Qseven® conga-MCB/Qseven ARM

Short description of the congatec Qseven® ARM mini carrier board

Short Description

Revision 1.1

Revision History

Revision	Date (yyyy.mm.dd)	Author	Changes
1.0	2014.05.23	AEM	• Official release
1.1	2016.08.31	AEM	• Updated the whole document

Preface

This short description provides information about the components, features and connectors available on the conga-MCB/Qseven ARM mini carrier board.

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Symbols

The following symbols are used in this short description:

! Warning

Warnings indicate conditions that, if not observed, can cause personal injury.

! Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.

Note

Notes call attention to important information that should be observed.

Connector Type

Describes the connector that must be used with the Qseven® mini carrier board, not the connector found on the Qseven® mini carrier board.

Link to connector layout diagram

This link icon is located in the top left corner of each page. It provides a direct link to the connector layout diagram on page 8 of this document.

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Intertek

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Terminology

Term	Description
PCI Express (PCIe)	Peripheral Component Interface Express
SDIO	Secure Digital Input Output
USB	Universal Serial Bus
SATA	Serial AT Attachment
HDA	High Definition Audio
S/PDIF	Sony/Philips Digital Interconnect Format
HDMI	High Definition Multimedia Interface
TMDS	Transition Minimized Differential Signaling
DVI	Digital Visual Interface
LPC	Low Pin-Count
I²C Bus	Inter-Integrated Circuit Bus
SM Bus	System Management Bus
CAN	Controller Area Network
SPI	Serial Peripheral Interface
GBE	Gigabit Ethernet
LVDS	Low-Voltage Differential Signaling
DDC	Display Data Channel is an I²C bus interface between a display and a graphics adapter.
N.C	Not connected
N.A	Not available
T.B.D	To be determined

Contents

1   Introduction

1.1   Qseven® 2.0 Concept

The Qseven® concept is an off-the-shelf, multi vendor, Computer-on-Module that integrates all the core components of a common PC and is mounted onto an application specific carrier board. Qseven® modules have a standardized form factor of 70mm x 70mm and a specified pinout based on the high speed MXM system connector and the pinout remains the same regardless of the vendor. The Qseven® module provides the functional requirements for an embedded application. These functions include, but are not limited to, graphics, sound, mass storage, network interface and multiple USB ports.

A single ruggedized MXM connector provides the carrier board interface to carry all the I/O signals to and from the Qseven® module. This MXM connector is a well known and proven high speed signal interface connector that is commonly used for high speed PCI Express graphics cards in notebooks.

Carrier board designers can utilize as little or as many of the I/O interfaces as deemed necessary. The carrier board can therefore provide all the interface connectors required to attach the system to the application specific peripherals. This versatility allows the designer to create a dense and optimized package, which results in a more reliable product while simplifying system integration.

The Qseven® evaluation carrier board provides carrier board designers with a reference design platform and the opportunity to test all the Qseven® I/O interfaces available and then choose what are suitable for their application. Qseven® applications are scalable, which means once a carrier board has been created there is the ability to diversify the product range through the use of different performance class Qseven® modules. Simply unplug one module and replace it with another, no need to redesign the carrier board.

This document describes the features available on the Qseven® evaluation carrier board. Additionally, the schematics for the Qseven® evaluation carrier board can be found on the congatec website.

1.2   conga-MCB/Qseven ARM

The conga-MCB/Qseven ARM is a Qseven® mini carrier board that is designed based on Qseven specification revision 2.0. It has an industrial 5-pin power connector with an input voltage range of 12-24V and nominal voltage of 19V, as well as 5V STB. It can therefore be used as a stand-alone carrier board for Qseven® modules.

You can also directly integrate the conga-MCB/Qseven ARM into an application or use it with a Qseven module as a small evaluation platform for your battery supported application.

1.2.1   Feature List

Form Factor	Based on Qseven® form factor specification revision 2.0	
Input Power Supplies	5-pin power connector DC-IN power jack for notebook-type power supply 8-pin connector for conga-SBM3 battery module	
Power Mode	ATX/AT	
Input Voltages	12-24V, nominal 19V.	

Interfaces	4x USB
	   - 3x USB 2.0
	   - 1x USB OTG
	1x Gigabit Ethernet connector with LEDs on front panel
	2x CAN
	   - 1x CAN connector onboard
	   - 1x optional CAN interface (not assembled by default)
	1x HDMI
	1x LVDS (Single/dual, 18/24bits)
	2x UART
		Audio
		   - 4-way audio Jack
		   - Auxiliary audio header (not assembled by default)
		GPIOs
		MIPI CSI-2 Camera
		FAN
		Mini-PCIe Card Socket
		SIM card slot
		SD card slot

Additional Features	Android Buttons: Power, sleep, back, search, home, volume up, volume down, menu, LID and reset CAN terminal Fan Voltage Selector (5V or 12V) LED indicators Backlight voltage selector Alternative Boot CMOS battery	

Note

Information about the cables required to operate the conga-MCB/Qseven ARM mini carrier board can be found in section 6 "Cables" of this document.

2   Connector Layout

The connector layout picture below shows each connector and its name designator. Jumpers and their respective pins are also shown. Select the Adobe 'Zoom-In-Tool' and zoom in on a given component to see its designator.

Hover over the component and the 'Zoom-In-Tool' will change, indicating there is a link. Click on the link to navigate to the area in the document where the component is described. Use the mouse icon in the top left hand corner of the destination page to return to the connector layout pictures.

Labels around the board layout:

- CAN 0
- CAN 1 Optional
- Backlight
- Backlight Voltage Selection
- LVDS
- Panel Voltage Selection
- UART 1
- UART 0
- DC-IN Power Jack (diameter: 5.5x2.55) Input Voltage: 12-19V
- Auxiliary Audio Header
- CAN 0 Term.
- CAN 1 Term.
- Aux. DC-IN
- Audio Jack (4-way)
- Ethernet
- Qseven Edge Connector
- mSATA ACT LED
- SD Card ACT LED
- AT/ATX mode selection
- HDMI
- USB2.0 port3
- conga-QMX6 FFC Cable Connector
- Power LEDs 5VSB, 5V, 3V3
- USB2.0 port2
- USB2.0 port0
- BOOT ALT
- MIPI CSI-2 Camera
- USB OTG
- Android Buttons
- GPIOs
- FAN Voltage Selection
- Android Buttons Connectors
- Power Control

