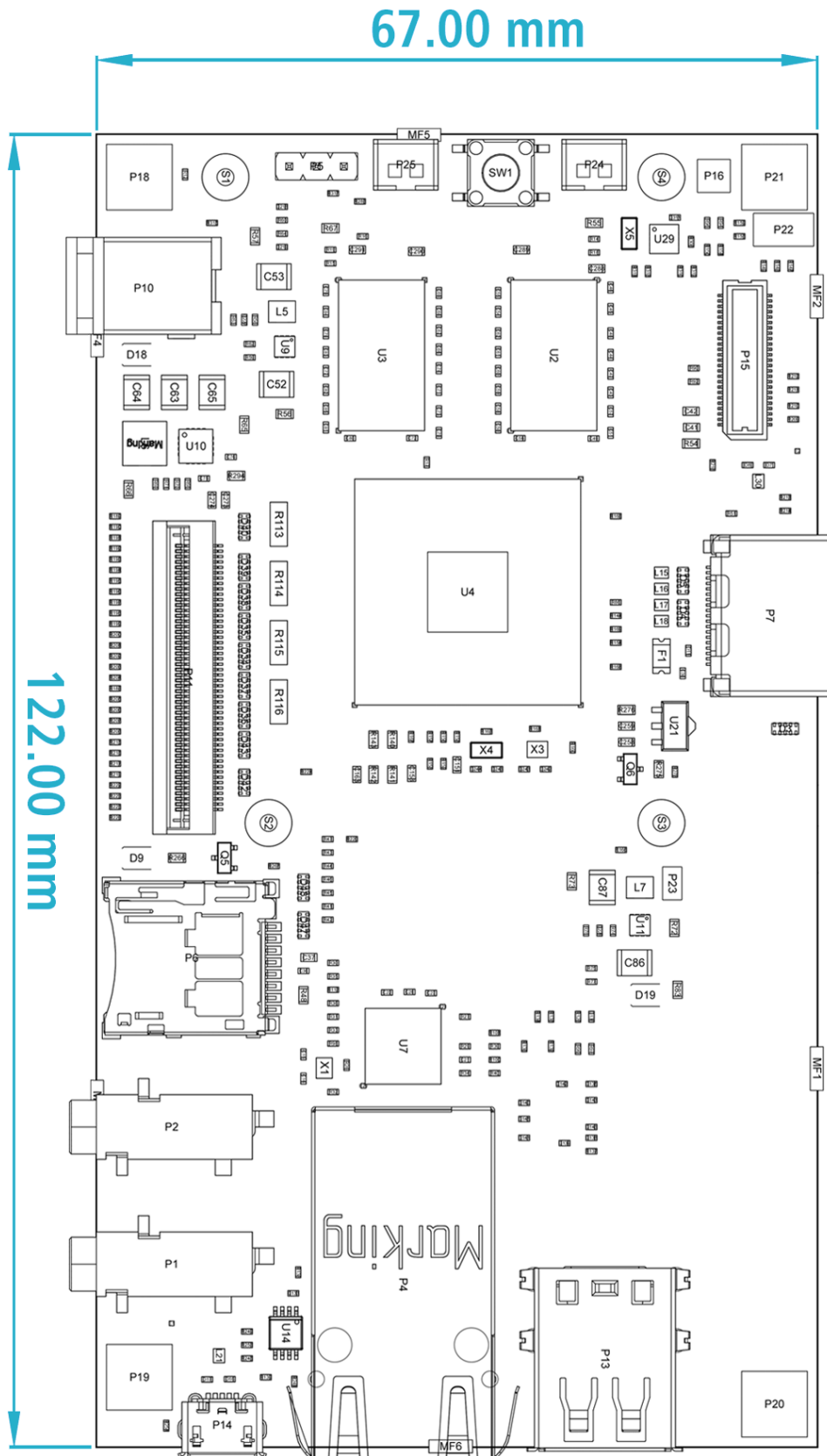
Other Interfaces	50 pin expansion header with fixed and configurable pins <ul style="list-style-type: none"> ▪ up to 21 GPIO ▪ 2x UART ▪ 2x I2C ▪ 2x CAN (FlexCAN) 	50 pin expansion header with fixed and configurable pins <ul style="list-style-type: none"> ▪ up to 21 GPIO ▪ 2x UART ▪ 1x SPI ▪ 2x I2C ▪ 2x CAN (FlexCAN) 	50 pin expansion header with fixed and configurable pins <ul style="list-style-type: none"> ▪ up to 21 GPIO ▪ 2x UART ▪ 1x SPI ▪ 2x I2C ▪ 2x CAN (FlexCAN)
Other Connectors	<ul style="list-style-type: none"> ▪ 2 pin external RTC battery connector ▪ 2 pin external RESET switch connector 	<ul style="list-style-type: none"> ▪ 2 pin external RTC battery connector ▪ 2 pin external RESET switch connector 	<ul style="list-style-type: none"> ▪ 2 pin external RTC battery connector ▪ 2 pin external RESET switch connector
Power	<ul style="list-style-type: none"> ▪ DC power jack ▪ RESET micro switch ▪ Power jumper 	<ul style="list-style-type: none"> ▪ DC power jack ▪ RESET micro switch ▪ Power jumper 	<ul style="list-style-type: none"> ▪ DC power jack ▪ RESET micro switch ▪ Power jumper

