

QSEVEN-Eval Carrier

Doc. Rev. 1.1

Doc. ID: 1062-1574

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 QSEVEN-EVAL CARRIER - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue	Author
1.0	Initial version	2018-Sept-11	CW
1.1	Chapter 7.28: caution note added	2018-Oct-08	HJS

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Symbols

The following symbols may be used in this user guide.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE indicates a property damage message.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.



This symbol indicates general information about the product and the user guide.

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

CAUTION



Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠ CAUTION

Danger of explosion if the battery is replaced incorrectly.

- ▶ Replace only with same or equivalent battery type recommended by the manufacturer.
 - ▶ Dispose of used batteries according to the manufacturer's instructions.
-

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit <http://www.kontron.com/about-kontron/corporate-responsibility/quality-management>.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- ▶ Reduce waste arising from electrical and electronic equipment (EEE)
- ▶ Make producers of EEE responsible for the environmental impact of their products, especially when the product be QSEVEN waste
- ▶ Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- ▶ Improve the environmental performance of all those involved during the lifecycle of EEE



Environmental protection is a high priority with Kontron.

Kontron follows the WEEE directive

You are encouraged to return our products for proper disposal.

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1/ Introduction

This user guide describes the Qseven-Eval carrier board. This document describes the electronic, mechanical and thermal design of the QSEVEN evaluation carrier board. It is designed to test the Qseven-Q7AL and other QSEVEN 2.1 modules. The board is equipped with DP++ connector, HDMI connector, LVDS connector, two full-size or half-size mPCIe card slot (PCIe + USB 2.0), two PCIe x1 slot and full-size mSATA slot to easily use and test additional cards.

The use of this user guide implies a basic knowledge of PC hardware and software. This user guide is focused on describing the special features and is not intended to be a standard PC textbook. New users are recommended to study the short installation procedure stated in the following chapter before switching on the power. All configuration and setup of the CPU board is either done automatically or manually by the user via the BIOS setup menus.

Latest revision of this user guide, datasheet, BIOS, drivers and BSPs (Board Support Packages) can be downloaded from Kontron's Web Page.

2/ Product Description

The Qseven-Eval Carrier Board designed based on the latest QSEVEN design guide version 2.0 is equipped with:

- ▶ DP++ connector
- ▶ HDMI connector
- ▶ Dual stacked Display Port
- ▶ LVDS connector
- ▶ Two full-size or half-size mPCIe card slot (PCIe + USB 2.0), connected to SIM UIM
- ▶ Two PCIe x1 slot
- ▶ SIM card slot
- ▶ Full-size mSATA slot
- ▶ SATA
- ▶ Micro SD
- ▶ Dual stacked USB 3.0/2.0 connector and one micro USB 2.0 OTG connector
- ▶ LPC/GPIO Header
- ▶ SPI S08 Socket
- ▶ COM port (DSUB DB9)
- ▶ Audio (I2S or HDA)
- ▶ Battery holder
- ▶ CAN interface
- ▶ Gigabit Ethernet

3/ Installation Procedure

3.1. Packing Check List

The package includes the following basic items accompany with this user guide.

- ▶ One Board

If this item is either damaged or missing, please contact your vendor and save all packing materials for future replacement and maintenance.

Note: The above packing list is for standard single box packing only.

3.2. Requirements IEC62368-1

Take care when designing chassis interface connectors in order to fulfill the IEC62368-1 standard.

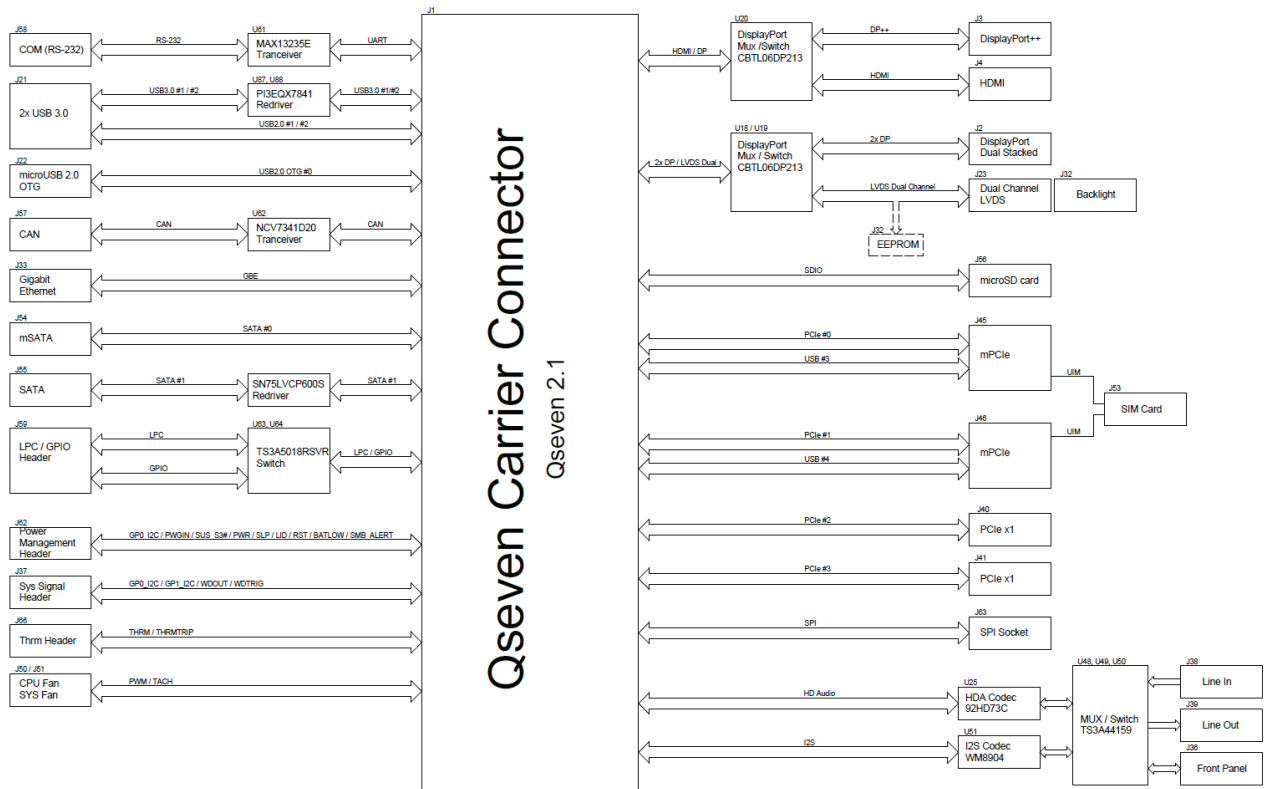
Users of board must evaluate the end product to ensure compliance the requirements of the IEC62368-1 safety standard are met:

- ▶ The motherboard must be installed in a suitable mechanical, electrical and fire enclosure.
- ▶ The system in its enclosure must be evaluated for temperature and air flow considerations.
- ▶ For interfaces having a power pin such as external power or fan, ensure that the connectors and wires are suitably rated. All connections from or to the product shall be with Safety Extra Low Voltage (SELV) circuits only.
- ▶ Wires have suitable rating to withstand the maximum available power.
- ▶ The enclosure of the peripheral device fulfills the fire protecting requirements of IEC62368-1.

4/ Product Specification

4.1. Block Diagram

Figure 1: Block Diagram for the QSEVEN-EVAL Carrier



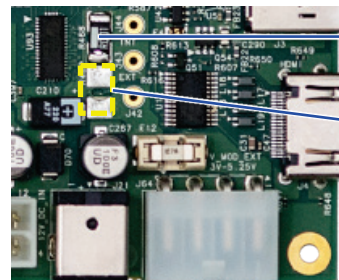
CAUTION



To power the Qseven Module the power can be set to Ext/Int power by populating one of the following resistors.

- ▶ R468 – V_MOD_IN from internal (V_5V0_55) [Default setting]
- ▶ R467 – V_MOD_IN from external (V_3V0-5V25_IN)

Figure 2: Qseven Module Power Setting Resistors



Location of R468 (V_5V0_55) the default setting

Location of R467 (V_3V0-5V25_IN)

4.2. Component Main Data

The table below summarizes the features of the motherboard.

Table 1: Component Main Data

Qseven-Eval Carrier	
Form factor	Carrier board with 210 mm x 200 mm.
Memory	
EEPROM System (U71)	The EEPROM type 24LC64 on carrier board connected to QSEVEN GP I2C or SM bus.
SPI flash socket (J63)	SPI flash socket (SOIC8 – 1045-8636) with flash memory W25Q128
EEPROM DDC optional (U32)	The EDID EEPROM type 24C04 on carrier board connected to LVDS_I2C bus. Holding display relevant DDC information. Used by BIOS to initialize LCD. KEAPI support with module.
External I/O	
LAN	1x Gbit-Ethernet port
USB	2x USB 3.0 double stack and 1x μ USB connector for On The Go (OTG) function: powered for host, not powered for client. The 5 V output from USB 2.0 and USB OTG is separately electronically fused to 500 mA. The 5V output from USB 3.0 is electronically fused to 1000 mA each port.
HDMI	HDMI connector from QSEVEN module
DP++	DP++ connector from QSEVEN module
COM1	COM RS232, 9-pin DSUB
Audio	Line-in and line-out 3.5 mm jack; Front Panel 2x5 Pin Header (2.54 mm), supporting both interfaces I2S and HDA selectable by jumper.
Internal I/O	
LVDS	30-pin LVDS dual channel from QSEVEN module. Configurable 3.3 V / 5V voltage levels of power for different panels via jumper.
Backlight	Backlight PWM and power. Configurable 12 V / 5 V voltage levels of backlight power for different panels via jumper. Maximum Power is 12 W continuous. If the selected panel exceeds, the provided power by this carrier evaluation of the QSEVEN module with LVDS can still be done with external panel power.
eDP	eDP connector, shared with LVDS as an option selectable by jumper. PWR Out must provide +3.3 V +/-10 % with a maximum current of 500 mA and a minimum power capability of 1.5 W.
mSATA	1x slot (full size / half size ; SATA port)
LVDS	One dual-channel LVDS. This is muxed with eDP0/eDP1 (jumper selectable) as per Qseven specification.
PCIe X1	Two PCIe X1 slots
mPCIe	Two card slots (full size / half size) - PCIe & USB; support all MC3 mPCIe cards
SIM Card	SIM Card connected to both mPCIe
μ SD	microSD card socket from QSEVEN module
Controller Area Network (CAN)	CAN interface