QMCAm11

Bottom Side conga-MCB/Qseven ARM

RTC

SD Card

SIM Card

mSATA

mSATA

Mini-PCIe Card Socket
(half or full size)
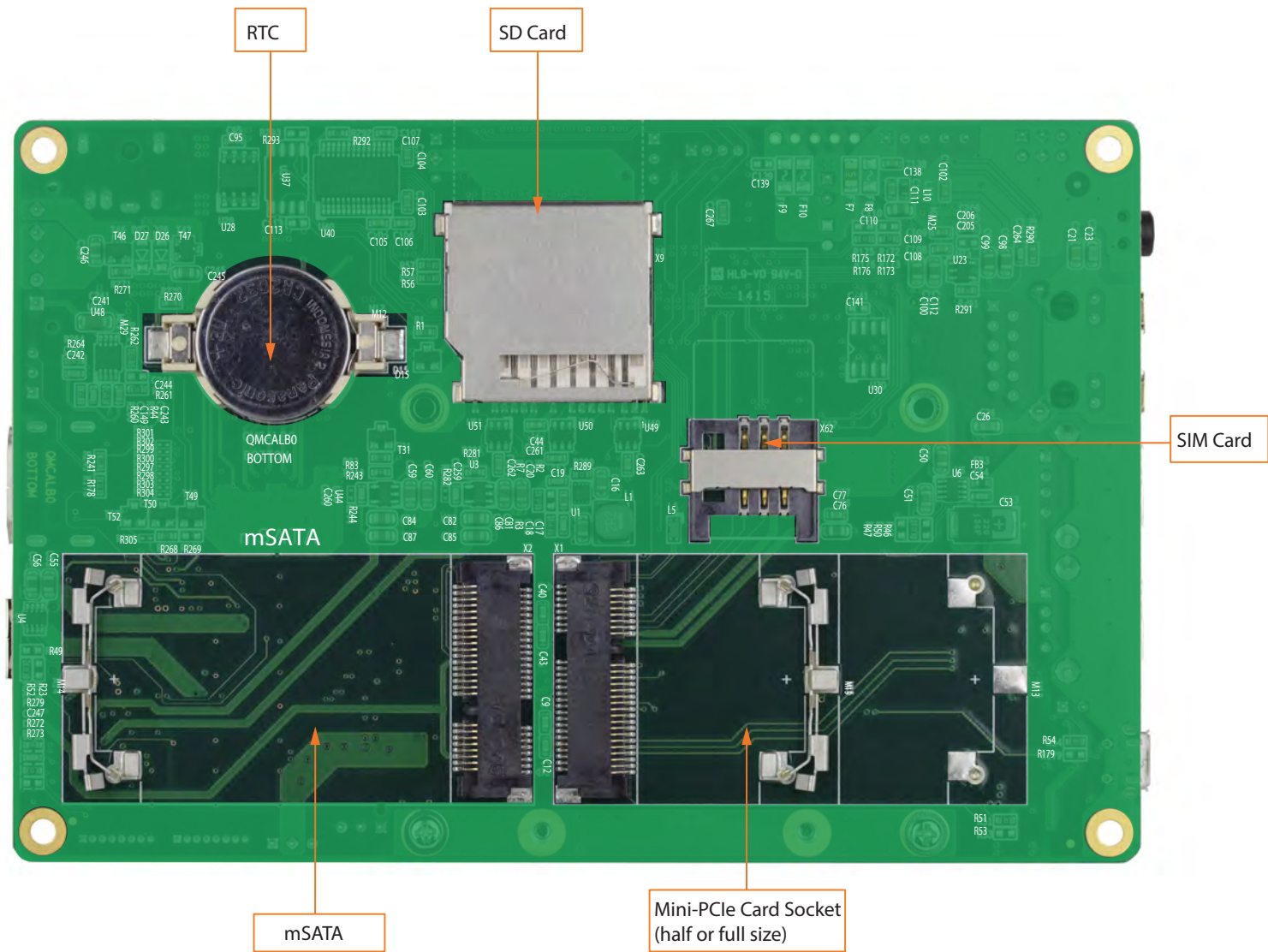
3 Specifications

3.1 Mechanical Dimensions

- 95mm x 145mm
- Height approximately 15mm (top side)
- Height approximately 6mm (bottom side)

3.2 Environmental Specifications

Temperature	Operation: 0° to 60°C	Storage: -20° to +80°C
Humidity	Operation: 10% to 90%	Storage: 5% to 95%

Note

The above operating temperatures must be strictly adhered to at all times. The maximum operating temperature refers to any measurable spot on the modules surface.

Humidity specifications are for non-condensing conditions.

4   Connector Descriptions

The following tables describe the pin assignments for the connectors found on the conga-MCB/Qseven ARM.

4.1   Connector CN1 Pinout

Pin	Signal	Description	Pin	Signal	Description
1	GND	Power Ground	2	GND	Power Ground
3	GBE_MDI3-	Gigabit Ethernet MDI3-	4	GBE_MDI2-	Gigabit Ethernet MDI2-
5	GBE_MDI3+	Gigabit Ethernet MDI3+	6	GBE_MDI2+	Gigabit Ethernet MDI2+
7	GBE_LINK100#	100 Mbps link speed	8	GBE_LINK1000#	1000 Mbps link speed
9	GBE_MDI1-	Gigabit Ethernet MDI1-	10	GBE_MDI0-	Gigabit Ethernet MDI0-
11	GBE_MDI1+	Gigabit Ethernet MDI1+	12	GBE_MDI0+	Gigabit Ethernet MDI0+
13	GBE_LINK#	Gigabit Ethernet Link indicator	14	GBE_ACT#	Gigabit Ethernet Activity indicator
15	GBE_CTREF	Reference voltage for GBE	16	SUS_S5#	S5 (Soft OFF) – shutdown state
17	WAKE#	External system wake event	18	SUS_S3#	S3 (Suspend to RAM) – SLP
19	SUS_STAT#	Suspend status	20	PWRBTN#	Power button
21	SLP_BTN#	Sleep button	22	LID_BTN#	LID button
23	GND	Power Ground	24	GND	Power Ground
Key					
25	GND	Power Ground	26	PWGIN	Power good input
27	BATLOW#	Battery low input	28	RSTBTN#	Reset button input
29	SATA0_TX+	Serial ATA Channel 0 TX+	30	SATA1_TX+	Serial ATA Channel 1 TX+
31	SATA0_TX-	Serial ATA Channel 0 TX-	32	SATA1_TX-	Serial ATA Channel 1 TX-
33	SATA_ACT#	Serial ATA Activity	34	GND	Power Ground
35	SATA0_RX+	Serial ATA Channel 0 RX+	36	SATA1_RX+	Serial ATA Channel 1 RX+
37	SATA0_RX-	Serial ATA Channel 0 RX-	38	SATA1_RX-	Serial ATA Channel 1 RX-
39	GND	Power Ground	40	GND	Power Ground
41	BIOS_DISABLE# /BOOT_ALT#	BIOS Module disable Boot Alternative Enable	42	SDIO_CLK	SDIO Clock Output
43	SDIO_CD#	SDIO Card Detect	44	SDIO_LED	SDIO LED
45	SDIO_CMD	SDIO Command/Response	46	SDIO_WP	SDIO Write Protect
47	SDIO_PWR#	SDIO Power Enable	48	SDIO_DAT1	SDIO Data Line 1