4. MECHANICAL SPECIFICATIONS

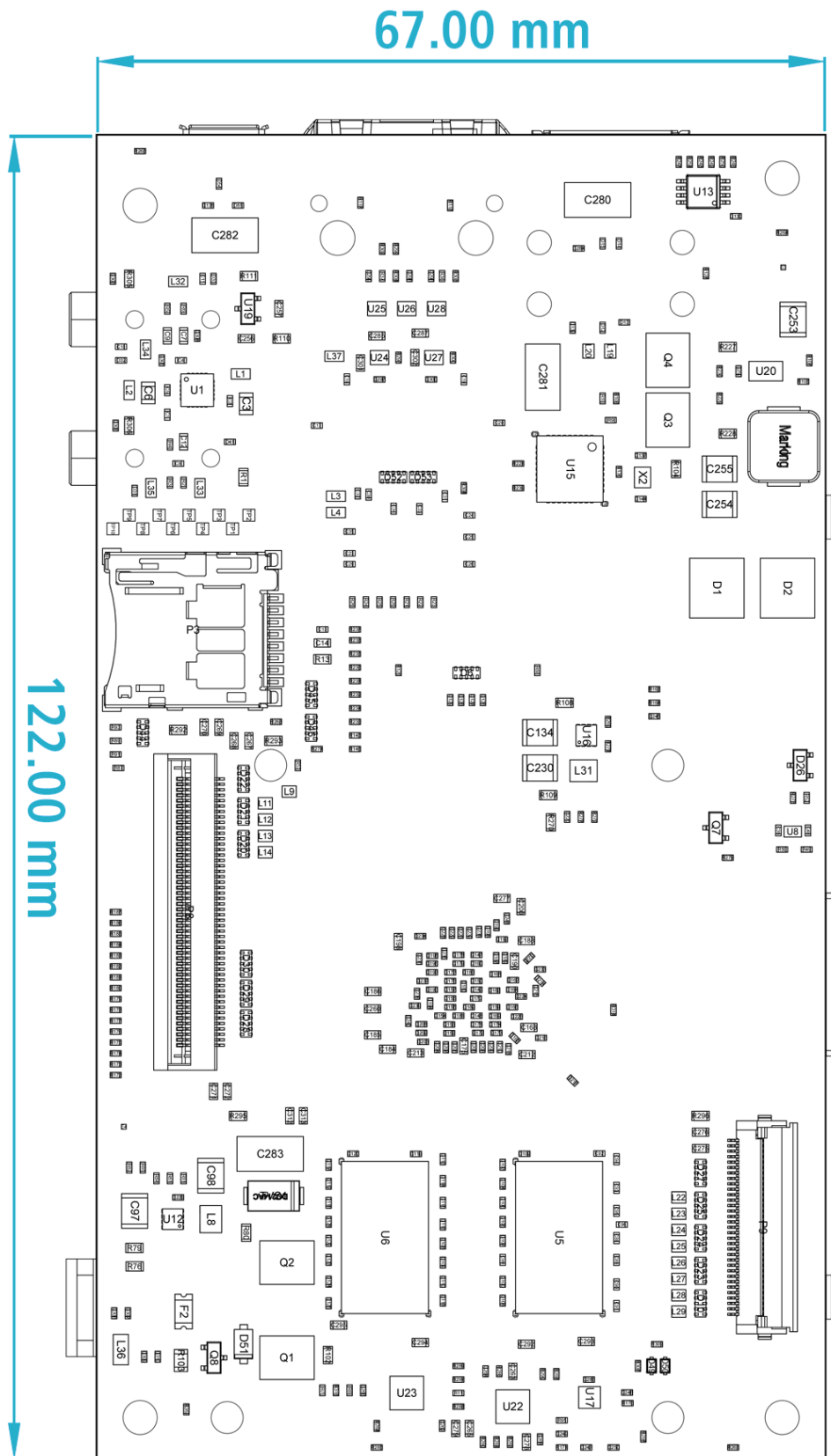
4.1 3D render drawing



4.2 Top View



4.3 Bottom View



5. ELECTRICAL SPECIFICATIONS

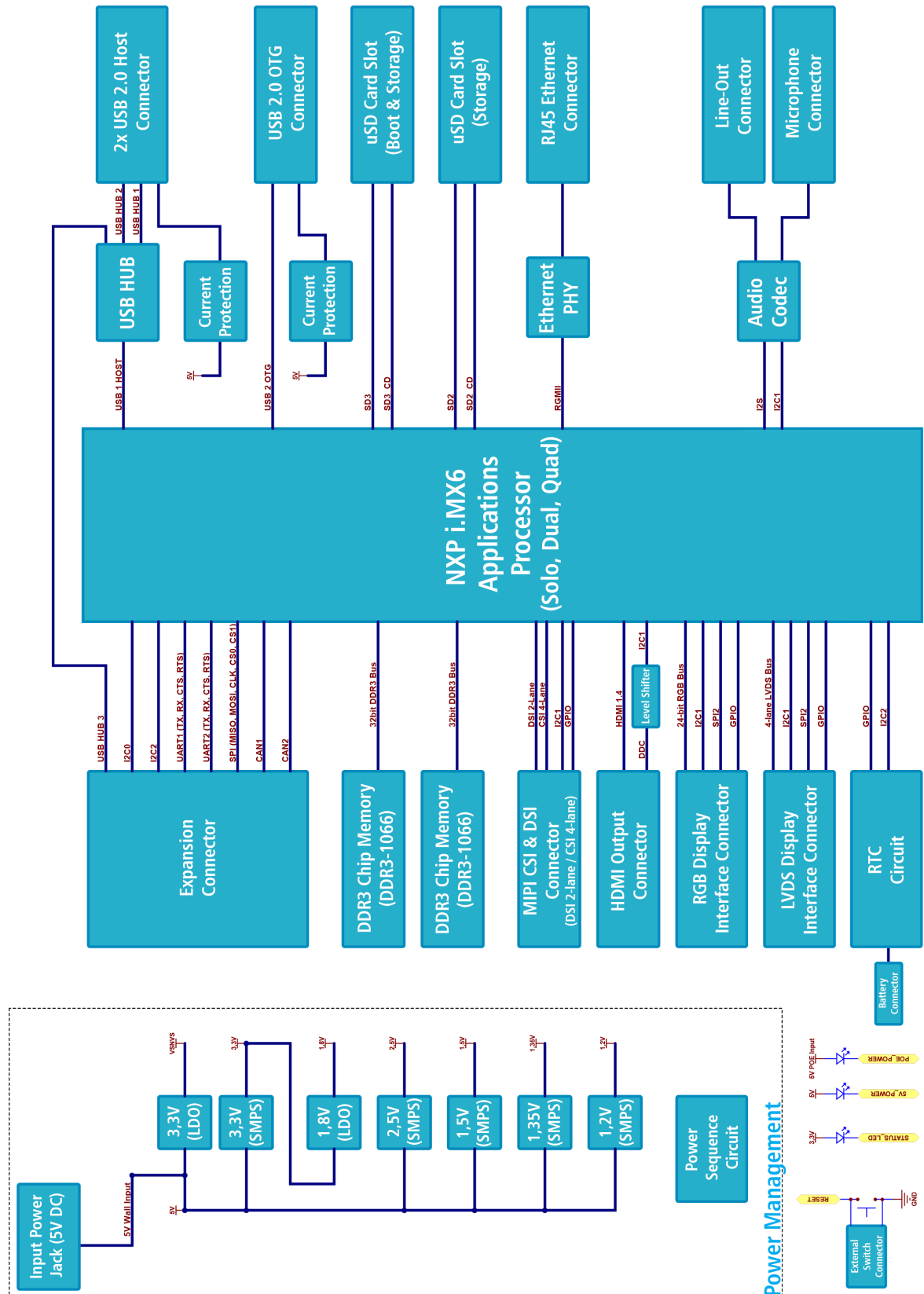
5.1 Maximum Ratings

Item	Symbol	Min	Max	Unit	Note
Supply Voltage for Operation	V _{cc}	4.75	5.25	V	
Operating Current for V _{cc}	I _{cc}		2	A	1
Operating Temperature	T _{op}	0	50	°C	
Static Electricity		IEC 61000-4-2			2

Note:

- 1) Maximum operating current is determined with the stress test software running and no external devices connected. Reference PSU (Power Supply Unit) Stontronics TS877ST.
- 2) ESD tests done according to the IEC 61000-4-2 standard.