LEDs	SMD LEDs for storage activity, board status, device and power status (power good)
Internal Header and Jumper	
GPIO/LPC	GPIO/LPC Header 2.54 mm
Power Management Header	2.54 mm pin header, dual row
SYS Signals Header	2.54 mm pin header, dual row
Battery	1.5F Goldcap and/or CR2032 battery. Optional parallel usage supported.
CPU Fan	4-pin fan connector, Voltage can be 5 V or 12 V (default)
SYS Fan	3-pin fan connector, Voltage can be 5 V or 12 V (default)
Carrier Board Controllers	
I2C EEPROM	General purpose EEPROM I2C
SPI Socket	SPI socket with 16 MB Flash
HDA Codec	TSI 92HD73C HDA Codec
I2S Codec	WM8904 I2S Codec
EEPROM DDC	Holding display relevant DDC information. Used by BIOS to initialize LCD.
Carrier Board Power	
Power Input	12 V input power connector, used as an alternative power for module to support wide voltage range. 12 V DC power connector for powering carrier and module 5 V. Separate input power connector for module with voltage range: 3.0 V to 5.25 V DC Optional 24-pin ATX Power Supply
LED status	
Power LEDs	Power good of carrier power lanes
CARRIER_PWR_ON	Power on
CARRIER_STB#	CARRIER_STB#
LVDS V_BKLT	5V, 12V indication LVDS backlight
Ethernet LEDs	Ethernet status
HDA/I2S LEDs	HDA / I2S Audio codec indication LEDs
mPCIE mode	WPAN#, WLAN#, WWAN# indication
SATA_ACT#	SATA activity LED
Power rails	1.8 V; 3.3 V; 5 V
GPIO	GPIO indication LEDs
Watchdog	Watchdog indication LED

CAUTION

Danger of explosion if the lithium battery is incorrectly replaced.

- ▶ Replace only with the same or equivalent type recommended by the manufacturer
- ▶ Dispose of used batteries according to the manufacturer's instructions

4.3. Environmental Conditions and Standard & Approvals

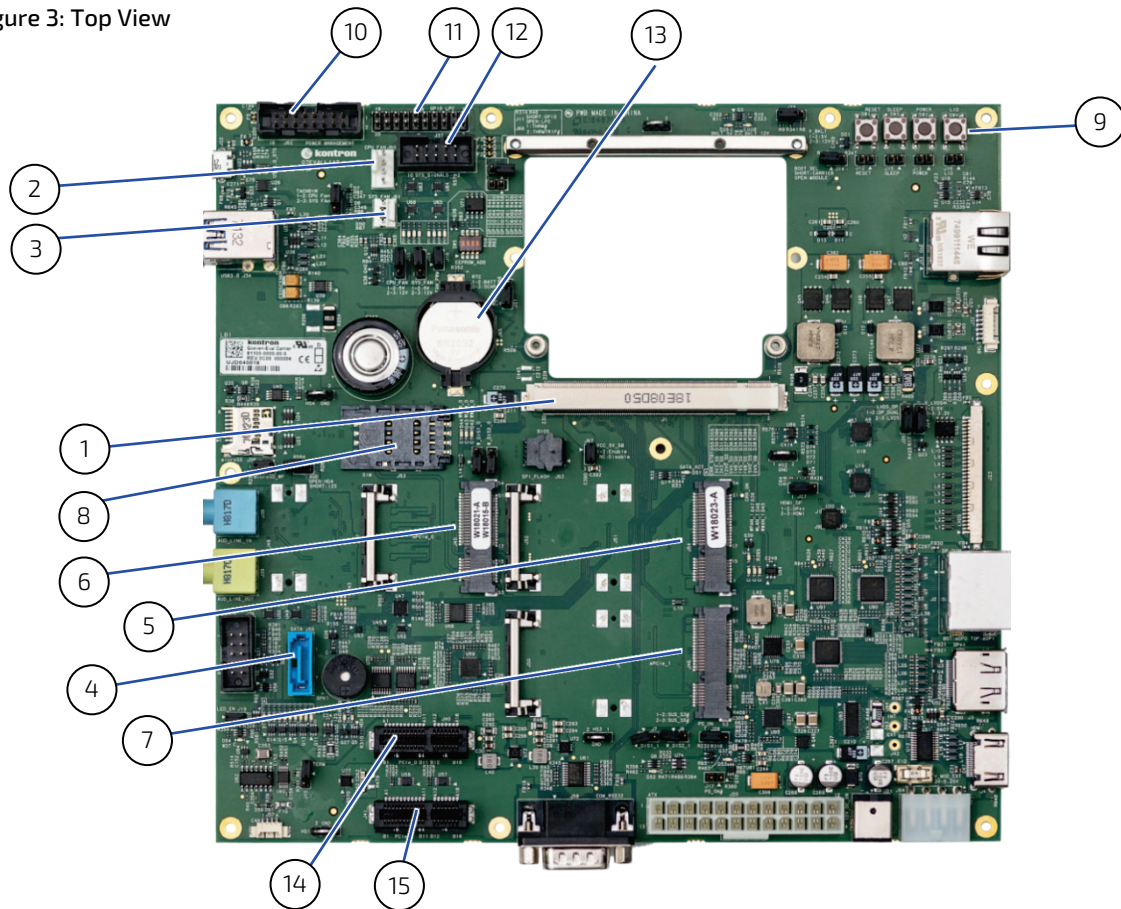
The Qseven-Eval Carrier plan to comply with the following standards.

Table 2: Environmental Conditions and Standard & Approvals

Operating	-40°C to +85°C
Storage	-40°C to +85°C Relative humidity (non-condensing) 93 % at 40°C
Electromagnetic Compatibility (EMC) and Interference (EMI)	The board shall be designed to meet the following requirements: EMC Emission EN 55032 Class B FCC part 15 Class B
Shock/Vibration/Bump	According to: IEC/EN60068-2-64 IEC/EN60068-2-27
Theoretical MTBF	Not applicable
RoHS II Compliance	The product will comply to the European Council Restriction of Hazardous Substances (RoHS) II Directive on the approximation of the laws of the member states relating to Directive 2001/65/EU or the last status thereof.
Safety	Component recognition to EN 62368-1

4.4. Mainboard View and I/O Locations

Figure 3: Top View



- | | | | |
|---|-------------------------------------|----|---|
| 1 | QSeven Connector (J1) | 9 | Button switches (reset, sleep, power, LID) |
| 2 | CPU fan (J60) | 10 | Power Management Header (J62) |
| 3 | System fan(J61) | 11 | LPC/GPIO header (J59) |
| 4 | SATA Connector (J55) | 12 | System Signals (J37) |
| 5 | Mini SATA Card Socket (J54) | 13 | RTC battery Holder |
| 6 | Mini PCIe card socket mPCIe_0 (J45) | 14 | PCIe connector (J40) |
| 7 | Mini PCIe card socket mPCIe_1 (J46) | 15 | PCIe connector (J41) |
| 8 | SIM card (J53) | | |

Figure 4: Rear View

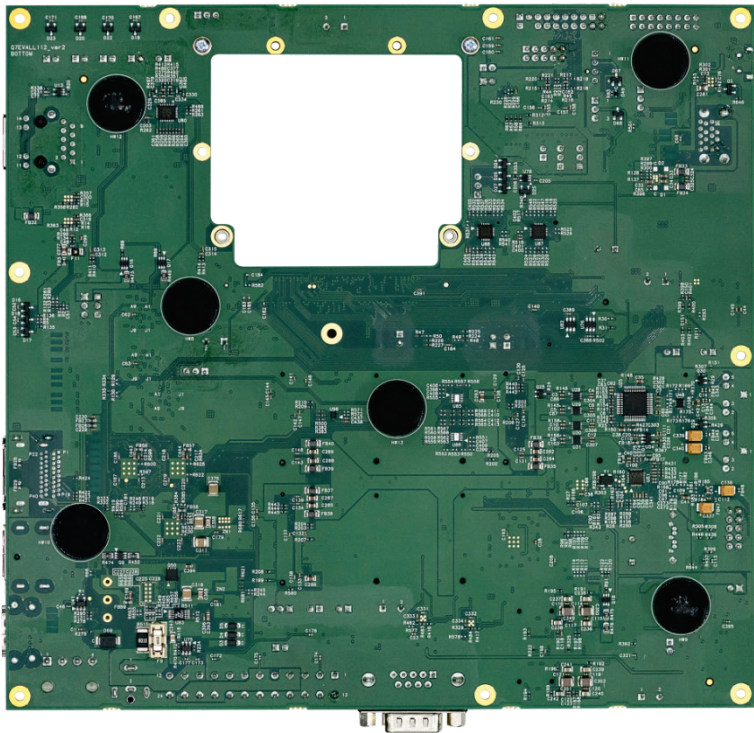
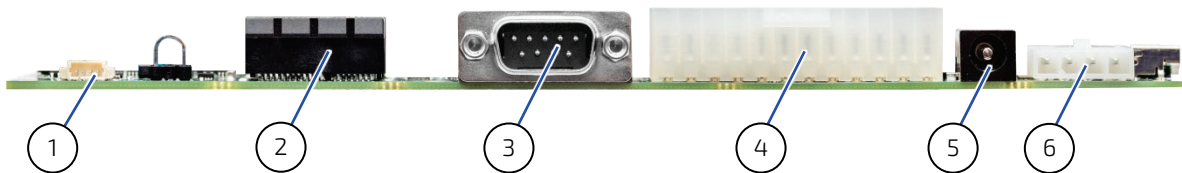


Figure 5: Front View



- | | | | |
|---|----------------------|---|---------------------------------|
| 1 | CAN connector (J57) | 4 | ATX connector (J20) |
| 2 | PCIe connector (J41) | 5 | Power-In Connector (J21) |
| 3 | COM connector(J58) | 6 | Module Power-In connector (J64) |
| | | 7 | |