Pin	Signal	Description	Pin	Signal	Description
49	SDIO_DAT0	SDIO Data Line 0	50	SDIO_DAT3	SDIO Data Line 3
51	SDIO_DAT2	SDIO Data Line 2	52	SDIO_DAT5	SDIO Data Line 5
53	SDIO_DAT4	SDIO Data Line 4	54	SDIO_DAT7	SDIO Data Line 7
55	SDIO_DAT6	SDIO Data Line 6	56	RSVD	Reserved
57	GND	Power Ground	58	GND	Power Ground
59	HDA_SYNC / AC97_SYNC / I2S_WS	Serial Bus Synchronization. Serial Bus Synchronization Multiplexed with I2S Word Select	60	SMB_CLK / GP1_I2C_CLK	SMBus Clock line. Multiplexed with General Purpose I²C bus #1 clock line
61	HDA_RST# / AC97_RST# / I2S_RST#	HD Audio Codec Rest AC'97 Codec Reset. Multiplexed with I2S Codec Reset	62	SMB_DAT / GP1_I2C_DAT	SMBus Data line. Multiplexed with General Purpose I²C bus #1 data line.
63	HDA_BCLK / AC97_BCLK / I2S_CLK	HD Audio Serial Bit Clock AC'97 Serial Bit Clock. Multiplexed with I2S Serial Data Clock	64	SMB_ALERT#	SMBus Alert input
65	HDA_SDI / AC97_SDI / I2S_SDI	HD Audio Serial Data Input AC'97 Serial Data Input. Multiplexed with I2S Serial Data Input	66	GP0_I2C_CLK	General Purpose I2C Bus No 0 clock line
67	HDA_SDO / AC97_SDO / I2S_SDO	HD Audio Serial Data Output AC'97 Serial Data Output. Multiplexed with I2S Serial Data Output.	68	GP0_I2C_DAT	General Purpose I2C Bus No 0 data line
69	THRM#	Thermal Alarm active low	70	WDTRIG#	Watchdog trigger signal
71	THRMTRIP#	Thermal Trip indicates an overheating condition	72	WDOUT	Watchdog event indicator
73	GND	Power Ground	74	GND	Power Ground
75	USB_P7- / USB_SSTX0-	USB Port 7 Differential Pair- . Multiplexed with Superspeed USB transmit differential pair-	76	USB_P6- / USB_SSRX0-	USB Port 6 Differential Pair-. Multiplexed with Superspeed USB receive differential pair-
77	USB_P7+ / USB_SSTX0+	USB Port 7 Differential Pair+. Multiplexed with Superspeed USB transmit differential pair+	78	USB_P6+ / USB_SSRX0+	USB Port 6 Differential Pair+. Multiplexed with Superspeed USB receive differential pair+
79	USB_6_7_OC#	Over current detect input for USB port 6 and 7	80	USB_4_5_OC#	Over current detect input for USB port 4 and 5
81	USB_P5- / USB_SSTX1-	USB Port 5 Differential Pair-. Multiplexed with Superspeed USB transmit differential pair-	82	USB_P4- / USB_SSRX1-	USB Port 4 Differential Pair-. Multiplexed with Superspeed USB receive differential pair-
83	USB_P5+ / USB_SSTX1+	USB Port 5 Differential Pair+. Multiplexed with Superspeed USB transmit differential pair+	84	USB_P4+ / USB_SSRX1+	USB Port 4 Differential Pair+. Multiplexed with Superspeed USB receive differential pair+
85	USB_2_3_OC#	Over current detect input for USB port 2 and 3	86	USB_0_1_OC#	Over current detect input for USB port 0 and 1
87	USB_P3-	USB Port 3 Differential Pair-	88	USB_P2-	USB Port 2 Differential Pair-
89	USB_P3+	USB Port 3 Differential Pair+	90	USB_P2+	USB Port 2 Differential Pair+

Pin	Signal	Description	Pin	Signal	Description
91	USB_CC	USB Client present detect pin	92	USB_ID	USB ID pin
93	USB_P1-	USB Port 1 Differential Pair-	94	USB_P0-	USB Port 0 Differential Pair-
95	USB_P1+	USB Port 1 Differential Pair+	96	USB_P0+	USB Port 0 Differential Pair+
97	GND	Power Ground	98	GND	Power Ground
99	eDP0_TX0+ / LVDS_A0+	eDP Primary Channel 0+ LVDS Primary channel 0+	100	eDP1_TX0+ / LVDS_B0+	eDP Secondary channel 0+ LVDS Secondary channel 0+
101	eDP0_TX0- / LVDS_A0-	eDP Primary channel 0- LVDS Primary channel 0-	102	eDP1_TX0- / LVDS_B0-	eDP Secondary channel 0- LVDS Secondary channel 0-
103	eDP0_TX1+ / LVDS_A1+	eDP Primary channel 1+ LVDS Primary channel 1+	104	eDP1_TX1+ / LVDS_B1+	eDP Secondary channel 1+ LVDS Secondary channel 1+
105	eDP0_TX1- / LVDS_A1-	eDP Primary channel 1- LVDS Primary channel 1-	106	eDP1_TX1- / LVDS_B1-	eDP Secondary channel 1- LVDS Secondary channel 1-
107	eDP0_TX2+ / LVDS_A2+	eDP Primary channel 2+ LVDS Primary channel 2+	108	eDP1_TX2+ / LVDS_B2+	eDP Secondary channel 2+ LVDS Secondary channel 2+
109	eDP0_TX2- / LVDS_A2-	eDP Primary channel 2- LVDS Primary channel 2-	110	eDP1_TX2- / LVDS_B2-	eDP Secondary channel 2- LVDS Secondary channel 2-
111	LVDS_PPEN	LVDS Power enable	112	LVDS_BLEN	LVDS Backlight enable
113	eDP0_TX3+ / LVDS_A3+	eDP Primary channel 3+ LVDS Primary channel 3+	114	eDP1_TX3+ / LVDS_B3+	eDP Secondary channel 3+ LVDS Secondary channel 3+
115	eDP0_TX3- / LVDS_A3-	eDP Primary channel 3- LVDS Primary channel 3-	116	eDP1_TX3- / LVDS_B3-	eDP Secondary channel 3- LVDS Secondary channel 3-
117	GND	Power Ground	118	GND	Power Ground
119	eDP0_AUX+ / LVDS_A_CLK+	eDP Primary Auxilliary channel+ LVDS Primary channel CLK+	120	eDP1_AUX+ / LVDS_B_CLK+	eDP Secondary Auxiliary channel CLK+ LVDS Secondary channel CLK+
121	eDP0_AUX- / LVDS_A_CLK-	eDP Primary Auxilliary channel- LVDS Primary channel CLK-	122	eDP1_AUX- / LVDS_B_CLK-	eDP Secondary Auxiliary channel CLK- LVDS Secondary channel CLK-
123	LVDS_BLT_CTRL / GP_PWM_OUT0	PWM Backlight brightness General Purpose PWM Output	124	GP_1-Wire_Bus	General Purpose 1-wire bus interface
125	LVDS_DID_DAT / GP2_I2C_DAT	DDC Display ID Data line General Purpose I2C Data line	126	eDP0_HPD# / LVDS_BLC_DAT	SSC clock chip data line. Can be used as eDP primary hotplug detect
127	LVDS_DID_CLK / GP2_I2C_CLK	DDC Display ID Clock line General Purpose I2C Clock line	128	eDP1_HPD# / LVDS_BLC_CLK	SSC clock chip clock line. Can be used as eDP secondary hotplug detect
129	CAN0_TX	CAN TX Output for CAN Bus Channel 0	130	CAN0_RX	CAN RX Input for CAN Bus Channel 0
131	DP_LANE3+ / TMDS_CLK+	DisplayPort differential pair line lane 3+. Multiplexed with TMDS differential pair clock+	132	RSVD (Differential)	Reserved
133	DP_LANE3- / TMDS_CLK-	DisplayPort differential pair line lane 3-. Multiplexed with TMDS differential pair clock-	134	RSVD (Differential)	Reserved