6. BLOCK DIAGRAM

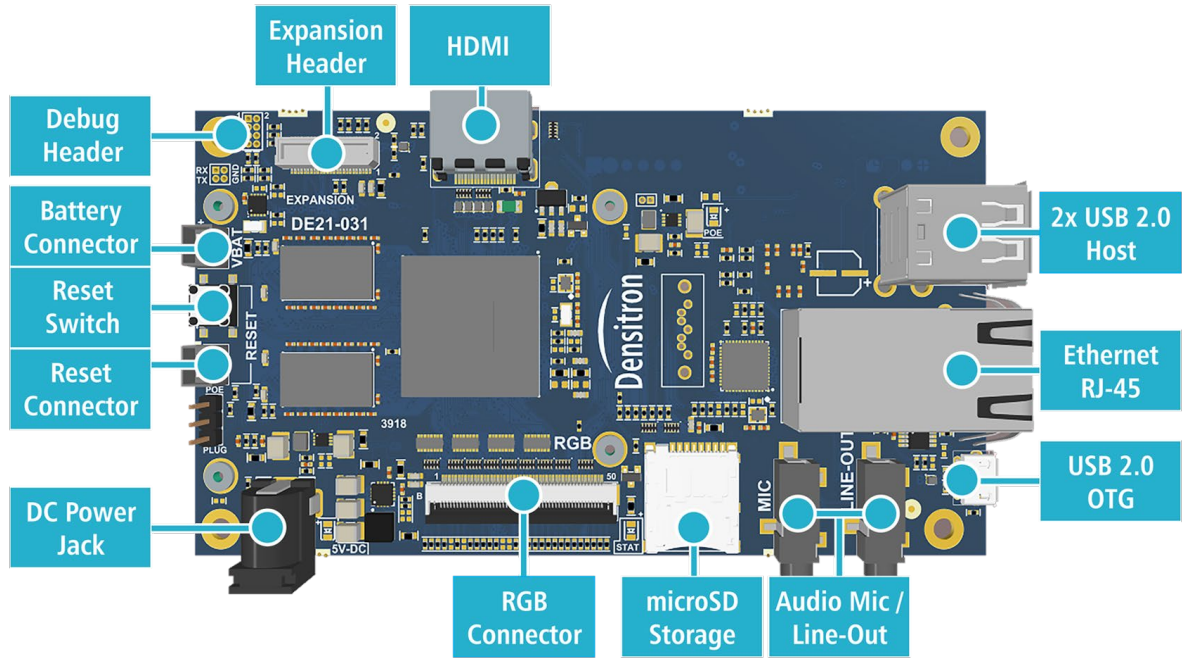


7. CONNECTORS & INTERFACES

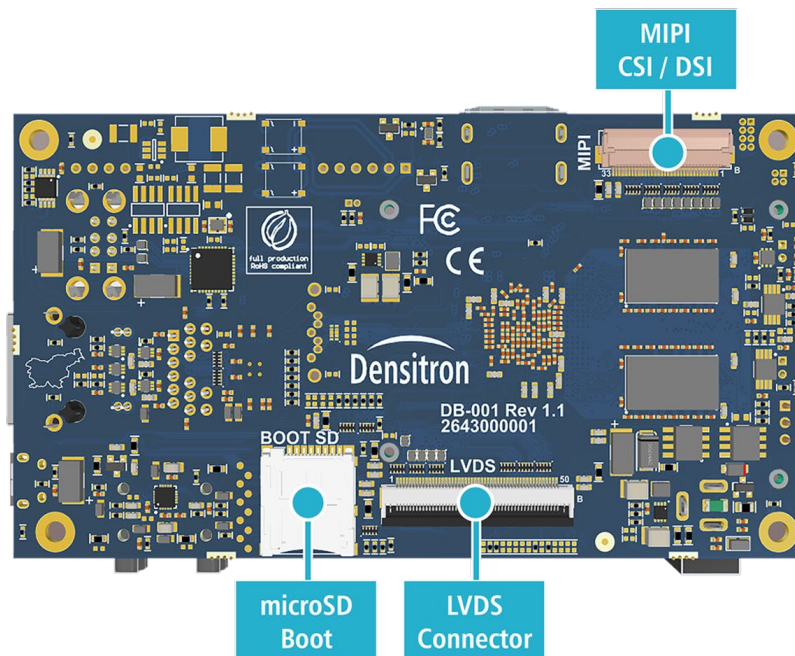
An array of standard, proprietary and optional connectors is available on the Aurora SBX™ SBC to provide various communication and input / output interfaces.

Designator	Description	Status
P1	Audio Line-out jack	Standard
P2	Audio Mic jack	Standard
P3	microSD slot for boot	Standard
P4	RJ-45 Ethernet port	Standard
P6	microSD slot for data storage	Standard
P7	HDMI connector	Standard
P8	LVDS connector	Standard
P9	MIPI CSI / DSI connector	Standard
P10	DC Power Jack	Standard
P11	RGB connector	Standard
P13	Dual USB 2.0 type A ports	Standard
P14	Micro USB 2.0 OTG port	Standard
P15	Expansion header	Standard
P24	RTC battery connector	Standard
P25	Reset connector	Standard

7.1 Connectors and features – top



7.2 Connectors and features - bottom



8. CONNECTOR DESCRIPTIONS

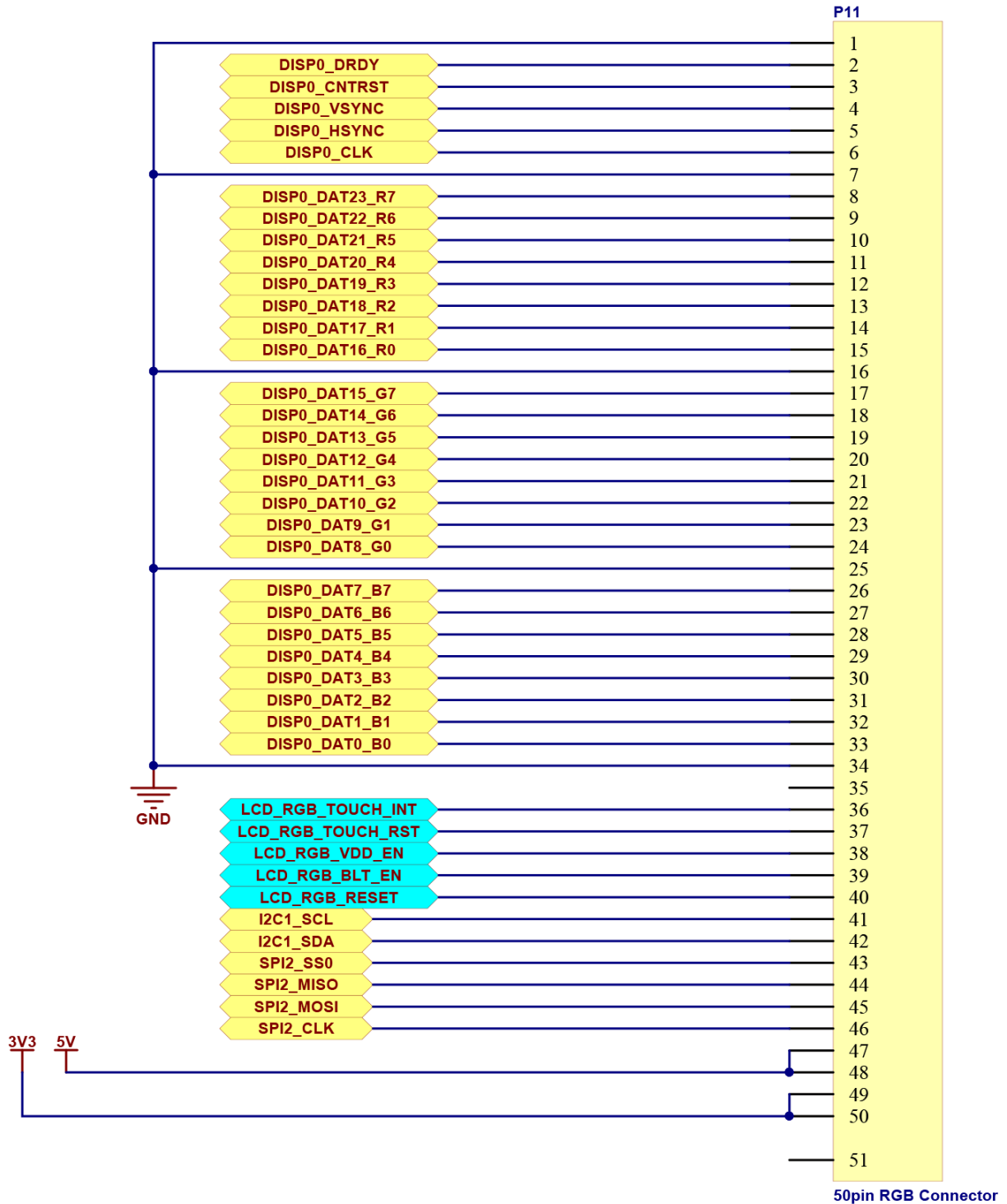
The following section contains pinouts and pin descriptions for the main connectors and interfaces available on the SBC.

Along with a diagram a table listing all the pins provides additional description and pin functions.

The structure of the table is as follows:

Pin Number	Signal	I/O (pin function)	Function
1	SIGNAL_NAME	I = INPUT	Pin function description
2	SIGNAL_NAME	O= OUTPUT	Pin function description
3	SIGNAL_NAME	I/O = INPUT / OUTPUT	Pin function description
4	SIGNAL_NAME	P = POWER	Pin function description