Figure 6: Right Side View

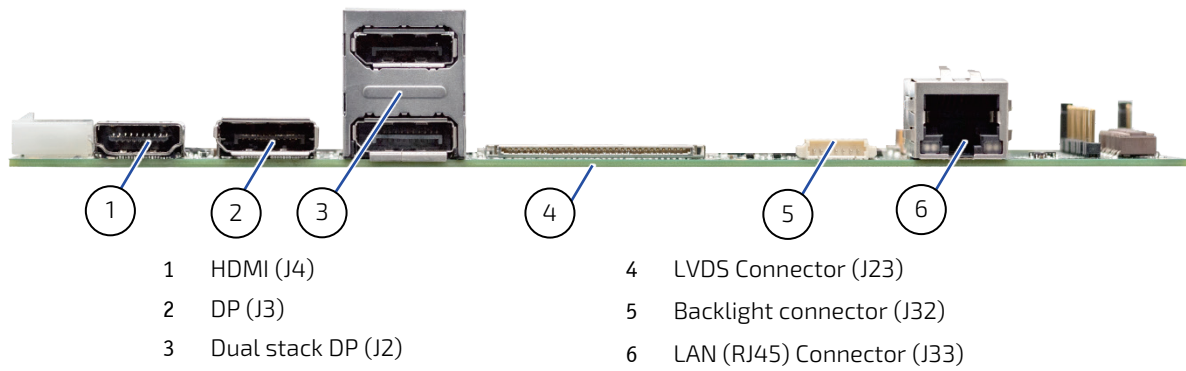
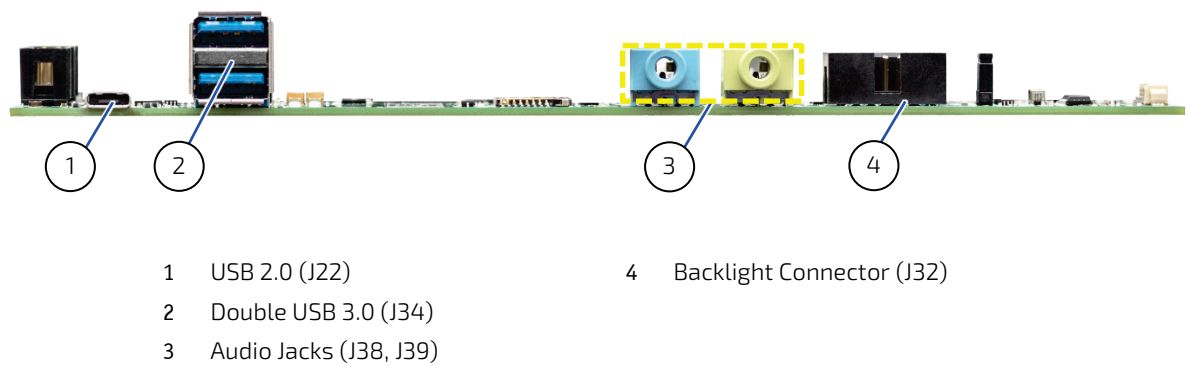


Figure 7: Left Side View



5/ Jumpers and Connectors

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on the board are in the proper position Hardware Configuration Setting

In general, jumpers on the board are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here, NC stands for "Not Connect".

Table 3: Jumpers and Connectors of Q7EVAL

Connector	Function	Remark
Module Power-in Connector (J64)	Module power-in selection from 3 V to 5.25 V. ATTENTION: J64 powers the module ONLY! Carrier still needs to be powered via 12V, through (J21) Power-In connector or (J20) ATX Connector.	1x4-pin Connector
5 V/3.3 V (J24)	Display voltage selection (3.3 V/5 V)	1x3-pin Jumper
5 V/12 V (J25)	Display backlight voltage selection (5 V/12 V)	1x3-pin Jumper
Dual DisplayPort/HDMI (J27)	Graphic Display selection (DP or DD0 in current)	1x3-pin Jumper
DP/LVDS (J26)	Graphic Display selection (LVDS/DP)	1x3-pin Jumper
MPCIE_0_W_DISABLE1# (J5)	Disable miniPCIe radio operation	1x2-pin Jumper
MPCIE_0_W_DISABLE2# (J6)	Disable miniPCIe radio operation	1x2-pin Jumper
MPCIE_1_W_DISABLE1# (J7)	Disable miniPCIe radio operation	1x2-pin Jumper
MPCIE_1_W_DISABLE2# (J8)	Disable miniPCIe radio operation	1x2-pin Jumper
CODEC_OPTION_SW_I2S_HDA# (J35)	Audio Codec Multipexor HDA/I2S Codec	1x2-pin Jumper
microSD Write Protect (J9)	microSD Write Protect Disable/Enable	1x2-pin Jumper
CAN Bus Termination (J10)	CAN Bus Termination Enable/Disable	1x2-pin Jumper
GPIO/LPC (J11)	GPIO/LPC to Header	1x2-pin Jumper
CPU Fan 12V/5V (J30)	CPU Fan 12V/5V	1x3-pin Jumper
System Fan 12V/5V (J29)	Sys Fan 12V/5V	1x3-pin Jumper
System Fan PWM control (J18)	System Fan without/with PWM control	1x2-pin Jumper
Boot Selection (J14)	Boot from Module/Carrier SPI Flash	1x2-pin Jumper
ATX PSU control (J28)	Control by SUS_S3#/#SUS_S5#	1x3-pin Jumper
ATX PSU force (J17)	ATX PSU is controlled by module/Force ATX PSU to ON	1x2-pin Jumper
LEDs ENABLE (J19)	Enable/Disable status and power LEDs	1x2-pin Jumper
V_BAT_JP (J31)	Selection between Battery or Goldcap	1x3-pin Jumper
COM(RS232) (J58)	Serial connector from QSEVEN module	standard
USB 3.0 (J34)	Dual Stacked USB 3.0 connectors	standard
microUSB 2.0 OTG (J22)	microUSB 2.0 connector	standard
QSEVEN (J1)	QSEVEN connector	1x230-pin header
CAN (J57)	CAN, Molex 53261-0471 or similar	1x4 header
Gigabit Ethernet (J33)	GBE connector	standard
LVDS (J23)	LVDS dual channel from QSEVEN module. Configurable 3.3 V / 5 V voltage levels of power for different panels	1x30 pins

Connector	Function	Remark
Backlight (J32)	via jumper.	1x7 pins
HDMI (J4)	HDMI connector from QSEVEN module	standard
DP++ (J3)	Display port connector from QSEVEN module	standard
PCIe x1 (J40/J41)	2x PCIe 1x slot	standard
mPCIe (J45/J46)	2x card slot (full size / half size) - PCIe & USB; support all MC3 mPCIe cards	standard
SIM (J53)	SIM card acceptor	standard
mSATA (J54)	1x slot (full size / half size ; SATA port)	standard
SATA (J55)	SATA port 1	standard
microSD (J56)	1.10mm Pitch microSD Memory Card Connector	standard
SPI socket (J63)	SPI Flash socket, for SOIC8	standard
LPC/GPIO (J59)	LPC/GPIO Header 2.54 mm	2x10 header
Audio (J38 IN/J39 OUT/J36 Front Panel)	Line-in and line-out 3.5 mm jack; Front Panel 2x5 Pin Header (2.54 mm)	Front Panel 2x5 header
Sys Signal Header (j37)	System header signal (2.54 mm pin)	2x5 header
Power Management Header (J62)	Power Management Header (2.54 mm pin)	2x8 header
CPU Fan (J60)	CPU Fan connector	1x4 header
SYS Fan (J61)	System Fan connector	1x3 header
Module Standby Voltage (J67)	V_5V0_SB enable disable	1x 2-pin header
TACHOIN CPU Fan/SYS Fan (J68)	TACHOIN for FAN	1x 3-pin header

6/ Maintenance and Status Information

6.1. LEDs

Figure 8: Power LEDs

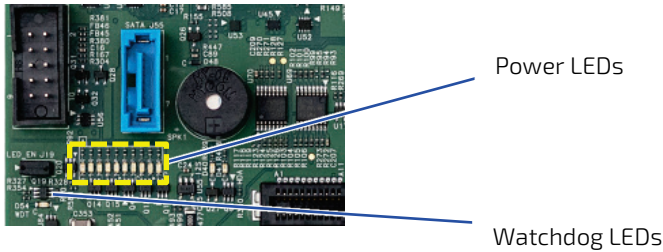


Table 4: Power LEDs

LED Color	Signal	Diode	Function
Green	V_1V8_S5	D33	Voltage V_1V8_S5 is present
Green	V_1V8_S0	D34	Voltage V_1V8_S0 is present
Green	V_1V5_S0	D35	Voltage V_1V5_S0 is present
Green	V_3V3_S5	D30	Voltage V_3V3_S5 is present
Green	V_3V3_S0	D31	Voltage V_3V3_S0 is present
Green	V_5V0_S5	D32	Voltage V_5V0_S5 is present
Green	V_5V0_S0	D36	Voltage V_5V0_S0 is present
Green	V_12V0_S0	D37	Voltage V_12V0_S0 is present
Green	V_2V5_STB	D38	Voltage V_2V5_STB is present
Green	Carrier_PWR_ON	D39	Voltage Carrier_PWR_ON is present
Red	Carrier_STBY	D55	Voltage Carrier_STBY is present

Table 5: Watchdog LEDs

LED Color	Signal	Diode	Function
Red	WDT	D54	Watchdog indication from module

Table 6: Backlight Voltage LEDs

LED Color	Signal	Diode	Function
Green	PG_BKLT_5V	D28	Indicate backlight voltage is 5 V
Green	PG_BKLT_12V0	D29	Indicate backlight voltage is out of range is 12 V

Figure 9: GPIO LEDs

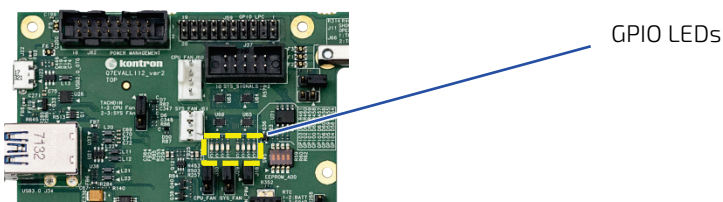


Table 7: GPIO LEDs

LED Color	Signal	Diode	Function
Blue	GPIO0	D62	GPIO0 level indication
Blue	GPIO1	D63	GPIO1 level indication
Blue	GPIO2	D64	GPIO2 level indication
Blue	GPIO3	D65	GPIO3 level indication
Blue	GPIO4	D58	GPIO4 level indication
Blue	GPIO5	D59	GPIO5 level indication
Blue	GPIO6	D60	GPIO6 level indication
Blue	GPIO7	D61	GPIO7 level indication

Table 8: Audio selection LEDs

LED Color	Signal	Diode	Function
Yellow	CODEC_OPTION_SW_I2S_HDA#	D40	I2S Codec is active; J35 is closed
Yellow	CODEC_OPTION_SW_I2S_HDA#	D41	HDA Codec is active; J35 is open

Table 9: SATA Activity LEDs

LED Color	Signal	Diode	Function
Red	SATA_ACT	D51	Indicate SATA activity

Table 10: mPCIe slot A LEDs

LED Color	Signal	Diode	Function
Yellow	MPCIEA_WPAN#	D44	WPAN Activity
Yellow	MPCIEA_WLAN#	D43	WLAN Activity
Yellow	MPCIEA_WWAN#	D42	WWAN Activity

Table 11: mPCIe slot B LEDs

LED Color	Signal	Diode	Function
Yellow	MPCIEB_WPAN#	D47	WPAN Activity
Yellow	MPCIEB_WLAN#	D46	WLAN Activity
Yellow	MPCIEB_WWAN#	D45	WWAN Activity

7/ Pin Definitions

The following sections provide pin definitions and detailed description of all on-board connectors.