Pin	Signal	Description	Pin	Signal	Description
135	GND	Power Ground	136	GND	Power Ground
137	DP_LANE1+ / TMDS_LANE1+	DisplayPort differential pair line lane 1+ Multiplexed with TMDS differential pair lane1+	138	DP_AUX+	DisplayPort auxiliary channel
139	DP_LANE1- / TMDS_LANE1-	DisplayPort differential pair line lane 1- Multiplexed with TMDS differential pair lane1-	140	DP_AUX-	DisplayPort auxiliary channel
141	GND	Power Ground	142	GND	Power Ground
143	DP_LANE2+ / TMDS_LANE0+	DisplayPort differential pair line lane 2+ Multiplexed with TMDS differential pair line lane0+	144	RSVD (Differential Pair)	Reserved
145	DP_LANE2- / TMDS_LANE0-	DisplayPort differential pair line lane 2- Multiplexed with TMDS differential pair line lane0-	146	RSVD (Differential Pair)	Reserved
147	GND	Power Ground	148	GND	Power Ground
149	DP_LANE0+ / TMDS_LANE2+	DisplayPort differential pair line lane 0+ Multiplexed with TMDS differential pair lane2+	150	HDMI_CTRL_DAT	DDC based control signal (data) for HDMI/DVI device.
151	DP_LANE0- / TMDS_LANE2-	DisplayPort differential pair line lane 0- Multiplexed with TMDS differential pair lane2-	152	HDMI_CTRL_CLK	DDC based control signal (clock) for HDMI/DVI device.
153	DP_HDMI_HPD#	Hot plug detection	154	DP_HPD	DisplayPort Hot Plut Detect
155	PCIE_CLK_REF+	PCI Express Reference Clock+	156	PCIE_WAKE#	PCI Express Wake event
157	PCIE_CLK_REF-	PCI Express Reference Clock-	158	PCIE_RST#	Reset Signal for external devices
159	GND	Power Ground	160	GND	Power Ground
161	PCIE3_TX+	PCI Express Channel 3 Output+	162	PCIE3_RX+	PCI Express Channel 3 Input+
163	PCIE3_TX-	PCI Express Channel 3 Output-	164	PCIE3_RX-	PCI Express Channel 3 Input-
165	GND	Power Ground	166	GND	Power Ground
167	PCIE2_TX+	PCI Express Channel 2 Output+	168	PCIE2_RX+	PCI Express Channel 2 Input+
169	PCIE2_TX-	PCI Express Channel 2 Output-	170	PCIE2_RX-	PCI Express Channel 2 Input-
171	UART0_TX	Serial Data Transmitter	172	UART0_RTS#	Request To Send handshake signal
173	PCIE1_TX+	PCI Express Channel 1 Output+	174	PCIE1_RX+	PCI Express Channel 1 Input+
175	PCIE1_TX-	PCI Express Channel 1 Output-	176	PCIE1_RX-	PCI Express Channel 1 Input-
177	UART0_RX	Serial Data Receiver	178	UART0_CTS#	Clear To Send handshake signal
179	PCIE0_TX+	PCI Express Channel 0 Output+	180	PCIE0_RX+	PCI Express Channel 0 Input+
181	PCIE0_TX-	PCI Express Channel 0 Output-	182	PCIE0_RX-	PCI Express Channel 0 Input-
183	GND	Power Ground	184	GND	Power Ground
185	LPC_AD0 / GPIO0	LPC Interface Address Data 0 General Purpose input/output 0	186	LPC_AD1 / GPIO1	LPC Interface Address Data 1 General Purpose input/output 1

Pin	Signal	Description	Pin	Signal	Description
187	LPC_AD2 / GPIO2	LPC Interface Address Data 2 General Purpose input/output 2	188	LPC_AD3 / GPIO3	LPC Interface Address Data 3 General Purpose input/output 3
189	LPC_CLK /GPIO4	LPC Interface Clock General Purpose input/output 4	190	LPC_FRAME# /GPIO5	LPC frame indicator General Purpose input/output 5
191	SERIRQ /GPIO6	Serialized interrupt General Purpose input/output 6	192	LPC_LDRQ# /GPIO7	LPC DMA request General Purpose input/output 7
193	VCC_RTC	3V backup cell input	194	SPKR /GP_PWM_OUT2	Output for audio enunciator General Purpose PWM Output
195	FAN_TACHOIN /GP_TIMER_IN	Fan tachometer input General Purpose Timer In	196	FAN_PWMOUT /GP_PWM_OUT1	Fan speed control (PWM) General Purpose PWM Output
197	GND	Power Ground	198	GND	Power Ground
199	SPI_MOSI	SPI Master serial output/Slave serial input	200	SPI_CS0#	SPI Chip Select 0 Output
201	SPI_MISO	SPI Master serial input/Slave serial output signal	202	SPI_CS1#	SPI Chip Select 1 Output
203	SPI_SCK	SPI Clock Output	204	MFG_NC4	For manufacturing and debugging purposes
205	VCC_5V_SB	+5VDC,Standby ±5%	206	VCC_5V_SB	+5VDC Standby ±5%
207	MFG_NC0	For manufacturing and debugging purposes	208	MFG_NC2	For manufacturing and debugging purposes
209	MFG_NC1	For manufacturing and debugging purposes	210	MFG_NC3	For manufacturing and debugging purposes
211	VCC	Power supply +5VDC ±5%	212	VCC	Power supply +5VDC ±5%
213	VCC	Power supply +5VDC ±5%	214	VCC	Power supply +5VDC ±5%
215	VCC	Power supply +5VDC ±5%	216	VCC	Power supply +5VDC ±5%
217	VCC	Power supply +5VDC ±5%	218	VCC	Power supply +5VDC ±5%
219	VCC	Power supply +5VDC ±5%	220	VCC	Power supply +5VDC ±5%
221	VCC	Power supply +5VDC ±5%	222	VCC	Power supply +5VDC ±5%
223	VCC	Power supply +5VDC ±5%	224	VCC	Power supply +5VDC ±5%
225	VCC	Power supply +5VDC ±5%	226	VCC	Power supply +5VDC ±5%
227	VCC	Power supply +5VDC ±5%	228	VCC	Power supply +5VDC ±5%
229	VCC	Power supply +5VDC ±5%	230	VCC	Power supply +5VDC ±5%

4.2   Input Power Supply

4.2.1   DC-IN - Connector X54

The conga-MCB/Qseven ARM provides a DC-IN power jack connector for notebook-type power supply. The carrier board supports input voltage range of 12-24V, with 19V nominal voltage. The recommended power supply rating is 90W, 19V @ 4.7A with 5.5x2.5mm plug (PN: 10000079).
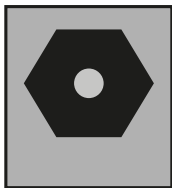
DC-IN (X54)

Pin	Signal
1	VCC
2	VCC
3	GND

Connector Type

X54: 5.5x2.5mm D.C Power Jack (PN: 41500436)

4.2.2   Auxiliary DC-IN - Connector X58

The conga-MCB/Qseven ARM has a 5 pin power connector (X58) that provides the ability to connect a power source with voltage range of 12-24V, with 19V nominal voltage and 5V ±5% standby voltage. The 5V ±5% standby voltage is an optional voltage supported by ATX mode. You can also use connector X54 for single voltage supply (without 5V Standby) thereby allowing the mini carrier to be a stand-alone carrier board.