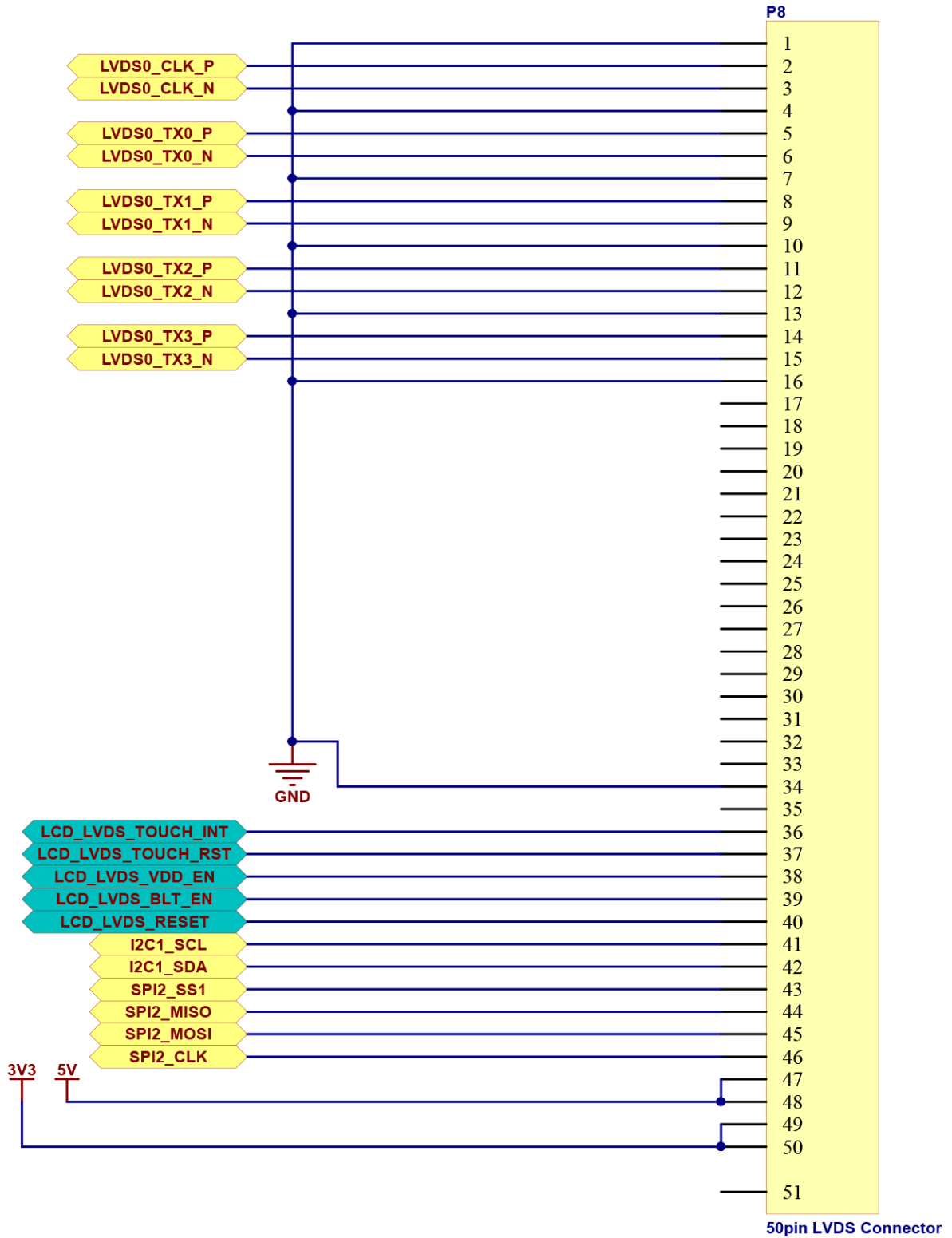
8.1 RGB Display interface pinout



Pin Number	Signal	I/O	Function
1	GND	P	Ground
2	LCD DRDY	O	Data enable
3	LCD CNTRST	-	Reserved for future use (Leave open)
4	LCD VSYNC	O	Vertical synchronous signal
5	LCD HSYNC	O	Horizontal synchronous signal
6	LCD CLK	O	Dot Clock
7	GND	P	Ground
8	LCD DAT23 R7	O	Red Data 7 (MSB)
9	LCD DAT22 R6	O	Red Data 6
10	LCD DAT21 R5	O	Red Data 5
11	LCD DAT20 R4	O	Red Data 4
12	LCD DAT19 R3	O	Red Data 3
13	LCD DAT18 R2	O	Red Data 2
14	LCD DAT17 R1	O	Red Data 1
15	LCD DAT16 R0	O	Red Data 0 (LSB)
16	GND	P	Ground
17	LCD DAT15 G7	O	Green Data 7 (MSB)
18	LCD DAT14 G6	O	Green Data 6
19	LCD DAT13 G5	O	Green Data 5
20	LCD DAT12 G4	O	Green Data 4
21	LCD DAT11 G3	O	Green Data 3
22	LCD DAT10 G2	O	Green Data 2
23	LCD DAT9 G1	O	Green Data 1
24	LCD DAT8 G0	O	Green Data 0 (LSB)
25	GND	P	Ground
26	LCD DAT7 B7	O	Blue Data 7 (MSB)
27	LCD DAT6 B6	O	Blue Data 6
28	LCD DAT5 B5	O	Blue Data 5
29	LCD DAT4 B4	O	Blue Data 4
30	LCD DAT3 B3	O	Blue Data 3
31	LCD DAT2 B2	O	Blue Data 2
32	LCD DAT1 B1	O	Blue Data 1
33	LCD DAT0 B0	O	Blue Data 0 (LSB)
34	GND	P	Ground
35	NC	-	Not Connected

Pin Number	Signal	I/O	Function
36	LCD_RGB_TOUCH_INT	I/O	Interrupt signal for touch controller (active high). Also determines I2C address after reset.
37	LCD RGB TOUCH RST	O	Reset signal for touch controller (active low).
38	LCD RGB VDD EN	O	Enable 3V3 and 5V power on the adapter board.
39	LCD RGB BLT EN	O	Enable backlight (active high). Can also be used for backlight dimming (PWM capable).
40	LCD RGB RESET	O	Reset screen IC (active low)
41	I2C1 SCL	O	I2C 1 clock
42	I2C1 SDA	I/O	I2C 1 data
43	SPI2 SSO	O	SPI 2 chip select
44	SPI2 MISO	I	SPI 2 data input
45	SPI2 MOSI	O	SPI 2 data output
46	SPI2 CLK	O	SPI 2 clock
47	5V	P	+ 5V power supply
48	5V	P	+ 5V power supply
49	3V3	P	+3.3V power supply
50	3V3	P	+3.3V power supply