The connector definitions follow the following notation:

Table 12: Connector Definitions

Column Name	Description
Pin	Shows the pin-numbers in the connector. The graphical layout of the connector definition tables is made similar to the physical connectors.
Signal	The mnemonic name of the signal at the current pin. The notation "XX#" states that the signal "XX" is active low.
Type	AI: Analog Input AO: Analog Output I: Input, TTL compatible if nothing else stated IO: Input / Output, TTL compatible if nothing else stated IOT: Bi-directional tristate IO pin. IS: Schmitt-trigger input, TTL compatible. IOC: Input / open-collector Output, TTL compatible IOD: Input / Output, CMOS level Schmitt-triggered (Open drain output) NC: Not Connected O: Output, TTL compatible OC: Output, open-collector or open-drain, TTL compatible OT: Output with tri-state capability, TTL compatible LVDS: Low Voltage Differential Signal PWR: Power supply or ground reference pins. loh: Typical current in mA flowing out of an output pin through a grounded load, while the output voltage is > 2.4 V DC (if nothing else stated). lol: Typical current in mA flowing into an output pin from a VCC connected load, while the output voltage is < 0.4 V DC (if nothing else stated).
Pull U/D	On-board pull-up or pull-down resistors on input pins or open-collector output pins.
Note	Special remarks concerning the signal
Designation	Type and number of item described

7.1. QSEVEN Connector (J1)

The QSEVEN connector is MXM 230-pin connector, with the same pins on both sides:

- ▶ Top side: 103 pins are on the left side, 12 pins on the right side
- ▶ Bottom side(mirrored): 12 pins are on the left side, 103 pins on the right side

Table 13: QSEVEN Connector Pin Assignment

Pin.No	Pin Name (Bottom side row)	Pin.No	Pin Name (Top side row)
1	GND	2	GND
3	GBE_MDI3-	4	GBE_MDI2-
5	GBE_MDI3+	6	GBE_MDI2+
7	GBE_LINK100#	8	GBE_LINK1000#
9	GBE_MDI1-	10	GBE_MDI0-
11	GBE_MDI1+	12	GBE_MDI0+
13	GBE_LINK#	14	GBE_ACT#
15	GBE_CTREF	16	SUS_S5#
17	WAKE#	18	SUS_S3#
19	GPO0	20	PWRBTN#
21	SLP_BTN# / GPII1	22	LID_BTN# / GPII0
23	GND	24	GND
KEY		KEY	
25	GND	26	PWGIN
27	BATLOW# / GPII2	28	RSTBTN#
29	SATA0_TX+	30	SATA1_TX+
31	SATA0_TX-	32	SATA1_TX-
33	SATA_ACT#	34	GND
35	SATA0_RX+	36	SATA1_RX+
37	SATA0_RX-	38	SATA1_RX-
39	GND	40	GND
41	BIOS_DISABLE# / BOOT_ALT#	42	SDIO_CLK#
43	SDIO_CD#	44	reserved
45	SDIO_CMD	46	SDIO_WP
47	SDIO_PWR#	48	SDIO_DAT1
49	SDIO_DAT0	50	SDIO_DAT3
51	SDIO_DAT2	52	reserved
53	reserved	54	reserved
55	reserved	56	USB_OTG_PEN
57	GND	58	GND
59	HDA_SYNC / I2S_WS	60	SMB_CLK / GP1_I2C_CLK
61	HDA_RST# / I2S_RST#	62	SMB_DAT / GP1_I2C_DAT
63	HDA_BITCLK / I2S_CLK	64	SMB_ALERT#
65	HDA_SDI / I2S_SDI	66	GPO_I2C_CLK
67	HDA_SDO / I2S_SDO	68	GPO_I2C_DAT
69	THRM#	70	WDTRIG#

Pin.No	Pin Name (Bottom side row)	Pin.No	Pin Name (Top side row)
71	THRMTRIP#	72	WDOUT
73	GND	74	GND
75	USB_P7- / USB_SSTX0-	76	USB_P6- / USB_SSRX0-
77	USB_P7+ / USB_SSTX0+	78	USB_P6+ / USB_SSRX0+
79	USB_6_7_OC#	80	USB_4_5_OC#
81	USB_P5- / USB_SSTX2-	82	USB_P4- / USB_SSRX2-
83	USB_P5+ / USB_SSTX2+	84	USB_P4+ / USB_SSRX2+
85	USB_2_3_OC#	86	USB_0_1_OC#
87	USB_P3-	88	USB_P2-
89	USB_P3+	90	USB_P2+
91	USB_VBUS	92	USB_ID
93	USB_P1-	94	USB_P0-
95	USB_P1+	96	USB_P0+
97	GND	98	GND
99	eDP0_TX0+ / LVDS_A0+	100	eDP1_TX0+ / LVDS_B0+
101	eDP0_TX0- / LVDS_A0-	102	eDP1_TX0- / LVDS_B0-
103	eDP0_TX1+ / LVDS_A1+	104	eDP1_TX1+ / LVDS_B1+
105	eDP0_TX1- / LVDS_A1-	106	eDP1_TX1- / LVDS_B1-
107	eDP0_TX2+ / LVDS_A2+	108	eDP1_TX2+ / LVDS_B2+
109	eDP0_TX2- / LVDS_A2-	110	eDP1_TX2- / LVDS_B2-
111	LVDS_PPEN	112	LVDS_BLEN
113	eDP0_TX3+ / LVDS_A3+	114	eDP1_TX3+ / LVDS_B3+
115	eDP0_TX3- / LVDS_A3-	116	eDP1_TX3- / LVDS_B3-
117	GND	118	GND
119	eDP0_AUX+ / LVDS_A_CLK+	120	eDP1_AUX+ / LVDS_B_CLK+
121	eDP0_AUX- / LVDS_A_CLK-	122	eDP1_AUX- / LVDS_B_CLK-
123	LVDS_BLT_CTRL / GP_PWM_OUT0	124	GP_1-Wire_Bus / HDMI_CEC
125	GP2_I2C_DAT / LVDS_DID_DAT	126	eDP0_HPD# / LVDS_BLC_DAT
127	GP2_I2C_CLK / LVDS_DID_CLK	128	eDP1_HPD# / LVDS_BLC_CLK
129	CAN0_TX	130	CAN0_RX
131	DP_LANE3+ / TMDS_CLK+	132	USB_SSTX1-
133	DP_LANE3- / TMDS_CLK-	134	USB_SSTX1+
135	GND	136	GND
137	DP_LANE1+ / TMDS_LANE1+	138	DP_AUX+
139	DP_LANE1- / TMDS_LANE1-	140	DP_AUX-
141	GND	142	GND
143	DP_LANE2+ / TMDS_LANE0+	144	USB_SSRX1-
145	DP_LANE2- / TMDS_LANE0-	146	USB_SSRX1+
147	GND	148	GND
149	DP_LANE0+ / TMDS_LANE2+	150	HDMI_CTRL_DAT
151	DP_LANE0- / TMDS_LANE2-	152	HDMI_CTRL_CLK
153	HDMI_HPD#	154	DP_HPD#

Pin.No	Pin Name (Bottom side row)	Pin.No	Pin Name (Top side row)
155	PCIE_CLK_REF+	156	PCIE_WAKE#
157	PCIE_CLK_REF-	158	PCIE_RST#
159	GND	160	GND
161	PCIE3_TX+	162	PCIE3_RX+
163	PCIE3_TX-	164	PCIE3_RX-
165	GND	166	GND
167	PCIE2_TX+	168	PCIE2_RX+
169	PCIE2_TX-	170	PCIE2_RX-
171	UART0_TX	172	UART0_RTS#
173	PCIE1_TX+	174	PCIE1_RX+
175	PCIE1_TX-	176	PCIE1_RX-
177	UART0_RX	178	UART0_CTS#
179	PCIE0_TX+	180	PCIE0_RX+
181	PCIE0_TX-	182	PCIE0_RX-
183	GND	184	GND
185	LPC_ADO / GPIO0	186	LPC_AD1 / GPIO1
187	LPC_AD2 / GPIO2	188	LPC_AD3 / GPIO3
189	LPC_CLK / GPIO4	190	LPC_FRAME# / GPIO5
191	SERIRQ / GPIO6	192	LPC_LDRQ# / GPIO7
193	VCC_RTC	194	SPKR / GP_PWM_OUT2
195	FAN_TACHOIN / GP_TIMER_IN	196	FAN_PWMOUT / GP_PWM_OUT1
197	GND	198	GND
199	SPI_MOSI	200	SPI_CS0#
201	SPI_MISO	202	SPI_CS1#
203	SPI_SCK	204	MFG_NC4
205	VCC_5V_SB	206	VCC_5V_SB
207	MFG_NC0	208	MFG_NC2
209	MFG_NC1	210	MFG_NC3
211	NC*	212	NC*
213	NC*	214	NC*
215	NC*	216	NC*
217	NC*	218	NC*
219	VCC	220	VCC
221	VCC	222	VCC
223	VCC	224	VCC
225	VCC	226	VCC
227	VCC	228	VCC
229	VCC	230	VCC

7.2. LVDS Connector (J23)

This connector provides data and power connection between the Carrier Board and the Display. This 30-pin lockable connector contains the LVDS output signals and the power to the LVDS display.