Pin	Signal
1	VCC
2	VCC
3	GND
4	GND
5	+5V STB (±5%)

Connector Type

Auxiliary DC-IN (X58)

Pin 1

X58: 3mm Pitch Micro-Fit 3.0™ Receptacle (PN: 41500356).
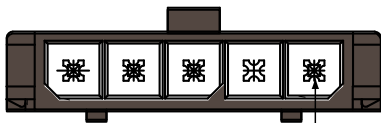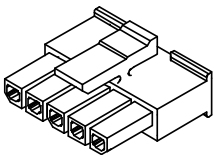
4.2.2.1   AT/ATX Mode Selector - Jumper X65

Jumper X65 configures the power supply to operate in ATX or AT mode.

| Jumper X65	Configuration
1-2	ATX mode (default)
2-3	AT mode

Jumper X65

Connector Type

X65: 2.54mm Grid Jumper

4.2.3   Power Supply Control - Connector X20

The conga-MCB/Qseven ARM has an 8-pin power control connector (X20) for connecting the power source of a 12V battery management module.

Pin	Signal	Description
1	GND	Ground
2	SDA	I2C bus Data
3	SCL	I2C bus Clock
4	BATLOW#	signal from Qseven® connector CN1
5	SUS_STAT#	signal from Qseven® connector CN1
6	SUS_S3#	signal from Qseven® connector CN1
7	SUS_S5#	signal from Qseven® connector CN1
8	PWRBTN#	Power Button

Power Connector (X20)
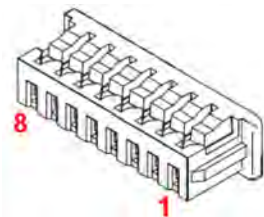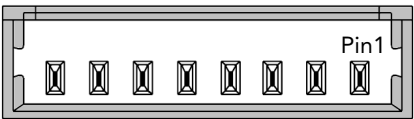
Connector Type

X20: 1.25mm Pitch PicoBlade™ Header (PN: 41500357).

4.3 Fan - Connector X39

Connector X39 is a standard 3 pin header for fan connection. You can connect a 5V or 12V fan to connector X39 but must set the output voltage via jumper X40 (see section 4.3.1).

If a 12V fan is to be used, then the conga-MCB/Qseven ARM must be powered with a +12V input voltage.

Pin	Configuration
1	GND
2	+VDD (12V/5V)
3	FAN_TACHOIN

Fan (X39)

1: GND
2: +VDD (5V/12V*)
3: FAN_TACHOIN
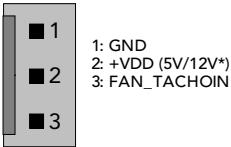
Connector Type

X39: 2.54mm Standard 3-pin Fan Connector (PN: 41500022)

4.3.1 Fan Voltage Selection - Jumper X40

Jumper X40 provides the ability to select the fan's input voltage supplied to connector X39 via pin 2.

Jumper X40	Configuration
1-2	12V
2-3	+5V (default)

Jumper X40

Connector Type

X40: 2.54mm Grid Jumper

4.4 HDMI - Connector X35

A high resolution monitor can be attached to conga-MCB/Qseven ARM via the HDMI port on connector X35. The HDMI connector supports DDC detection.

Pin	Signal	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 (not supported)	14	RESERVED
15	SCL (Serial Clock for DDC)	16	SDA (Serial Data for DDC)
17	DDC/CEC/HEC GND	18	+5V Power (max 50mA)
19	Hot Plug Detect		
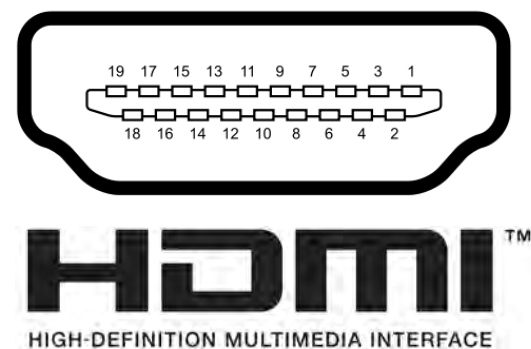
Connector Type

X35: 19-Pin HDMI SMT Receptacle - without flange (PN: 41500434).

4.5   MIPI CSI-2 Camera - Connector X66

Connector X66 is used to connect MIPI CSI-2 Camera. The MIPI CSI-2 signals are routed from the Qseven module to the camera module connector (X66) via a bridge connector - X4.

To connect the MIPI camera interface from the Qseven module to the conga-MCB/Qseven ARM, you need a 36-pin, pitch 0.5mm flat flexible cable (PN: 48000026). You also need to connect a camera module to connector X66. The tested camera module is the JAL-2721 from KaiLap Technologies (PN: 44500025).

Flat Flexible Cable (Connector X4)

Connector X66 supports up to two MIPI-CSI 2.0 data lanes. The MIPI interfaces follow the MIPI-CSI-2 specifications as defined by the MIPI Alliance and support YUV420, YUV422, RGB444, RGB555, RGB565, and RAW 8b/10b/12b.

X66 Pin Description

Pin #	Signal	Description
1	+V2.8MIPI	Camera Module Power
2	+V2.8MIPI	Camera Module Power
3	I2C2_SCL	Camera Module Control Interface (CC1) Clock
4	I2C2_SDA	Camera Module Control Interface (CCI) Data
5	MIPI_CAM_RST	Camera Module Reset Signal
6	MIP_CAM_PWD	Camera Module PD Signal
7	+V1.8MIPI	Camera Module Power
8	+V1.5S	Camera Module Power
9	GND	Ground
10	MIPI_MCLK	Camera Module System Clock
11	GND	Ground
12	GND	Ground
13	CSI_D0-	CSI Data 0-

14	CSI_CLK+	CSI Clock +
15	CSI_D0+	CSI Data 0+
16	CSI_CLK-	CSI Clock-
17	GND	Ground
18	GND	Ground
19	GND	Ground
20	CSI_D1+	CSI Data1+
21	GND	Ground
22	CSI_D1-	CSA Data1-
23	GND	Ground
24	GND	Ground

Connector Type

X66: 24-pin 0.4mm Dual Row Socket (PN: 41500437)

X4: 36-Pin, Pitch 0.5mm Flat Flexible Cable (PN: 48000026)

4.6 UART - Connectors X59, X60

The conga-MCB/Qseven ARM provides two UART interfaces - UART0 on connector X59 and UART1 on connector X60. Connector X59 is a 10-pin connector with fully featured UART signals while connector X60 is a 6-pin connector with receive and transmit signals only.

Connector X59

Pin #	Signal	Description
1	NC	Not connected
2	NC	Not connected
3	NC	Not connected
4	NC	Not connected
5	UART0_CTS	UART0 Clear To Send handshake signal
6	UART0_TX	UART0 Serial Data Transmitter
7	UART0_RTS	UART0 Ready To Send handshake signal
8	UART0_RX	UART0 Serial Data Receiver
9	GND	Ground
10	NC	Not connected

Connector X60

Pin #	Signal	Description
1	NC	Not connected
2	NC	Not connected
3	GND	Ground
4	UART1_TX	UART1 Serial Data Transmitter
5	UART1_RX	UART1 Serial Data Receiver
6	NC	Not connected

Connector Type

X59: 10-pin 1.25mm Pitch PicoBlade SMT Header (PN: 41500294).

X60: 6-pin 1.25mm Pitch PicoBlade SMT Header (PN: 41500292).

4.7   LVDS - Connector X14

The conga-MCB/Qseven ARM supports a dual LVDS Interface with DDC detection via box header X14. With jumper X31, you can set the supply voltage for the LCD display to 5V or 3.3V. Maximal output current is 1A.