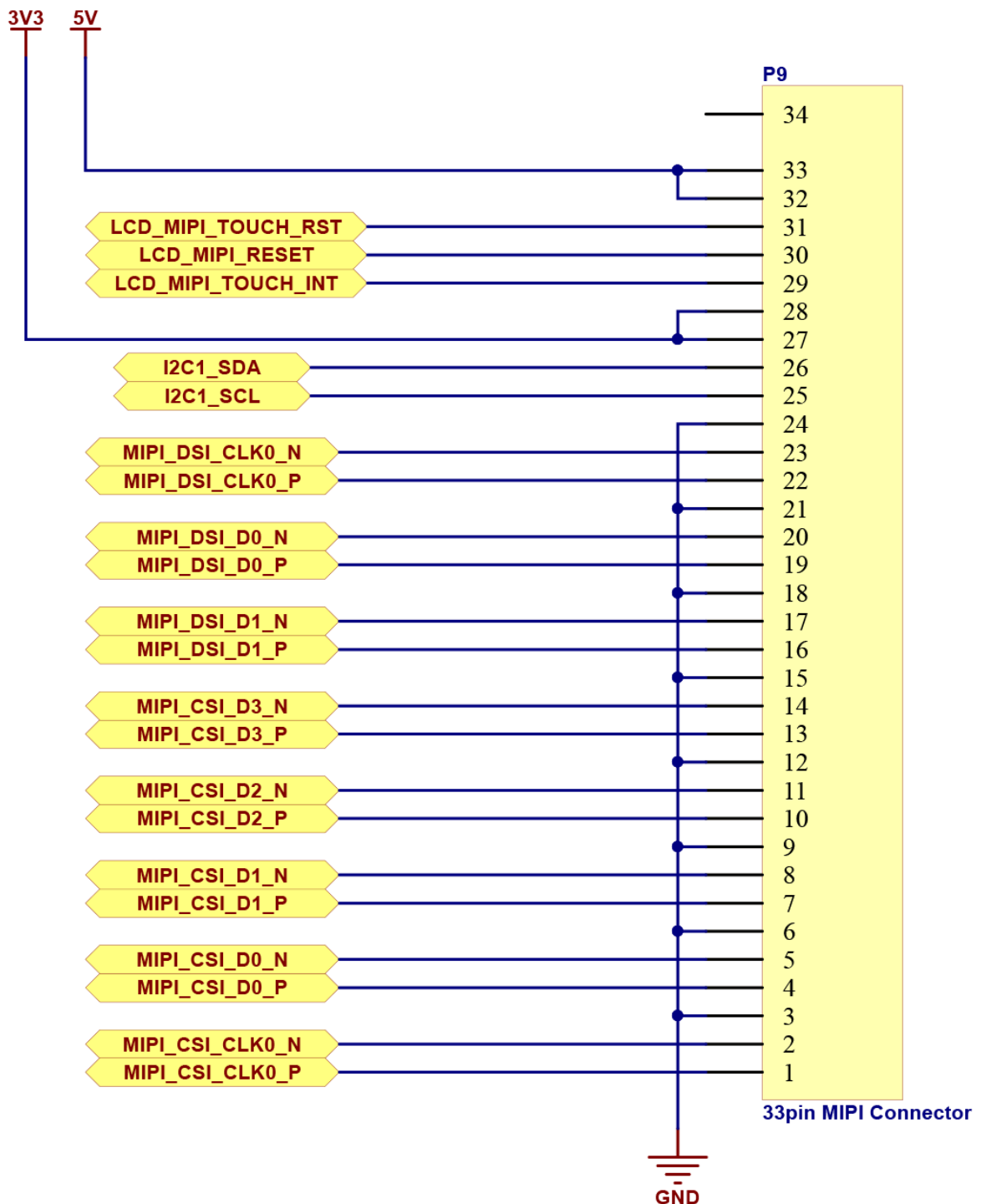
8.2 LVDS Display interface pinout



Pin Number	Signal	I/O	Function
1	GND	P	Ground
2	LVDS0_CLK_P	O	Positive LVDS differential Clock input
3	LVDS0_CLK_N	O	Negative LVDS differential Clock input
4	GND	P	Ground
5	LVDS0_TX0_P	O	Positive LVDS differential data input
6	LVDS0_TX0_N	O	Negative LVDS differential data input
7	GND	P	Ground
8	LVDS0_TX1_P	O	Positive LVDS differential data input
9	LVDS0_TX1_N	O	Negative LVDS differential data input
10	GND	P	Ground
11	LVDS0_TX2_P	O	Positive LVDS differential data input
12	LVDS0_TX2_N	O	Negative LVDS differential data input
13	GND	P	Ground
14	LVDS0_TX3_P	O	Positive LVDS differential data input
15	LVDS0_TX3_N	O	Negative LVDS differential data input
16	GND	P	Ground
17-33	NC	-	Not connected (floating)
34	GND	P	Ground
35	NC	-	Not connected (floating)
36	LCD_LVDS_TOUCH_INT	I/O	Interrupt signal for touch controller (active high). Also determines I2C address after reset.
37	LCD LVDS TOUCH RST	O	Reset signal for touch controller (active low).
38	LCD LVDS VDD EN	O	Enable 3V3 and 5V power on the adapter board.
39	LCD LVDS BLT EN	O	Enable backlight (active high). Can also be used for backlight dimming (PWM capable).
40	LCD LVDS RESET	O	Reset screen IC (active low)
41	I2C1 SCL	O	I2C 1 clock
42	I2C1 SDA	I/O	I2C 1 data
43	SPI2 SS1	O	SPI 2 chip select
44	SPI2 MISO	I	SPI 2 data input
45	SPI2 MOSI	O	SPI 2 data output
46	SPI2 CLK	O	SPI 2 clock
47	5V	P	+ 5V power supply
48	5V	P	+ 5V power supply

Pin Number	Signal	I/O	Function
49	3V3	P	+3.3V power supply.
50	3V3	P	+3.3V power supply.

8.3 MIPI interface pinout



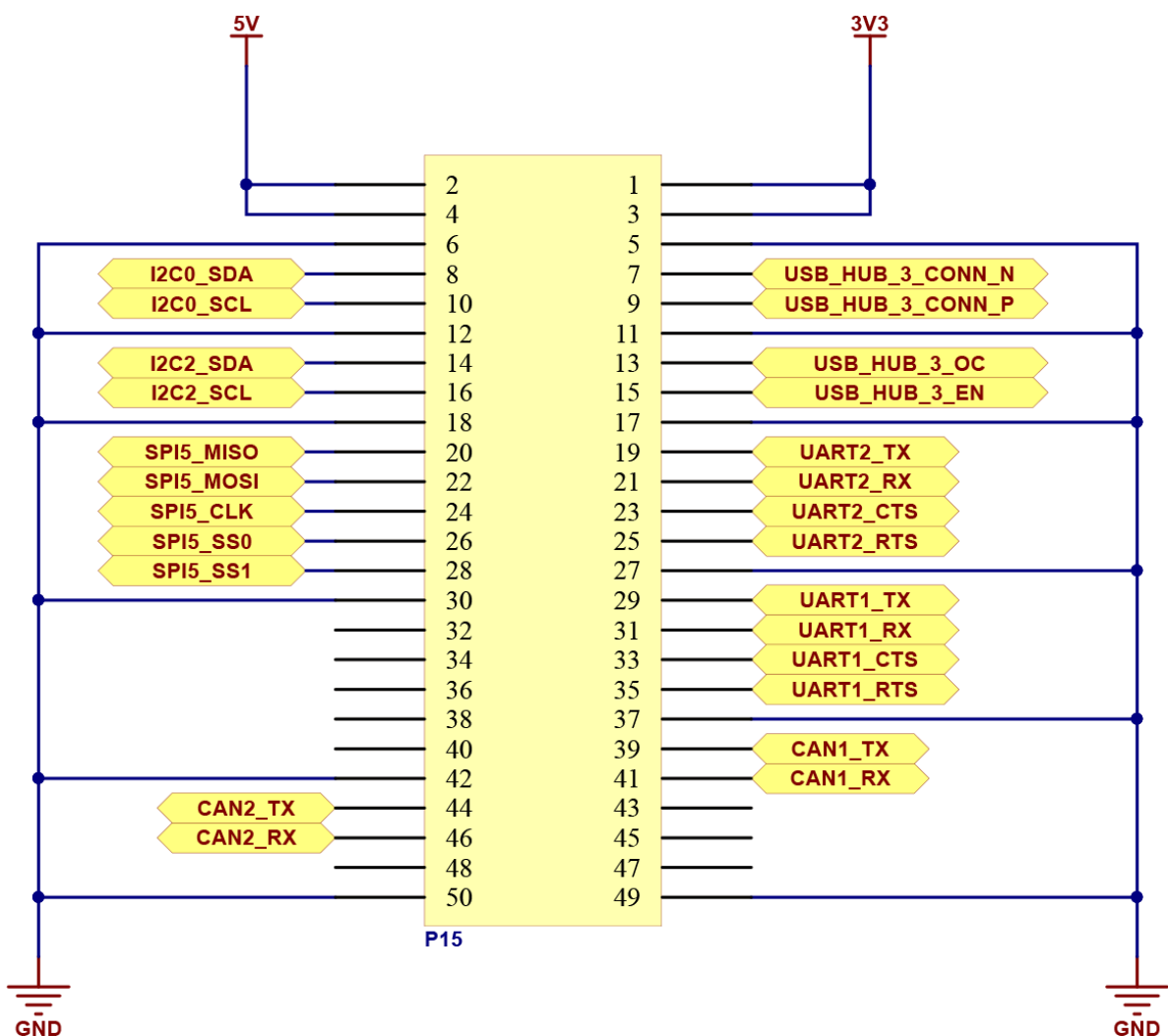
Pin Number	Signal	I/O	Function
1	MIPI_CSI_CLK0_P	I/O	MIPI Camera Interface Clock pair.
2	MIPI_CSI_CLK0_N	I/O	
3	GND	P	Ground
4	MIPI_CSI_D0_P	I/O	MIPI Display Interface Data 0 pair.
5	MIPI_CSI_D0_N	I/O	
6	GND	P	Ground
7	MIPI_CSI_D1_P	I/O	MIPI Display Interface Data 1 pair.
8	MIPI_CSI_D1_N	I/O	
9	GND	P	Ground
10	MIPI_CSI_D2_P	I/O	MIPI Display Interface Data 2 pair.
11	MIPI_CSI_D2_N	I/O	
12	GND	P	Ground
13	MIPI_CSI_D3_P	I/O	MIPI Display Interface Data 3 pair.
14	MIPI_CSI_D3_N	I/O	
15	GND	P	Ground
16	MIPI_DSI_D1_P	I/O	MIPI Display Interface Data 1 pair.
17	MIPI_DSI_D1_N	I/O	
18	GND	P	Ground
19	MIPI_DSI_D0_P	I/O	MIPI Display Interface Data 0 pair.
20	MIPI_DSI_D0_N	I/O	
21	GND	P	Ground
22	MIPI_DSI_CLK0_P	I/O	MIPI Display Interface Clock pair.
23	MIPI_DSI_CLK0_N	I/O	
24	GND	P	Ground
25	I2C1_SCL	O	I2C 1 clock
26	I2C1_SDA	I/O	I2C 1 data
27	3V3	P	+3.3V power supply.
28	3V3	P	+3.3V power supply.
29	MIPI_GPIO3_CLKO2	I/O	Interrupt signal for touch controller (active high). Also determines I2C address after reset.
30	MIPI_GP106	-	Reserved for future use (Leave open)
31	MIPI_IPUI_SISG2	O	Reset signal for touch controller (active low).
32	5V	P	+ 5V power supply
33	5V	P	+ 5V power supply

8.4 Expansion header

The expansion header provides the option to add and expand the communication of the SBC with other peripherals over different communication interfaces and protocols. Through the 50 pin header various additional features of the NXP i.MX6 APU can be accessed. The available pins as listed in the following table have a fixed configuration or can be configured with pin multiplexing to provide different configuration options.