Note: Pin 1 and pin 32 shields and are not included in the table below.

Figure 10: 30-pin LVDS connector

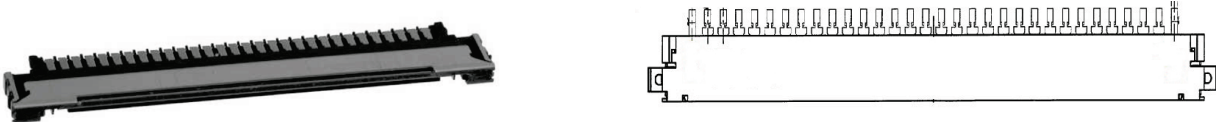


Table 14: 30-pin LVDS connector

Pin	Signal	Description
2	LVDS_A_DATA[0]-	LVDS odd channel 0, minus signal
3	LVDS_A_DATA[0]+	LVDS odd channel 0, plus signal
4	LVDS_A_DATA[1]-	LVDS odd channel 1, minus signal
5	LVDS_A_DATA[1]+	LVDS odd channel 1, plus signal
6	LVDS_A_DATA[2]-	LVDS odd channel 2, minus signal
7	LVDS_A_DATA[2]+	LVDS odd channel 2, plus signal
8	GND	Ground
9	LVDS_A_CLK-	LVDS odd channel clock, minus signal
10	LVDS_A_CLK+	LVDS odd channel clock, plus signal
11	LVDS_A_DATA[3]-	LVDS odd channel 3, minus signal
12	LVDS_A_DATA[3]+	LVDS odd channel 3, plus signal
13	LVDS_B_DATA[0]-	LVDS even channel 0, minus signal
14	LVDS_B_DATA[0]+	LVDS even channel 0, plus signal
15	GND	Ground
16	LVDS_B_DATA[1]-	LVDS even channel 1, minus signal
17	LVDS_B_DATA[1]+	LVDS even channel 1, plus signal
18	GND	Ground
19	LVDS_B_DATA[2]-	LVDS even channel 2, minus signal
20	LVDS_B_DATA[2]+	LVDS even channel 2, plus signal
21	LVDS_B_CLK-	LVDS even channel clock, minus signal
22	LVDS_B_CLK+	LVDS even channel clock plus signal
23	LVDS_B_DATA[3]-	LVDS even channel 3, minus signal
24	LVDS_B_DATA[3]+	LVDS even channel 3, plus signal
25	GND	Ground
26	I2C_LCD_DATA	EDID data signal
27	LVDS_Strap	LVDS STRAP signal
28	I2C_LCD_CLK	EDID clock signal
29	V_TFT	Flat panel power supply (3.3 V or 5V)
30	V_TFT	Flat panel power supply (3.3 V or 5V)
31	V_TFT	Flat panel power supply (3.3 V or 5V)

7.3. Backlight Connector (J32)

Figure 11: 7-pin Backlight Connector

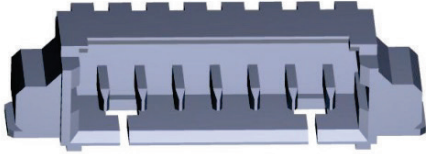


Table 15: 7-pin Backlight Connector

Pin	Signal	Type
1	NC	NC
2	Backlight Brightness 5V or 3.3V (jumper selection J24) PWM (0% - 100%)	Out (27.4 Ohm series resistor)
3	GND	Ground
4	V_BKLT - 12V or 5.0V (jumper selection J25)	Power
5	V_BKLT - 12V or 5.0V (max. 12W continuous, inrush limited with U36 or U35)"	Power
6	GND	Ground
7	Backlight enable (0 V: off; 5 V or 3 V3: on)	Out (27.4 Ohm series resistor)

7.4. Dual Stacked DP Connector (Display Port) (J2)

The connector provides DP signals from the QSEVEN board as an option on LVDS pins.

Figure 12: Dual Stacked DP Connector

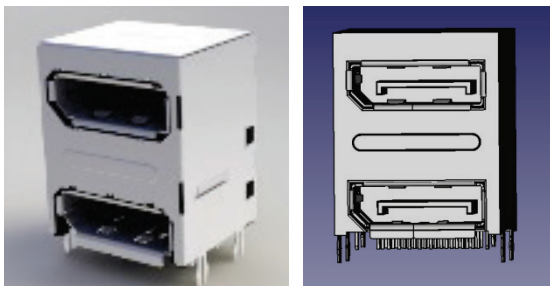


Table 16: Dual Stacked DP Connector

Pin	Signal	Description
1	OUT	ML_Lane0+_TOP
2	GND	GND_P2
3	OUT	ML_Lane0-_TOP
4	OUT	ML_Lane1+_TOP
5	GND	GND_P5

Pin	Signal	Description
6	OUT	ML_Lane1-_TOP
7	OUT	ML_Lane2+_TOP
8	GND	GND_P8
9	OUT	ML_Lane2-_TOP
10	OUT	ML_Lane3+_TOP
11	GND	GND_P11
12	OUT	ML_Lane3-_TOP
13	CONFIG	CONFIG1_TOP
14	CONFIG	CONFIG2_TOP
15	I/O	AUX_CH+_TOP
16	GND	GND_P16
17	I/O	AUX_CH-_TOP
18	IN	HOT_PLUG_TOP
19	GND	RETURN_TOP
20	PWR	DP_PWR_TOP
21	OUT	ML_Lane0+_BOT
22	GND	GND_P2
23	OUT	ML_Lane0-_BOT
24	OUT	ML_Lane1+_BOT
25	GND	GND_P5
26	OUT	ML_Lane1-_BOT
27	OUT	ML_Lane2+_BOT
28	GND	GND_P8
29	OUT	ML_Lane2-_BOT
30	OUT	ML_Lane3+_BOT
31	GND	GND_P11
32	OUT	ML_Lane3-_BOT
33	CONFIG	CONFIG1_BOT
34	CONFIG	CONFIG2_BOT
35	I/O	AUX_CH+_BOT
36	GND	GND_P16
37	I/O	AUX_CH-_BOT
38	IN	HOT_PLUG_BOT
39	GND	RETURN_BOT
40	PWR	DP_PWR_BOT

7.5. HDMI connector (J4)

Figure 13: 19-pin HDMI connector

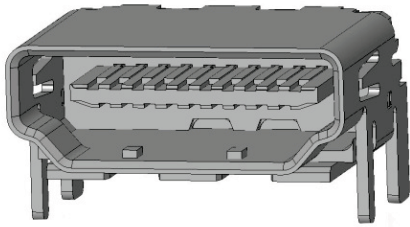


Table 17: 19-pin HDMI connector

Pin	Signal
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2-
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1-
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	CEC
14	Reserved / Utility
15	SCL
16	SDA
17	DDC/CEC Ground
18	+5V Power
19	Hot Plug Detect

7.6. DP connector (J3)

Figure 14: 20-pin DP connector

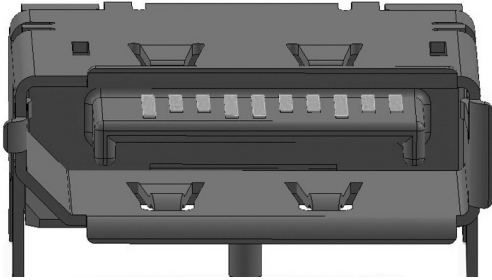


Table 18: 20-pin DP connector

Pin	Signal	Pin	Signal
1	ML LANE 0+	2	GND (ML LANE 0)
3	ML LANE 0-	4	ML LANE 1+
5	GND (ML LANE 1)	6	ML LANE 1-
7	ML LANE 2+	8	GND (ML LANE 2)
9	ML LANE 2-	10	ML LANE 3+
11	GND (ML LANE 3)	12	ML LANE 3-
13	AUX_SEL#	14	Pull-down to GND
15	AUX CH+	16	GND (AUX CH)
17	Hot Plug	18	Hot plug
19	GND (GND_DDC)	20	+3.3V (DDC EEPROM power) Max 500mA

7.7. Mini PCIe Card Socket 0 (J45) & Mini PCIe Card Socket 1 (J46)

Figure 15: 52-pin Mini PCIe Card

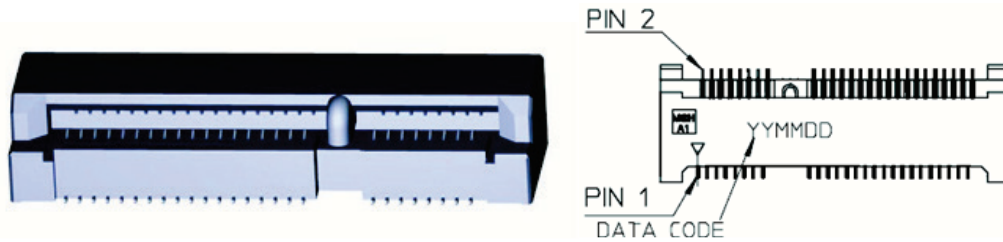


Table 19: 52-pin Mini PCIe Card

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V_S5
3	N.C.	4	GND
5	N.C.	6	+1.5V_S0
7	CLKREQ#	8	UIM-PWR
9	GND	10	UIM-DATA
11	PCIe_REFCLK-	12	UIM-CLK
13	PCIe_REFCLK+	14	UIM-RST
15	GND	16	UIM-SPU
17	UIM-IC -	18	GND
19	UIM-IC +	20	W_DISABLE1#
21	GND	22	PLTRST#
23	PCIe_RX-	24	+3.3V_S5
25	PCIe_RX+	26	GND
27	GND	28	+1.5V_S0
29	GND	30	PU3.3V(S5) (Optional: SMB_CLK)
31	PCIe_TX-	32	PU3.3V(S5) (Optional: SMB_DAT)
33	PCIe_TX+	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3V_S5	40	GND
41	+3.3V_S5	42	PU 3.3V(S5)
43	GND	44	PU 3.3V(S5)
45	N.C.	46	PU 3.3V(S5)
47	N.C.	48	+1.5V_S0
49	N.C.	50	GND
51	W_DISABLE2#	52	+3.3V_S5