Pin	Signal	Pin	Signal
1	LVDS B TX0N	2	LCD + VDD (+3.3V/+5V)
3	LVDS B TX0P	4	LCD + VDD (+3.3V/+5V)
5	GND	6	GND
7	LVDS B TX1N	8	GND
9	LVDS B TX1P	10	LVDS A TX0N
11	GND	12	LVDS A TX0P
13	LVDS B TX2N	14	GND
15	LVDS B TX2P	16	LVDS A TX1N
17	GND	18	LVDS A TX1P
19	LVDS B CLKN	20	GND
21	LVDS B CLKP	22	LVDS A TX2N
23	GND	24	LVDS A TX2P
25	LVDS B TX3N	26	GND
27	LVDS B TX3P	28	LVDS A CLKN
29	GND	30	LVDS A CLKP
31	GND	32	GND
33	LVDS VDD ENABLE	34	LVDS A TX3N
35	NC	36	LVDS A TX3P

Contact No.3

Contact No.1

Contact No.2
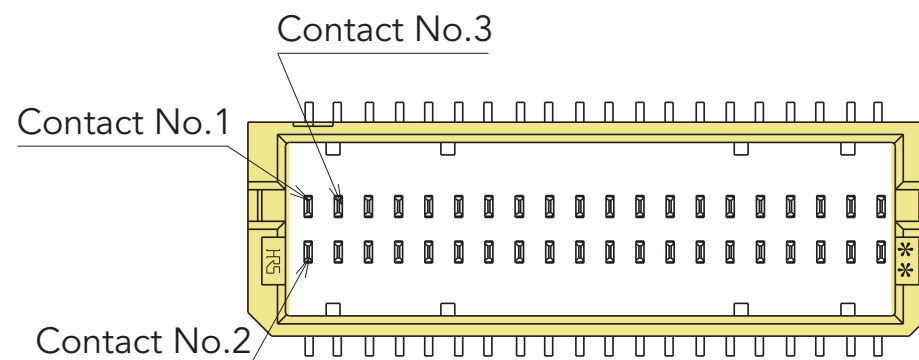
37	LVDS BKL CTRL	38	LVDS SCL
39	LVDS BKL ENABLE	40	LVDS SDA

Connector Type

X14: 1 mm Pitch Double Row, 40 Pos Female Socket (PN: 41500250).

4.7.1 Panel Voltage Selection - Jumper X31

Jumper X31 provides the ability to select the LCD supply voltage.

Jumper X31	Configuration
1-2	+3.3V (default)
2-3	+5V

Connector Type

X31: 2.54mm Grid Jumper

Jumper X31

4.8 Backlight - Connector X15

Connector X15 on the conga-MCB/Qseven ARM is a 4-pin box header designated for backlight voltage. Supply voltage for the backlight converter can be set to 12V or +5V with jumper X32. When the VCC is used as backlight voltage, a suitable backlight converter must be used. Maximal output current is 1A.

Pin	Signal
1	VDD BCKL (VCC*/+5V)
2	GND
3	BCKL EN (High active)
4	BCKL CTRL*

Backlight Power (X15)

Note

* VCC is the input power supply voltage of conga-MCB/Qseven ARM.

*BCKL_CTRL signal is controlled by the I²C bus and originates from the Qseven® module.

Connector Type

X15: 2.00mm Pitch 4 Pos Box Header (PN: 41500325).

4.8.1 Backlight Voltage Selection - Jumper X32

Jumper X32 provides the ability to select the backlight supply voltage.

Jumper X32	Configuration
1-2	12V
2-3	+5V (default)

Jumper X32

Note

If a 12V backlight inverter is to be used, then 12V VCC has to be present and jumper X32 set to position 1-2. BCKL_CTRL signal is controlled by the I²C bus and originates from Qseven® module.

Connector Type

X32: 2.54mm Grid Jumper

4.9 CAN Bus - Connector X38

The conga-MCB/Qseven ARM provides two Controller Area Network bus interfaces - CAN 0 on connector X38 and CAN 1 on connector X41. Only CAN 0 connector - a 5-pin header connector is assembled by default. CAN 1 is an optional interface, and therefore not assembled by default.

Connector X38 also provides +5V power supply for an external CAN device via 750mA fuse. Supplying power to the CAN device via the Qseven® mini carrier power input is optional. Additionally with jumper X64, you can enable or disable the 120 ohm resistor termination for CAN 0.

Pin	Signal
1	+5V / 12V
2	CAN Low bus output
3	GND
4	CAN High bus output
5	NC

CAN Bus 0 (X38)
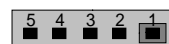
Jumper X64

Connector Type

X38: 5-Pin 2.54mm Pitch Housing (PN: 4150031)

4.10   Auxiliary Audio Header (Line-IN/Line-OUT) - Connector X45

The conga-MCB/Qseven ARM provides a header connector X45 for analog audio Line-IN and Line-Out connection. This header is not assembled by default.

Line In/Out Header (X45)
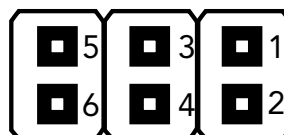
Connector Type

X45: 2.5mm header connector (PN: 41500034)

4.11   Audio Jack (Headphone/MIC-IN) - Connector X47

Stereo analog audio signals are provided via 3.5mm 4-pin audio jack connector X47. The 4-pin audio jack connector provides headphone and MIC-IN capabilities.

Headphone and MIC-IN (X47)

Connector Type

X47: Standard 3.5mm 4-pin Audio SMD Jack connector (PN: 41500416).

4.12 Ethernet - Connector X3

The conga-MCB/Qseven ARM has an RJ45 connector with integrated magnetics to support Gigabit Ethernet on the X3 connector. Link and activity LED indicators are also integrated within the LAN connector.

Pin	Signal
1	GBE MDI0P
2	GBE MDI0N
3	GBE MDI1P
4	GBE MDI2P
5	GBE MDI2N
6	GBE MDI1N
7	GBE MDI3P
8	GBE MDI3N
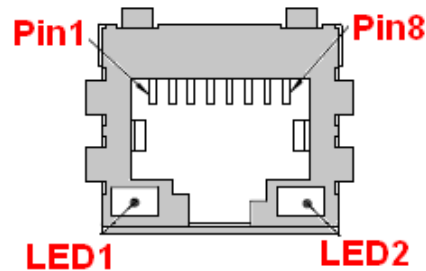
Action	Description
LED 1 Green lit	Link
LED 1 Green blinking	Activity
LED 2 Green lit	Link 100Mbit
LED 2 Yellow lit	Link 1 Gbit

Connector Type

X3: Standard 8-Pin RJ45 Male Connector (PN: 41500355).

4.13 USB 2.0 - Connectors X48,X49,X50,X51

The conga-MCB/Qseven ARM provides four USB ports - three USB 2.0 host ports (connectors X49,X50,X51) and one USB OTG port (connector X48). The USB signals are routed directly from port 0-3 of the Qseven module. The USB OTG can operate as host or client. Support for USB 2.0 and/or 1.1 devices depends on the Qseven® module used.