Please note that the various configurations and mentioned interfaces / protocols on the expansion header are not part and are not supported by the supplied BSPs. It is up to the customer to develop, support and test the desired configuration.

8.5 Expansion interface pinout



Pin Number	Signal	I/O	Function	Pin configuration
1	3V3	P	+3.3V power supply	Fixed
2	5V	P	+5V power supply	Fixed
3	3V3	P	+3.3V power supply	Fixed
4	5V	P	+5V power supply	Fixed
5	GND	P	Ground	Fixed
6	GND	P	Ground	Fixed
7	USB_HUB_3_CONN_N	I/O	USB negative differential data signal	Optional
8	I2C0_SDA	I/O	I2C 0 data	Optional
9	USB_HUB_3_CONN_P	I/O	USB positive differential data signal	Optional
10	I2C0_SCL	O	I2C 0 Clock	Optional
11	GND	P	Ground	Fixed
12	GND	P	Ground	Fixed
13	USB_HUB_3_OC	I	USB power over-current detection input (active low) If not used tie pin to 3,3V through 10k resistor.	Optional
14	I2C2_SDA	I/O	I2C 2 data	Optional
15	USB_HUB_3_EN	I	USB power enable (active high)	Optional
16	I2C2_SCL	O	I2C 2 Clock	Optional
17	GND	P	Ground	Fixed
18	GND	P	Ground	Fixed
19	UART2_TX	O	UART 2 data transmit	Optional
20	SPI5_MISO	I	SPI 5 data input	Optional
21	UART2_RX	I	UART 2 data receive	Optional
22	SPI5_MOSI	O	SPI 5 data output	Optional
23	UART2_CTS	O	UART 2 Clear to send	Optional
24	SPI5_CLK	O	SPI 5 clock	Optional
25	UART2_RTS	I	UART 2 Request to send	Optional
26	SPI5_SS0	O	SPI 5 chip select 0	Optional
27	GND	P	Ground	Fixed
28	SPI5_SS1	O	SPI 5 chip select 1	Optional
29	UART1_TX	O	UART 1 data transmit	Optional
30	GND	P	Ground	Fixed
31	UART1_RX	I	UART 1 data receive	Optional

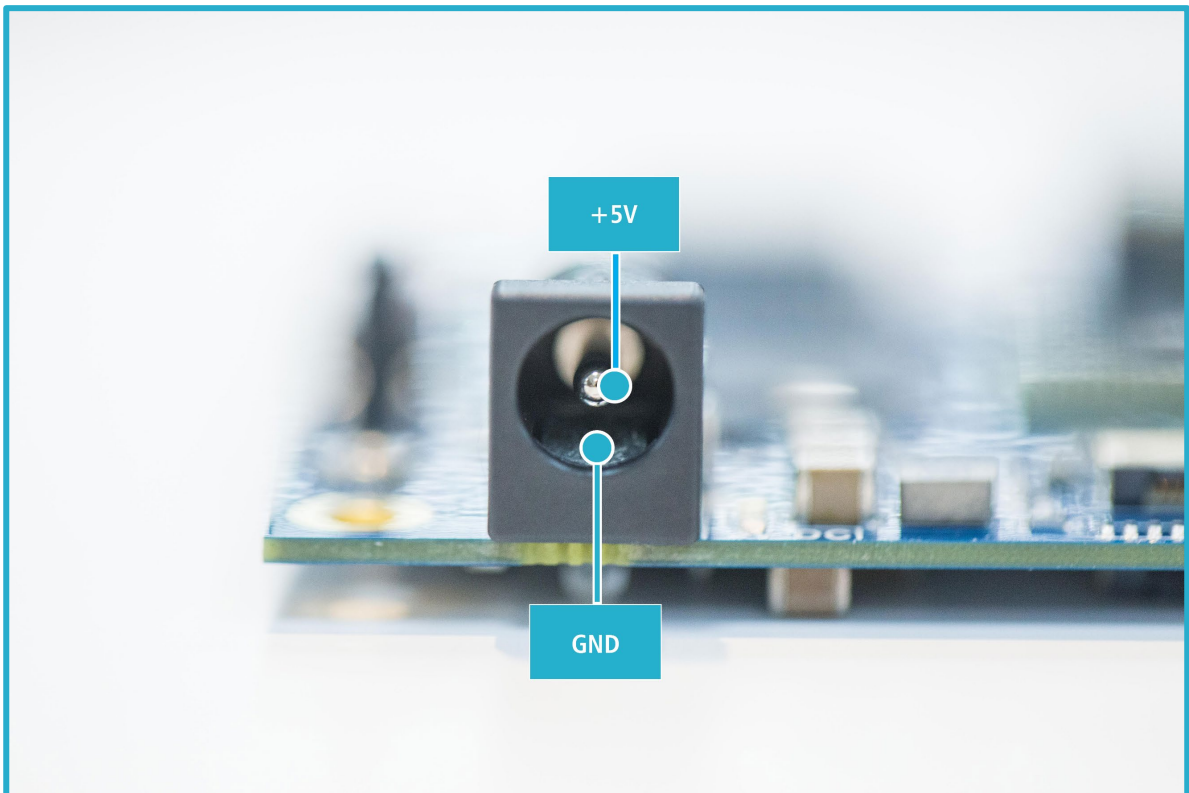
32	NC	-	Not connected	Not connected
33	UART1_CTS	O	UART 1 Clear to send	Optional
34	NC	-	Not connected	Not connected
35	UART1_RTS	I	UART 1 Request to send	Optional
36	NC	-	Not connected	Not connected
37	GND	P	Ground	Fixed
38	NC	-	Not connected	Not connected
39	CAN1_TX	O	CAN 1 transmit pin to transceiver	Optional
40	NC	-	Not connected	Not connected
41	CAN1_RX	I	CAN 1 receive pin from transceiver	Optional
42	GND	P	Ground	Fixed
43	NC	-	Not connected	Not connected
44	CAN2_TX	O	CAN 2 transmit pin to transceiver	Optional
45	NC	-	Not connected	Not connected
46	CAN2_RX	I	CAN 2 receive pin from transceiver	Optional
47	NC	-	Not connected	Not connected
48	NC	-	Not connected	Not connected
49	GND	P	Ground	Fixed
50	GND	P	Ground	Fixed

8.6 Other connectors and features

8.6.1 Power connector and power supply

Main power supply to the SBC is 5V centre positive with 3A.

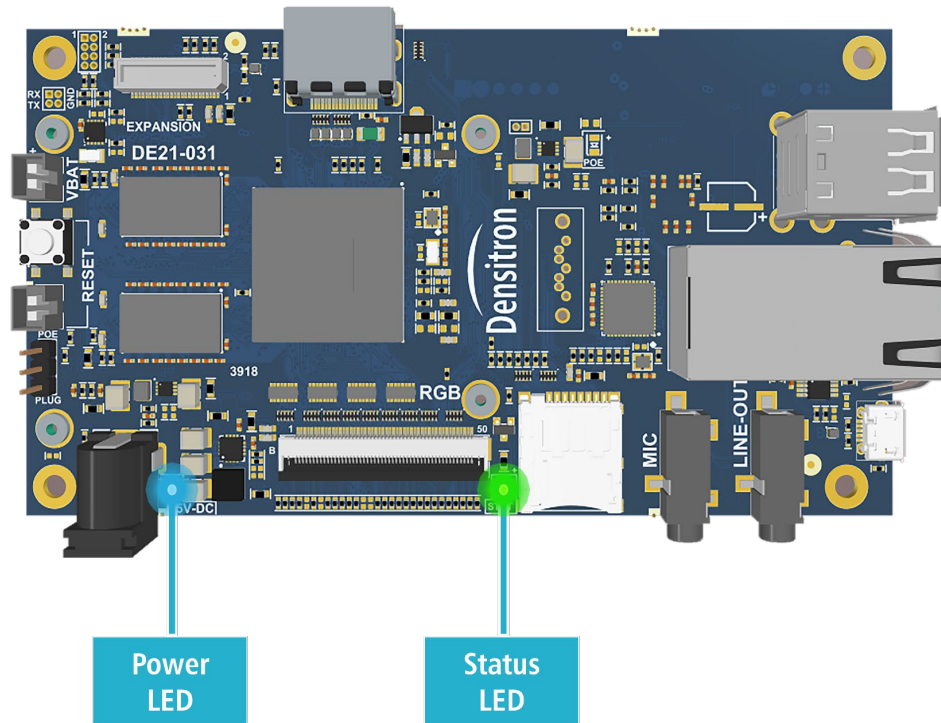
The reference power supply used is Stontronics TS877ST. The same power supply is also included and provided with the Aurora SBX™ Development Kit.