8.8. SIM card socket (J53)

Figure 16: 8-pin SIM card socket



Table 20: 8-pin SIM card socket

Pin	Signal
1	UIM_PWR
2	UIM_RST
3	UIM_CLK
4	UIM_IC + / NC
5	GND
6	UIM_VPP / NC
7	UIM_DATA
8	UIM_IC - / NC

7.9. PCIe x1 connectors (J40, J41)

Figure 17: 52-pin PCIe x1 connector



Table 21: 52-pin PCIe x1 connector

Pin	Signal	Pin	Signal
A1	PRSNT1#	B1	V_12V0_S0
A2	V_12V0_S0	B2	V_12V0_S0
A3	V_12V0_S0	B3	V_12V0_S0
A4	GND	B4	GND
A5	JTAG2_TCK	B5	SMCLK
A6	JTAG3_TDI	B6	SMDAT
A7	JTAG4_TDO	B7	GND
A8	JTAG5_TMS	B8	V_3V3_S0
A9	V_3V3_S0	B9	JTAG1_TRST#
A10	V_3V3_S0	B10	V_3V3_S5

Pin	Signal	Pin	Signal
A11	PERST#	B11	WAKE#
A12	GND	B12	RSVD – N.C.
A13	REFCLK+	B13	GND
A14	REFCLK-	B14	PET0+
A15	GND	B15	PET0-
A16	PER0+	B16	GND
A17	PER0-	B17	PRSNT2#
A18	GND	B18	GND

7.10. Mini SATA Card Socket (J54)

Figure 18: 52-pin SATA Card Socket

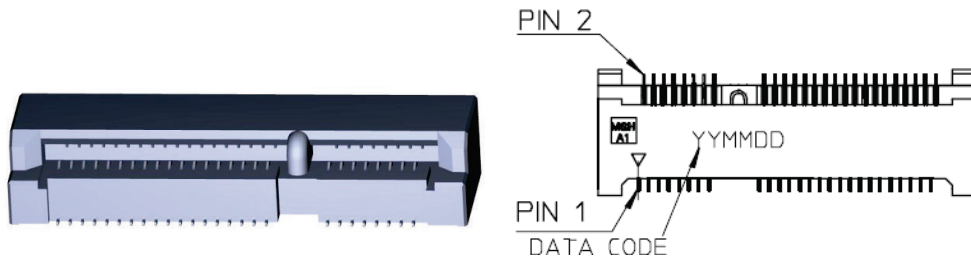


Table 22: 52-pin SATA Card Socket

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V_S5
3	NC	4	GND
5	NC	6	+1.5V_S0
7	NC	8	UIM-PWR
9	GND	10	UIM-DATA
11	NC	12	UIM-CLK
13	NC	14	UIM-RST
15	GND	16	UIM-VPP
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	PLTRST#
23	SATA_RX+	24	+3.3V_S5
25	SATA_RX-	26	GND
27	GND	28	+1.5V_S0
29	GND	30	PU 3.3V(S5) (Optional:SMB_CLK)
31	SATA_TX-	32	PU 3.3V(S5) (Optional:SMB_DAT)
33	SATA_TX+	34	GND

7.11. SATA Connector (J55)

Figure 19: SATA Connector

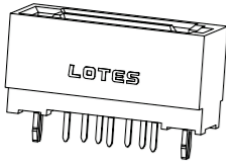


Table 23: SATA Connector

Pin	Signal
1	GND
2	SATA_RDRV_TX1_+
3	SATA_RDRV_TX1_-
4	GND
5	SATA_RDRV_RX1_-
6	SATA_RDRV_RX1_+
7	GND

7.12. Audio Connector Line In & Out (J38 & J39)

Figure 20: Audio Jacks



Table 24: Audio Jacks Pin Assignment (Line Out, green)

Pin	Signal
1	Audio GND
2	Line Out Left
3	Line Out Sense
4	Audio GND
5	Line Out Right

Table 25: Audio Jacks Pin Assignment (Line In, blue)

Pin	Signal
1	Audio GND
2	Line In Left
3	Line In Sense
4	Audio GND
5	Line In Right

7.13. Audio Connector (J36)

Figure 21: 9-pin Audio Connector Header



Table 26: 9-pin Audio Connector Header

Pin	Signal	Pin	Signal
1	MIC_L	2	AGND
3	MIC_R	4	PRESENCE#
5	LINE_R	6	MIC_JD
7 -	SENSE	8	-
9	LINE_L	10	LINE_JD

7.14. RTC battery holder (J65)

Figure 22: RTC battery holder

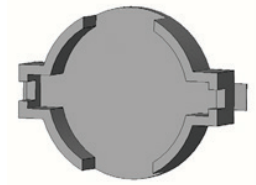


Table 27: RTC battery holder

Pin	Signal
Positive (+)	V_BAT_INT
Negative (-)	GND

7.15. USB 2.0 OTG Connector (J22)

Figure 23: μ USB 2.0 OTG Connector



Table 28: μ USB 2.0 OTG Connector

Pin	Signal
1	+5 V USB output (500 mA max.)
2	USB Data -
3	USB Data +
4	ID
5	Ground

7.16. USB Hub Connections (J34)

Connector J34 implements an industry standard USB dual Type A host connection. The USB ports are direct from the CPU. The hub upstream port is connected to the ULP-COM Module USB1 port.

Figure 24: USB 2.0 / 3.0 socket

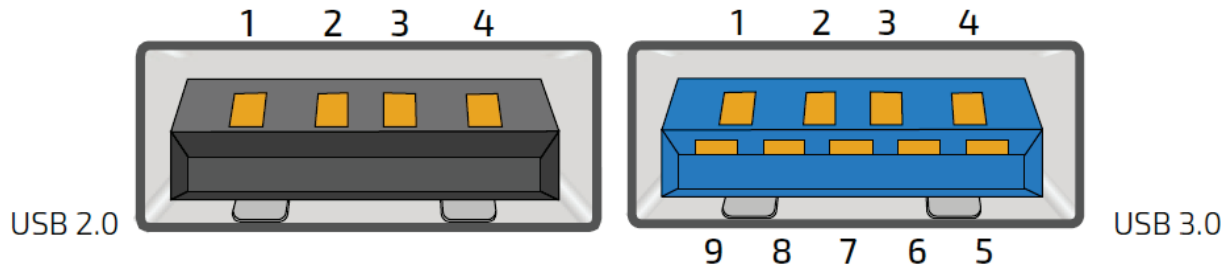


Table 29 : USB 3.0 Pin Assignment

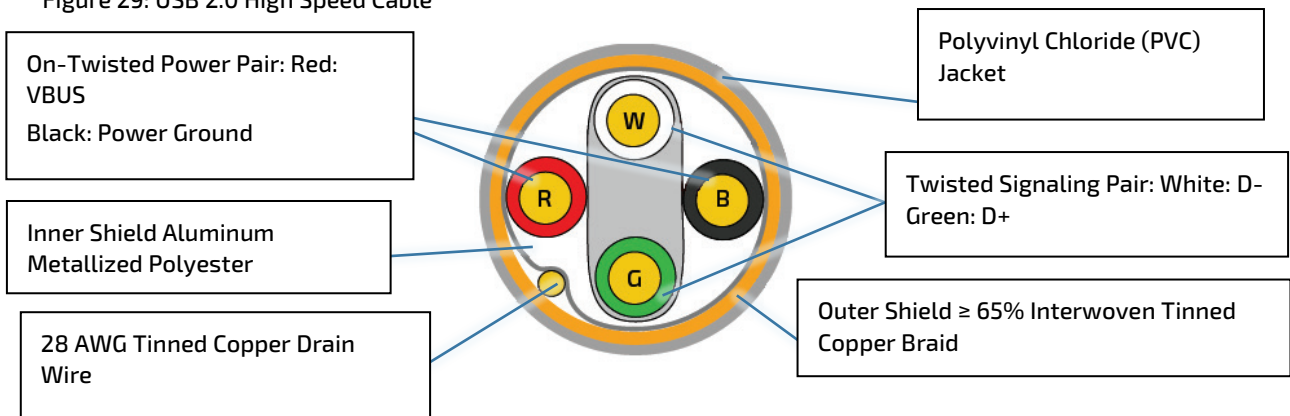
Pin	Type	Signal	Note
1	PWR	5 V / SB 5 V	USB2.0 / 3.0
2	IO	USB 3-	USB2.0 / 3.0
3	IO	USB 3+	USB2.0 / 3.0
4	PWR	GND	USB2.0 / 3.0
5	IO	RX 2 -	USB3.0
6	IO	RX 2 +	USB3.0
7	PWR	GND	USB3.0
8	IO	TX 2-	USB3.0
9	IO	TX 2+	USB3.0

Table 30 : USB 3.0 Pin Description

Signal	Description
USBn+ USBn- RXn+ RXn- TXn+ TXn-	Differential pair works as serial differential receive/transmit data lines. (n= 0,1,2,3)
5 V / SB5 V	5 V supply for external devices. SB5 V is supplied during power-down to allow wakeup on USB device activity. Protected by resettable 1.5 A fuse covering both USB ports.