Pin	Signal
1	+5V
2	DATA-
3	DATA+
4	GND

Connector Type

X48: Micro USB Type A/B Receptacle (PN: 41500429)

X49,50: USB Type A 4-Pos Right Angled Female Connector (PN: 41500111)

X51: USB Type A 4-Pos SMT Female Connector (PN:41500491)
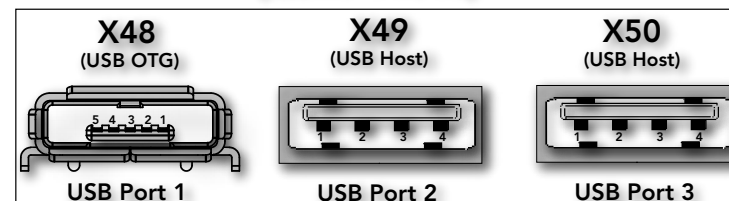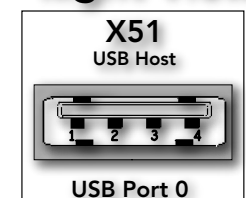
4.14 GPIOs - Connector X57

The General Purpose Input/Output pins are available on connector X57. Connector X57 signals are shown below:

Pin	Signal	Description
1	SMB_ALERT#	System Management Bus Alert input
2	GPIO1	General Purpose Input/Output 1
3	GPIO2	General Purpose Input/Output 2
4	GPIO3	General Purpose Input/Output 3
5	GPIO4	General Purpose Input/Output 4
6	GPIO5	General Purpose Input/Output 5
7	GND	Ground

Note

Connector X57 is not assembled by default.

4.15 Android Buttons Header - Connector X53

With connector X53, you can connect external android buttons on the conga-MCB/Qseven ARM. The pin description is shown below:

Pin		Description
1	PWRBTN#	Power button signal
2	KEY_VOL_UP	Increases volume
3	HOME	Returns to the main home screen
4	SEARCH	Brings up the search function
5	BACK	Takes you a level back in an app or a page back in a browser
6	MENU	Displays additional options in an application
7	KEY_VOL_DN	Decreases volume
8	GND	Ground

Android Button Connector (X53)
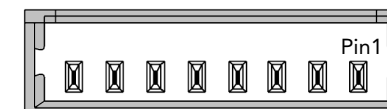
Connector Type

X53: 8-Pin 1.25 Pitch PicoBlade Header (PN: 41500357)

Note

The android button signals are also routed to switches SW1-SW10 on the conga-MCB/Qseven ARM carrier board.

4.16 Onboard Android Buttons - SW1 - SW10

The conga-MCB/Qseven ARM offers the following android buttons:

Button	Switch	Function
Power Button	SW1	Powers the android device on and off
Sleep Button	SW2	Places the android device in sleep mode
Reset Button	SW3	Resets the android device
LID Button	SW4	Controls the
Vol+	SW5	Increases volume
Home Button	SW6	Returns to the main home screen
Search Button	SW7	Brings up the search function
Back Button	SW8	Takes you a level back in an app or a page back in a browser
Menu Button	SW9	Displays additional options in an application
Vol-	SW10	Decreases volume

Android Buttons
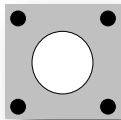
SW1 - SW10

Connector Type

SW1-SW10: 4.9x4.9x1.5mm SMD Button (PN: 47500025)

4.16.1 Power and Reset Buttons

The conga-MCB/Qseven ARM provides a power button (SW1) and a reset button (SW3). SW1 functions only if the conga-MCB/Qseven ARM power is supplied by an ATX power supply (for example when using the congatec ATX cable adapter for conga-MCB/Qseven ARM). Therefore to use SW1, you must connect the carrier board to an ATX power supply. SW3 resets the system.

If the conga-MCB/Qseven ARM is supplied from a single power source or a power source in AT mode, the carrier board will start immediately after the supply voltage is connected to power connector X54 or X58.
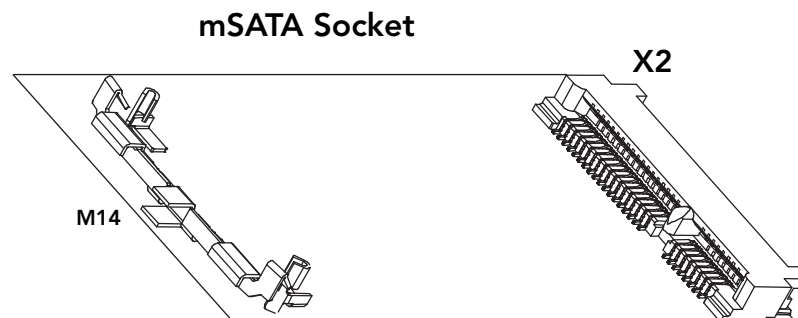
Power On   **Reset**
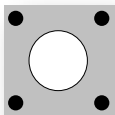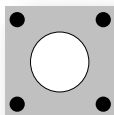
SW1   SW3

4.17 mSATA Socket - Connector X2

The conga-MCB/Qseven ARM provides mini-SATA connector on the bottom side. The mSATA and the mini-PCIe connectors are similar in appearance. They are also pin compatible. However, the data signals of mSATA connector connects to the SATA host controller instead of the PCI Express host controller.

mSATA Socket

4.18 Mini-PCIe Card Socket - Connector X1

The conga-MCB/Qseven ARM is equipped with a PCI Express Mini Card socket. The mini-PCI card socket is designed to support half and full sized mini PCI card. You can locate it on the bottom side of the conga-MCB/Qseven ARM.

PCI Express Mini Card is a unique small size form factor optimized for mobile computing platforms equipped with communication applications such as Wireless LAN. Connector X1 on the bottom side of the conga-MCB/Qseven ARM provides an interface to insert a standard PCIe Mini Card.
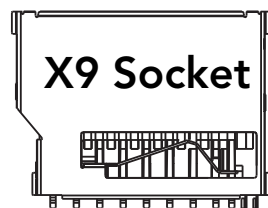
Half/Full Sized Mini-PCIe Card Socket
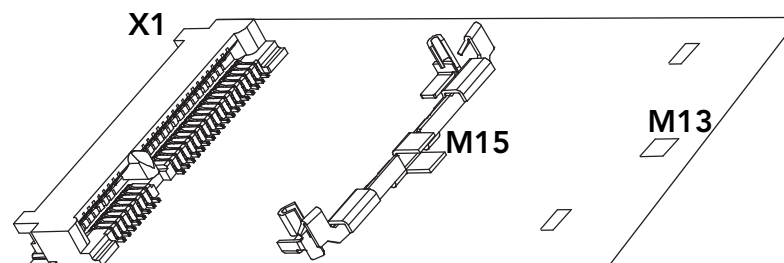
Connector Type

X1: Standard 52 Pos. Mini PCI Express Connector (PN: 41500087).

4.19   SD/MMC 4.0 Card Socket - Connector X9

The X9 socket on the bottom side of conga-MCB/Qseven ARM offers an interface for SD Card, SDHC Card and MMC Plus card media.
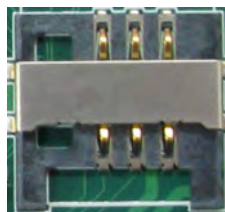

Connector Type

X9: SD/MMC 4.0 Card Socket (PN: 41500334).

4.20   SIM Card Slot - Connector X62

Connector X62 on the bottom side of the conga-MCB/Qseven ARM provides a slot for connecting SIM card.