8.6.2 LED flash indication

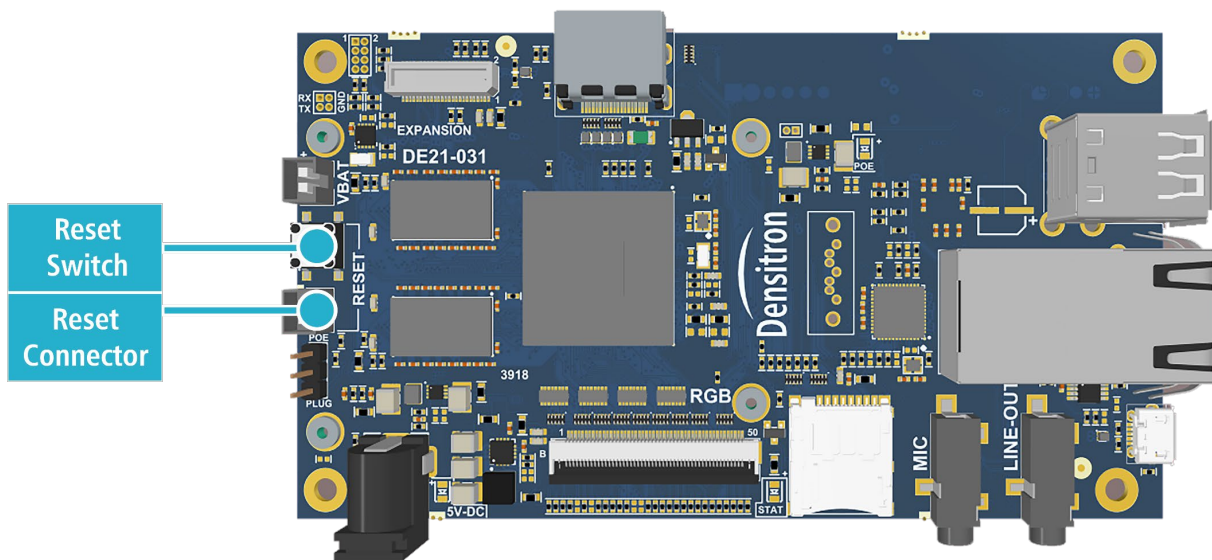
There are two LEDs present on the SBC, indicating DC power and general status (activity or “heartbeat”). By default, when the power supply is attached only the POWER LED (blue) is lit and remains on. The STATUS LED (green) blinks in accordance with the system activity (for example boot micro SD read / write) when using the provided Densitron Aurora BSP (Board Support Package).

Additionally, the status i.e. function indication of the STATUS LED (green) can be programmed by the customer to correspond to a system status or activity.

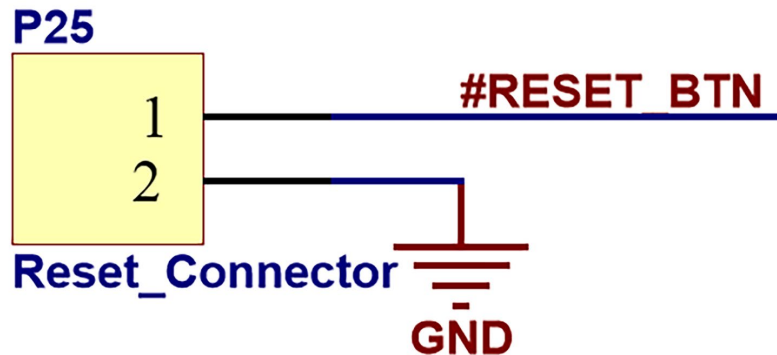


8.6.3 Reset connector and reset micro switch

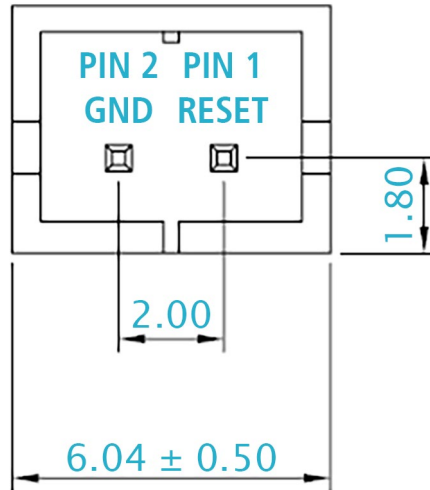
The hardware reset function is available either through a dedicated RESET micro switch or a two-pin RESET connector. Both provide the function that resets the APU and initiates the start-up of the SBC. The RESET connector allows the integration of this function with an external switch that can be made accessible on the outside of an enclosure or positioned according to customer and application requirements.



8.6.4 Reset connector schematic



8.6.5 Reset connector pin layout



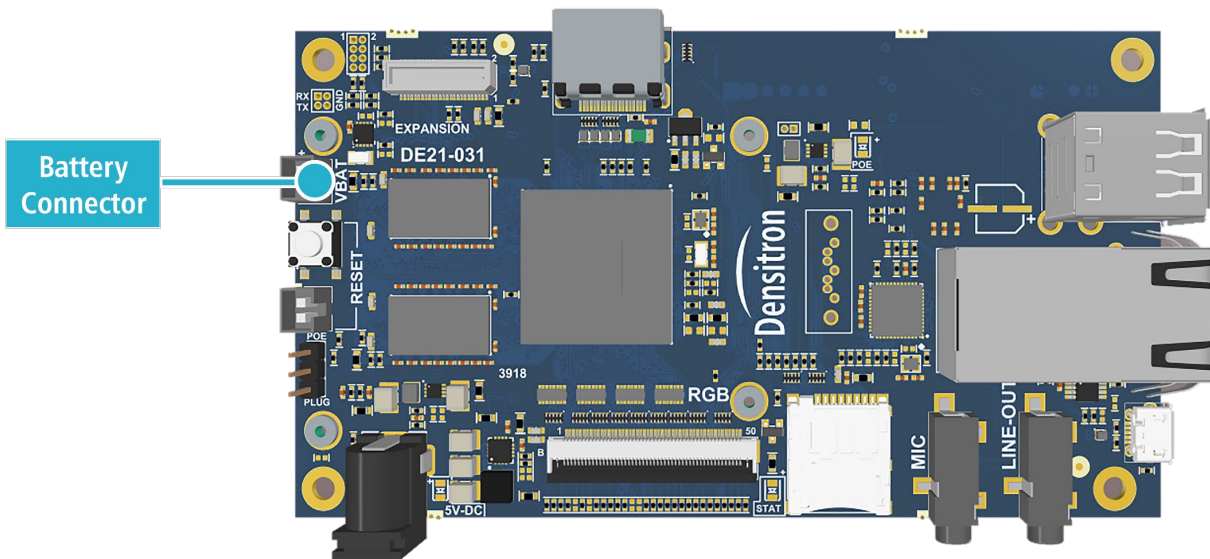
Reference connector:
JVE: 24W1140-02S10-05G

8.6.6 RTC battery connector

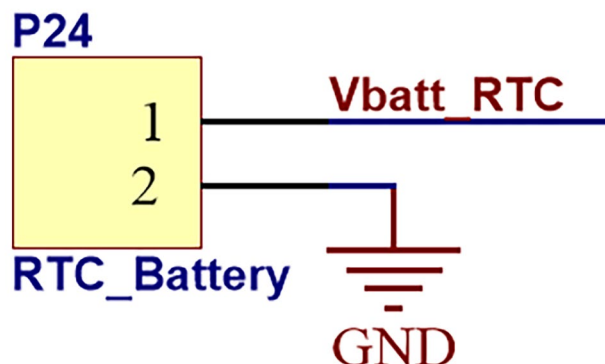
The i.MX6 APU features an internal embedded RTC (Real Time Clock). For applications requiring to maintain the RTC when power is not supplied to the device a dedicated two-pin BATTERY connector is featured on the Aurora SBX™. A cabled 3V non-rechargeable lithium-ion CR2032 battery should be used to power the RTC.