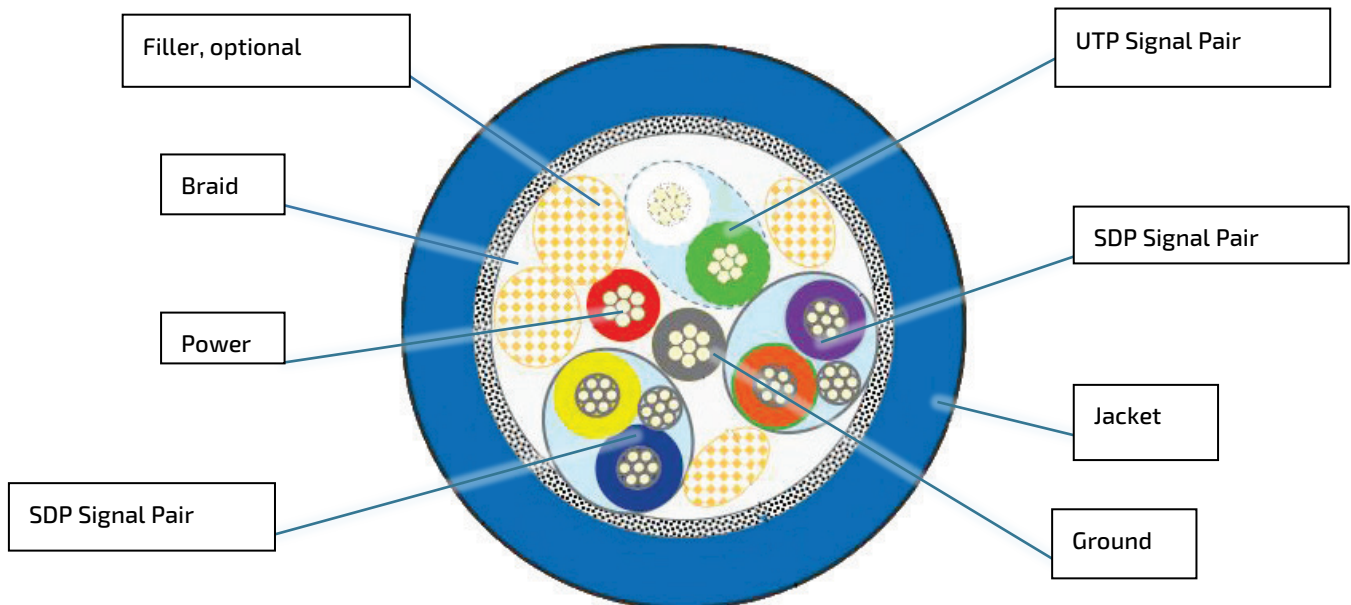
For HiSpeed rates it is required to use a USB cable, which is specified in USB2.0 standard:

Figure 29: USB 2.0 High Speed Cable



For SuperSpeed rates it is required to use a USB cable, which is specified in USB3.0 standard:

Figure 30: USB 3.0 High Speed Cable



7.17. Double USB 3.0 Connector (J34)

This connector provides two USB 3.0 connections (downstream). The 5 V output is electronically fused to 1000 mA each port.

Figure 25: Double USB 3.0 Connector

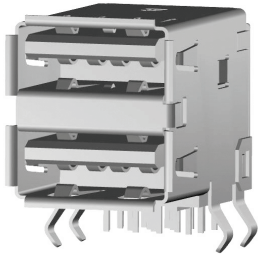


Table 31: Double USB 3.0 Connector

Pin	Signal	Remark
1	VBUS +5V (900mA max.)	Low, Full & High Speed (USB 2.0) contact pins Bottom con.
2	USB Data -	
3	USB Data +	
4	GND	
5	USB SSRX-	Super Speed (USB3.0) contact pins Bottom con.
6	USB SSRX+	
7	GND	
8	USB SSTX-	
9	USB SSTX+	Low, Full & High Speed (USB 2.0) contact pins Top con.
10	VBUS +5V (900mA max.)	
11	USB Data -	
12	USB Data +	
13	GND	Super Speed (USB3.0) contact pins Top con.
14	USB SSRX-	
15	USB SSRX+	
16	GND	
17	USB SSTX-	
18	USB SSTX+	
Shield	Shield	

7.18. LAN Connector (J33)

This connector provides an isolated Ethernet 1000Base-T port, which is connected to an on-board LAN Controller. The galvanic isolated transformers (1500 Vrms, Voltage Regulator Module (VRM)) are integrated in the LAN connectors.

Figure 26: LAN Connector

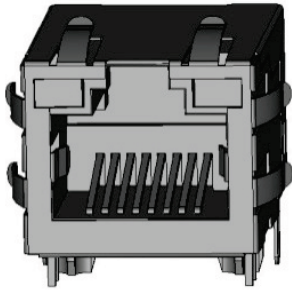


Table 32: LAN Connector

Pin	Signal	Pin	Signal
1	MDI0+	2	MDI0-
3	MDI1+	4	MDI1-
5	CTREF	6	CTREF
7	MDI2+	8	MDI2-
9	MDI3+	10	MDI3-
11	Green (A) / Yellow (C)	12	Green (C) / Yellow (A)
13	Green (A) / Yellow (C)	14	Green (C) / Yellow (A)

Table 33: LAN Left LEDs State

Left LED State	Link Activity State
Off	Link not active
Green (constant on)	Link active
Green (flashing)	Link active plus activity

Table 34: LAN Right LEDs State

Right LED State	Link Speed
Off	10 Base-T
Green (constant on)	100 Base-T
Green (flashing)	1000 Base-T

7.19. Micro-SD Card Connector (J56)

Figure 27: Micro-SD Card Connector

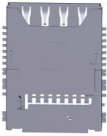


Table 35: Micro-SD Card Connector

Pin	Signal
1	SD_DAT[2]
2	CD / SD_DAT[3]
3	CMD
4	VDD
5	SD_CLK
6	GND / VSS
7	SD_DAT[0]
8	SD_DAT[1]
9	CD_DETECT
10	CD_GND
11	SH_GND
12	SH_GND
13	SH_GND
14	SH_GND

7.20. COM Connector (J58)

Figure 28: COM Connector



Table 36: COM Connector

Pin	Signal	Direction
1.	N.C.	
2	RXD (Receive Data)	In
3	TXD (Transmit Data)	Out
4	N.C.	
5	GND	
6	N.C.	
7	RTS# (Request to Send)	Out
8	CTS# (Clear to Send)	In
9	N.C	

7.21. CAN Connector (J57)

Figure 29: CAN Connector

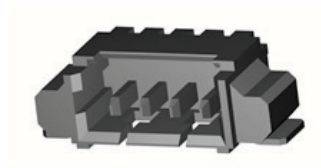


Table 37: CAN Connector

Pin	Signal
1	CAN0_L
2	CAN0_H
3	V_5V0
4	GND

7.22. LPC/GPIO Header (J59)

Figure 30: LPC/GPIO Header

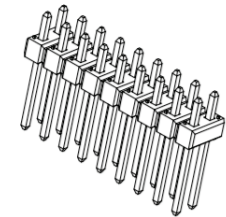


Table 38: LPC/GPIO Header

Pin	Signal	Pin	Signal
1	GPIO4/LPC_CLK	2	GND
3	GPIO5/LPC_FRAME#	4	N.C.
5	LPC_RST#	6	VCC 5.0V
7	GPIO3/LPC_AD3	8	GPIO2/LPC_AD2
9	VCC 3.3V	10	GPIO1/LPC_AD1
11	LPC_ADO	12	GND
13	SMB_CLK_GP1_I2C_CLK	14	SMB_DAT_GP1_I2C_DAT
15	VCC 3.3V	16	LPC_SERIRQ
17	GND	18	N.C.
19	GPO(SUS_STAT#)	20	LPC_LDRQ#

NOTE: SUS_STAT# is changed to GPO0 in Qseven Spec V2.1

7.23. Power Management Header (J62)

Figure 31: Power Management Header

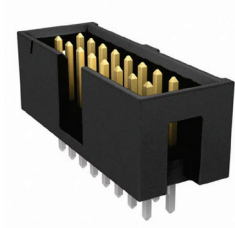


Table 39: Power Management Header

Pin	Signal	Pin	Signal
1	VCC 1.8V	2	VCC 3.3V
3	PWGIN	4	SUS_S3#
5	GPO0(SUS_STAT#)	6	SLP_BTN#
7	LID_BTN#	8	PWRBTN#
9	PLT_RST#	10	RSTBTN#
11	BATLOW#	12	GPO_I2C_DAT
13	GPO_I2C_CLK	14	SMB_ALERT#
15	GND	16	GND

NOTE: SUS_STAT# is changed to GPO0 in Qseven Spec V2.1

7.24. SYS Signals Header (J37)

Figure 32: SYS Signals Header

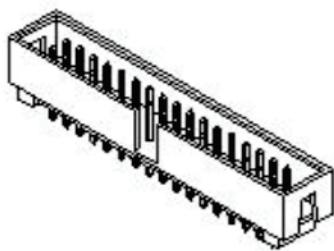


Table 40: SYS Signals Header

Pin	Signal	Pin	Signal
1	GPO_I2C_CLK	2	GPO_I2C_DAT
3	SMB_CLK_GP1_I2C_CLK	4	SMB_DAT_GP1_I2C_DAT
5	WDTRIG#	6	SMB_ALERT#
7	WDOUT	8	N.C.
9	GND	10	GND

7.25. Thermal Header (J66)

Figure 33: Thrm Header



Table 41: Thrm Header

Pin	Signal
1	THRM#
2	THRMTRIP#

7.26. CPU Fan (J60)

Figure 34: 4-pin CPU Fan Connector



Table 42: 4-pin CPU Fan Connector

Pin	Signal	Description
1	GND	GND
2	V_CPU_FAN_S0	12 V by default. Can optionally be changed to 5 V, via jumper H16 setting.
3	CPU_FAN_TACHOIN	CPU FAN-Tacho signal
4	CPU_FAN_PWM_CTRL	PWM output for FAN control

7.27. SYS Fan (J61)

Figure 35: 3-pin SYS Fan Connector



Table 43: 3-pin SYS Fan Connector

Pin	Signal	Description
1	SYS_FAN_TACHOIN	System FAN-Tacho signal
2	V_SYS_FAN_S0	12 V by default. Can optionally be changed to 5 V, via jumper H14 setting.
3	GND	GND

7.28. Power-In Connector (J21)

Figure 36: Power-In Connector



Table 44: Power-In Connector

Pin	Signal	Description
1	V_12V0_IN_CON	Main power input for either both module and carrier (default), or for carrier only, when J64 is used.
2	GND	

CAUTION

The board can be supplied via the AC/DC adapter plugged into the power jack. Such adapters have usually no connection to protective earth. Consequently, the potential of the conductive parts on the board may drift. If a human touches such a part, this may lead to an electric shock. The board must be grounded separately, if the unit is supplied via power jack.

7.29. Module Power-In Connector (J64)

Figure 37: Module Power-In Connector



Table 45: Module Power-In Connector

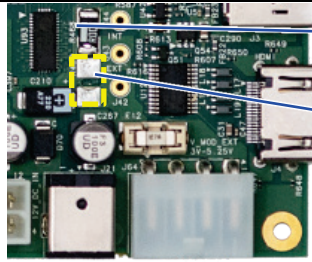
Pin	Signal	Description
1	V_MOD_EXT_CON	Module Power from 3.0 V to 5.25 V is independent from Carrier power.
2	GND	
3	N.C.	Not connected
4	GND	

CAUTION



To power the Qseven Module the power can be set to Ext/Int power by populating one of the following resistors.