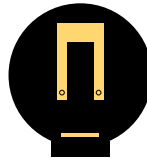**Connector Type**

X62: Sim Card Connector (PN: 41500304)

4.21   CMOS Battery - Connector M12

The conga-MCB/Qseven ARM includes a battery that supplies the RTC and CMOS memory of the Qseven® CPU module. The battery provides 3V power. The specified battery type is CR2032.

CMOS Battery CR2032

Connector Type

M12: CR2032 CMOS Battery Holder (PN: 46500006)

Note

To fulfill the requirements of the EN60950, the conga-MCB/Qseven ARM incorporates two current-limiting devices (resistor and diode) in the battery power supply path.

Warning

Danger of explosion if 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.
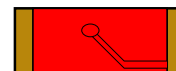
5   Additional Features

5.1   Red LEDs

There are two red LEDs found on the conga-MCB/Qseven ARM. The table below describes the functions of the LEDs.

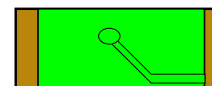| LED	Function When Lit
D4	mSATA Active - Indicates activity of mSATA
D5	SD Card Active - indicates activity of SD Card

Red LEDs

5.2   Green LEDs

There are six green LEDs (D1-D3 and D16-D18) located on the conga-MCB/Qseven ARM.

5.2.1   PCI Mini Card Activity LEDs

LEDs D1-D3 indicate PCIe Mini Card activity. The table below describes the functions of the LEDs.

| LED	Function When Lit
D1	WWAN - indicates activity of wireless wide area network
D2	WLAN - indicates activity of wireless local area network
D3	WPAN - indicates activity of wireless personal area network

Green LEDs

5.2.2   Power Indication LEDs (D16-D18)

LEDs D16-D18 indicate the presence of supply voltages on the carrier board. The table below describes the functions of the LEDs.

| LED	Function When Lit
D16	Indicates +3.3V is present
D17	Indicates +5V is present
D18	Indicates +5V STB is present

Green LEDs
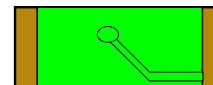
6   Cables

There are several cables that can be used with the conga-MCB/Qseven ARM mini carrier board.

The table below lists their part numbers and describes their functions.

Part Number	Name	Description
	Cable kit	Complete cable kit for conga-MCB/Qseven ARM
14000027	cab-MCB-Power	Power cable for conga-MCB/Qseven ARM connector X58 with 4 mm female banana plug.
14000033	cab-MCB-LVDS	LVDS display data cable for conga-MCB/Qseven ARM connector X14.
14000034	cab-MCB-BKL	Backlight cable for conga-MCB/Qseven ARM connector X15.
48000023	RS-232 adapter cable	RS-232 adapter cable for congatec ARM modules with 6-pin PicoBlade connector and 2x D-SUB 9-pin connector
48000026	36-pins FFC, pitch 0.5mm	36-pins flat flexible cable for conga-MCB/Qseven ARM connector X66

7 Mechanical Drawing
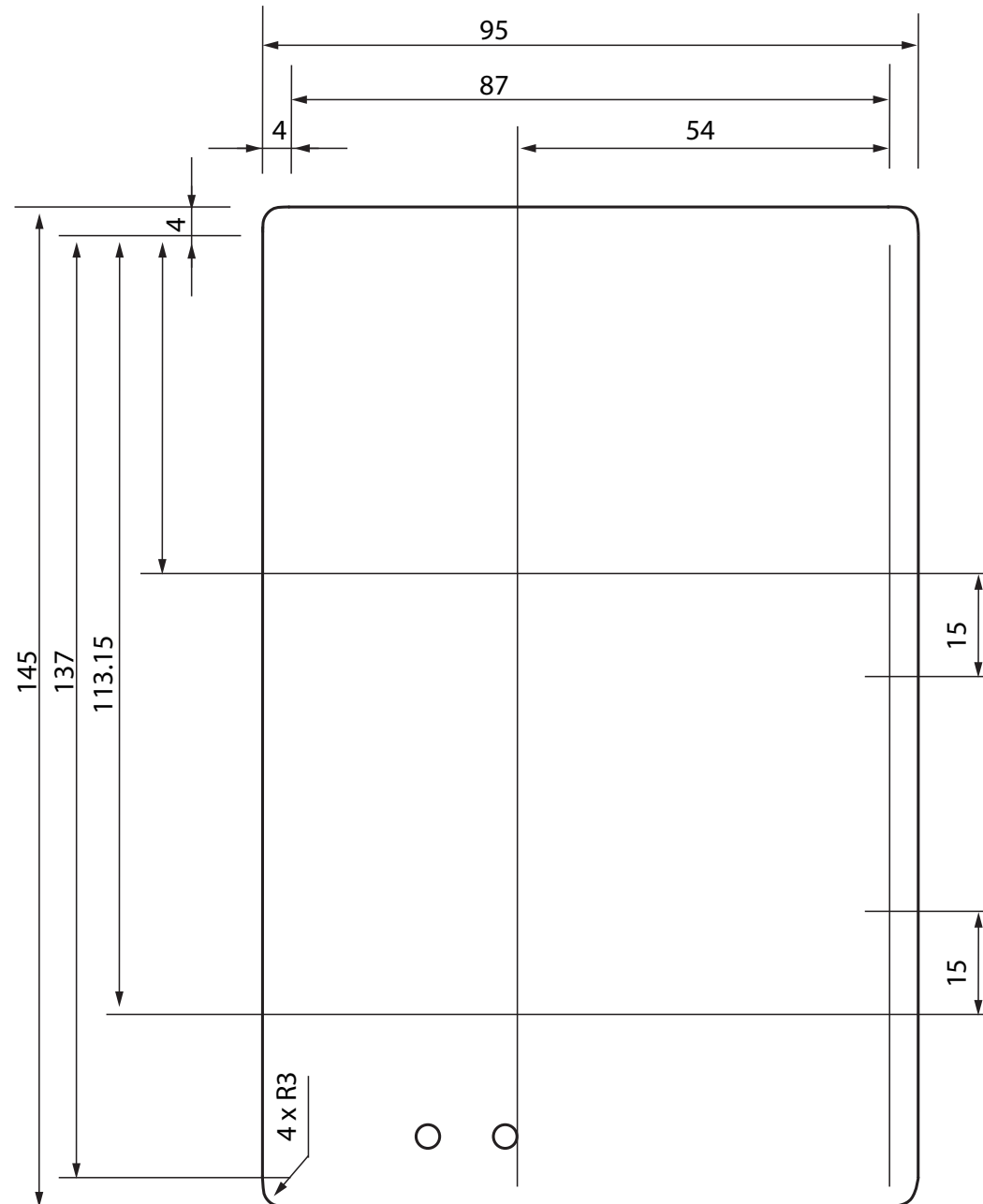
8 Industry Specifications

The list below provides links to industry specifications of the interfaces that can be found on the conga-MCB/Qseven ARM mini carrier board.

Specification	Link
Qseven™ Specification, Revision	http://www.qseven-standard.org
Qseven™ Design Guide	http://www.qseven-standard.org
PCI Express Base Specification	http://www.pcisig.com/specifications
Universal Serial Bus (USB) Specification, Revision 2.0	http://www.usb.org/home
Serial ATA Specification, Revision 1.0a	http://www.serialata.org
Low Pin Count Interface Specification, Revision 1.0 (LPC)	http://developer.intel.com/design/chipsets/industry/lpc.htm