On request a suitable cabled battery can be supplied. For reference the following cabled battery can be used or supplied:

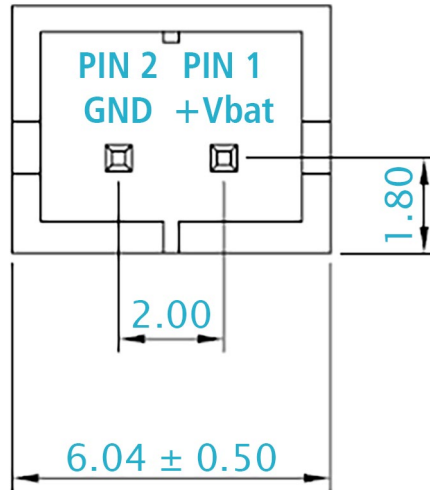
**Panasonic CR2032 Li-Battery w/wire L=50mm pitch=2.0mm
CR2032-JP-W-15A**



8.6.7 Reset connector schematic



8.6.8 Battery connector pin layout

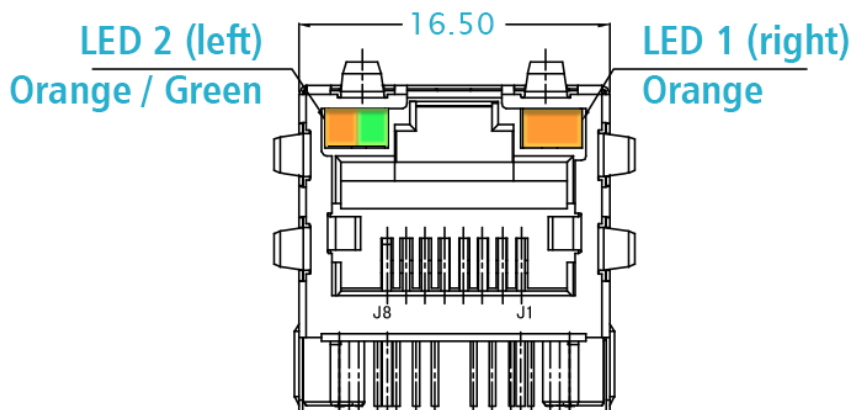


Reference connector:
JVE: 24W1140-02S10-05G

8.6.9 Ethernet LED flash indication

On the RJ-45 ethernet connector two status LEDs indicate the identified data transfer rate or link speed of the network connection when an ethernet cable is plugged in and a link established.±

8.6.10 Ethernet connector and LED positions



8.6.11 Ethernet LED flash patterns

Depending on the established link with the network the LEDs light up in different combinations or blink to represent the identified link speed.

LED designation / position	LED 2 (left)	LED 2 (left)	LED 1 (right)
LED color	Orange	Green	Orange
Link off / disconnected	Off	Off	Off
10Mbps link / no activity	Off	Off	On
10Mbps link / activity (RX, TX)	Off	Off	Blink
100Mbps link / no activity	On	Off	Off
100Mbps link / activity (RX, TX)	Blink	Off	Off
1000Mbps link / no activity	Off	On	Off
1000Mbps link / activity (RX, TX)	Off	Blink	On

9. PART NUMBERS AND ORDERING INFORMATION

Please refer to the following part numbers for ordering your chosen Aurora SBX™ model.

Part Number	Description
DA-100-0330R01	Aurora SBX Quad 2GB RAM
DA-100-0220R01	Aurora SBX Dual 1GB RAM
DA-100-0110R01	Aurora SBX Solo 512MB RAM

For orders, availability and additional purchase information please contact your regional Densitron sales office. Please visit www.densitron.com/en-gb/contact-us/ for your nearest sales contact.

10. PRECAUTIONS AND REGULATIONS

10.1 Static / ESD

The Aurora SBX™ is an electro-static sensitive device and can be damaged by high voltages caused by static electricity. Proper anti-static procedures including field maintenance should always be observed when handling and installing the device and necessary precautions and equipment used to reduce ESD risks.

10.2 Safety

The Aurora SBX™ features well-protected power supplies, and only uses low voltages nevertheless care should still be taken to avoid short circuits caused by conductive objects and surfaces. If the device has been exposed to water or other liquids, either through spillage or condensation, power should never be supplied to the device as damage may occur on the device and connected peripherals or subsystems.

10.3 Thermal

The Aurora SBX™ has a low thermal profile however to ensure stable and safe operation a heatsink is used to dissipate heat from the main heat sources – the APU and RAM memory.

When installing the device, it should be positioned in a way to ensure sufficient spacing and airflow to enable the thermal solution to properly cool the device. Same considerations must be applied to the enclosure or cabinet design to ensure proper operation.

The customer is required to assess and analyse the thermal design when assembling the complete solution or product and integrate thermal design requirements with respect to the device characteristics.

The Aurora SBX comes standard with a specifically designed passive heatsink to ensure operation within the designated environmental specifications however it is up to the customer to evaluate and test the thermal performance and final product suitability. The customer must ensure that the specified device environmental and operating specifications are met.

10.4 RoHS

The Aurora SBX™ is designed and produced with using RoHS compliant components and procedures and is manufactured on a lead-free production line.

10.5 EMC

The Aurora SBX™ is designed to meet the requirements of CE and FCC when located inside a suitably designed metal enclosure and sensible EMC precautions are taken with all connected cabling and other peripherals.

Care should be taken with all interconnecting cables to minimize EMC emission/susceptibility.

10.6 Batteries

The Aurora SBX™ requires an external coin Lithium-ion CR2032 battery for the internal RTC embedded in the i.MX6 APU.

It is the responsibility of the customer to ensure a regular battery checks and maintenance schedule. The batteries should be replaced well in advance of failure to ensure continuous and reliable RTC operation.

10.7 Environmental specifications

Operating Temperature	0~50°C (commercial version)*
Operating Humidity	5~95% @40°C, non-condensing
Non-Operation Shock	30Grms, 11ms, IEC 60068-2-27

* The provided values have been established within internal parameters and testing conditions and reports are available on request. As these values may vary depending on the used custom or non-standard thermal (heatsink) solution, enclosure, application and environment these values are for reference only. It is required from the customer to take into account these considerations when planning a product and to integrate and test thermal and mechanical (enclosure) solutions based on his specific requirements as well as perform the required testing and certifications of the final product.

11. RMA SUPPORT

In the event of general product failure, the customer should notify his Densitron representative, local subsidiary or Densitron directly through:

Online form	http://www.densitron.com/en/contact-us/
Email	salesuk@densitron.com
Phone	+44 (0)20 7648 4200

The customer is required to supply Densitron with detailed data of non-operational product. The customer should provide the following information about the non-operational product:

- Product part number and serial number(s) of the afflicted products
- System setup at the point of failure:
 - Product environment and final application
 - Mechanical setup
 - External connected devices / interfaces
 - Operating system version
 - Used internally or third-party developed application software
 - Error logs or messages
- A detailed description of the observed failure and any additional observations

A representative will open and provide an RMA request to start the process.

12. TERMS & CONDITIONS

STANDARD TERMS AND CONDITIONS OF SALE document applies to the product described within this product datasheet and are available in full upon request. For this product a 12 months warranty from the delivery date applies under the conditions set in the STANDARD TERMS AND CONDITIONS OF SALE.

The customer is required to have expertise in electrical and computer engineering for the installation and use of this product or the development kit. Further the product or the development kit must be handled or monitored by personnel with electronics training and good engineering practice standards must be observed.

It is the responsibility of the customer to determine whether this product is suitable for the planned applications and use in planned products planned, as well as for the planned application and use by its third-party customer(s).

Densitron Technologies Ltd. makes no representation or warranties with respect to the performance, interoperability, function or fitness for a specific purpose of any computer program and software, bundled in, delivered with this product or delivered separately and specifically disclaims any responsibility for any damages, special or consequential, connected with the use of this software.

For full information about Terms & Conditions please contact us online at www.densitron.com or contact us via email salesuk@densitron.com.

The logo for Densitron features the word "Densitron" in a bold, black, sans-serif font. A light blue curved line arches over the top of the letters "e", "n", and "s".

Densitron

Part of Quixant Group

The logo for Aurora SBX features the word "Aurora" in a bold, italicized, blue, sans-serif font. Below it, the letters "SBX" are in a bold, blue, sans-serif font, with a blue swoosh underline that starts under the "S" and ends under the "X".

AuroraTM
SBX