- ▶ R468 – V_MOD_IN from internal (V_5V0_S5) [Default setting]
- ▶ R467 – V_MOD_IN from external (V_3V0-5V25_IN)



Location of R468 (V_5V0_S5) the default setting

Location of R467 (V_3V0-5V25_IN)

7.30. ATX 24 Pin Connector (J20)

Figure 38: ATX 24 Pin Connector

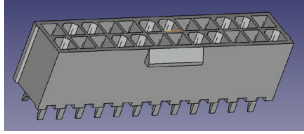


Table 46: ATX 24 Pin Connector

Pin	Signal	Pin	Signal
1	V_3V3_ATX_S0	13	V_3V3_ATX_S0
2	V_3V3_ATX_S0	14	V_3V3_ATX_S0
3	GND	15	GND
4	V_5V0_ATX_S0	16	PS_ON#
5	GND	17	GND
6	V_5V0_ATX_S0	18	GND
7	GND	19	GND
8	PG_ATX	20	N.C.
9	V_5V0_SB_ATX	21	V_5V0_ATX_S0
10	V_12V0_ATX_S0	22	V_5V0_ATX_S0
11	V_12V0_ATX_S0	23	V_5V0_ATX_S0
12	V_3V3_ATX_S0	24	GND

7.31. Button Switch (SW1,SW2,SW3,SW4)

Figure 39: Button Switch



Table 47: Reset Button (SW1, J12)

Pin	Signal
1	PWRBTN#
2	PWRBTN#
3	GND
4	GND
5	SHIELD

Table 48: Power Button (SW2, J13)

Pin	Signal
1	RSTBTN#
2	RSTBTN#

3	GND
4	GND
5	SHIELD

Table 49: Sleep Button (SW3, J15)

Pin	Signal
1	SLP_BTN#
2	SLP_BTN#
3	GND
4	GND
5	SHIELD

Table 50: Lid Button (SW4, J16)

Pin	Signal
1	LID_BTN#
2	LID_BTN#
3	GND
4	GND
5	SHIELD

7.32. Jumpers

7.32.1. Boot Alternate Jumper (J14)

There is a Jumper for Boot Alternate according to the QSEVEN 2.1 specification.

Table 51: Boot Alternate Jumper (J14)

Configuration	J14 Jumper Setting	Boot Source
1	1-2	Boot from Carrier SPI Flash
2	N.C.	Boot from Module SPI Flash (Default)



The BIOS does not support being split between two chips. Booting takes place either from the module SPI or from the baseboard SPI.

7.32.2. Display Power Select Jumper (J24)

Table 52: Display Power Select Jumper (J24)

Jumper Position	Function Description
1-2	LVDS Panel Voltage = 5V
2-3	LVDS Panel Voltage = 3.3V (Default)

7.32.3. Backlight Power of the Select Jumper (J25)

Table 53: Backlight Power Select Jumper (J25)

Jumper Position	Function Description
1-2	Backlight Voltage = 5V
2-3 (Default)	Backlight Voltage = 12V

7.32.4. Dual DP/LVDS Select Jumper (J26)

Table 54: Dual DP/LVDS Select Jumper (J26)

Jumper Position	Function Description
1-2 (Default)	Dual Display Port
2-3/NC	LVDS

7.32.5. Dual DP++/HDMI Select Jumper (J27)

Table 55: Dual DP++/HDMI Select Jumper (J27)

Jumper Position	Function Description
1-2 (Default)	Display Port++
2-3/NC	HDMI

7.32.6. Audio Channel Jumper for I2S or HDA (J35)

Table 56: Audio Channel Jumper for I2S or HDA (J35)

Jumper Position	Function Description
1-2	I2S Codec
NC (Default)	HDA codec

7.32.7. mPCIe-0WLAN Disable Jumper (J5,J6)

Table 57: mPCIe-0WLAN Disable Jumper (J5,J6)

Jumper Position	Function Description
Open (Default)	WLAN in mPCIe slot J45 active
Close	WLAN in mPCIe slot J45 inactive

7.32.8. mPCIe-1WLAN Disable Jumper (J7,J8)

Table 58: mPCIe-1WLAN Disable Jumper (J7,J8)

Jumper Position	Function Description
Open (Default)	WLAN in mPCIe slot J46 active
Close	WLAN in mPCIe slot J46 inactive

7.32.9. microSD Write Protect Jumper (J9)

Table 59: microSD Write Protect Jumper (J9)

Jumper Position	Function Description
1-2	microSD Write Protect Enable
NC (Default)	microSD Write Protect Disable

7.32.10. CAN Bus Termination Jumper (J10)

Table 60: CAN Bus Termination Jumper (J10)

Jumper Position	Function Description
1-2 (Default)	CAN Bus Termination Enable
NC	CAN Bus Termination Disable

7.32.11. LPC/GPIO Selection Jumper (J11)

Table 61: LPC/GPIO Selection Jumper (J11)

Jumper Position	Function Description
1-2 (Default)	GPIO to Header
NC	LPC to Header

7.32.12. CPU Fan Power Selection Jumper (J30)

Table 62: CPU Fan Power Selection Jumper (J30)

Jumper Position	Function Description
1-2	V_CPU_FAN_S0 = 5V
2-3 (Default)	V_CPU_FAN_S0 = 12V

7.32.13. SYS Fan Power Selection Jumper (J29)

Table 63: SYS Fan Power Selection Jumper (J29)

Jumper Position	Function Description
1-2	V_SYS_FAN_S0 = 5V
2-3 (Default)	V_SYS_FAN_S0 = 12V

7.32.14. SYS Fan PWM Control Selection Jumper (J18)

Table 64: SYS Fan PWM Control Selection Jumper (J18)

Jumper Position	Function Description
1-2 (Default)	System Fan without PWM control
NC	System Fan with PWM control

7.32.15. ATX PSU Control Selection Jumper (J28)

Table 65: ATX PSU Control Selection Jumper (J28)

Jumper Position	Function Description
1-2 (Default)	ATX PSU is controlled by SUS_S3#
2-3	ATX PSU is controlled by SUS_S5#

7.32.16. ATX PSU ON Selection Jumper (J17)

Table 66: ATX PSU ON Selection Jumper (J17)

Jumper Position	Function Description
1-2	Force ATX PSU to ON
NC (Default)	ATX PSU is controlled by module

7.32.17. LEDs Enable Jumper (J19)

Table 67: LEDs Enable Jumper (J19)

Jumper Position	Function Description
1-2 (Default)	Enable LEDs
NC	Disable LEDs

7.32.18. RTC Jumper (J31)

Table 68: RTC Jumper (J31)

Jumper Position	Function Description
1-2 (Default)	Module RTC powered by Battery (J65)
2-3	Module RTC powered by Super Cap (C367)

7.32.19. Module Standby Voltage (J67)

Table 69: Module Standby Voltage (J67)

Jumper Position	Function Description
1-2 (Default)	Enable V-5V0_SB for module
NC	Disable V-5V0_SB for module

7.32.20. TACHOIN CPU Fan/SYS Fan (J68)

Table 70: TACHOIN CPU Fan/SYS Fan (J68)

Jumper Position	Function Description
1-2 (Default)	TACHOIN from CPU FAN
NC (Default)	TACHOIN from SYS FAN

Appendix A: List of Acronyms

Table 71: List of Acronyms

BIOS	Basic Input Output System
BSP	Board Support Package
CAN	Controller-area network
Carrier Board	Application specific circuit board that accepts a COM Express® module
COM	Computer-on-Module
COP	Computer Operating Properly
DDI	Digital Display Interface –
DDIO	Digital Display Input/Output
DIMM	Dual In-line Memory Module
DP	DisplayPort (digital display interface standard)
DRAM	Dynamic Random Access Memory
DVI	Digital Visual Interface
EAPI	Embedded Application Programming Interface
ECC	Error Checking and Correction
EEPROM	Electrically Erasable Programmable Read-Only Memory
eDP	Embedded Display Port
EMC	Electromagnetic Compatibility (EMC)
ESD	Electro Sensitive Device
FAT	File Allocation Table
FIFO	First In First Out
FRU	Field Replaceable Unit
Gb	Gigabit
GBE	Gigabit Ethernet
GPI	General Purpose Input
GPIO	General Purpose Input Output
GPO	General Purpose Output
GPU	Graphics Processing Unit
HBR2	High Bit rate 2
HDA	High Definition Audio (HD Audio)
HD/HDD	Hard Disk /Drive
HDMI	High Definition Multimedia Interface
HPM	SGET Hardware Platform Management specification family
HWM	Hardware Monitor
IC	Integrated Circuit
I2C	Inter integrated Circuit Communications
IOT	Internet of Things
ISA	Industry Standard Architecture
LAN	Local Area Network
LPC	Low Pin-Count Interface:
LVDS	Low Voltage Differential Signaling –
M.A.R.S.	Mobile Application for Rechargeable Systems
MTBF	Mean Time Before Failure
NA	Not Available
NC	Not Connected
NCSI2	Network Communications Services Interface
NTC	Negative Temperature Coefficient resistor
PCI	Peripheral Component Interface
PCIe	PCI-Express
PEG	PCI Express Graphics
SGET®	PCI Industrial Computer Manufacturers Group
PHY	Ethernet controller physical layer device
Pin-out Type	QSEVEN® definitions for signals on QSEVEN® Module connector pins.
PSU	Power Supply Unit
RoHS	Restriction of the use of certain Hazardous Substances
RTC	Real Time Clock
SAS	Serial Attached SCSI2 – high speed serial version of SCSI2
SATA	Serial AT Attachment:
SMB	System Management Bus
SoC	System on a Chip
SPI	Serial Peripheral Interface
TPM	Trusted Platform Module
UART	Universal Asynchronous Receiver Transmitter
UEFI	Unified Extensible Firmware Interface
UHD	Ultra High Definition
USB	Universal Serial Bus
VGA	Video Graphics Adapter
WDT	Watch Dog Timer
WEEE	Waste Electrical and Electronic Equipement (directive)



About Kontron

Kontron is a global leader in embedded computing technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall. For more information visit: www.kontron.com



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