

Q7-AMC Adaptor Board Rev1



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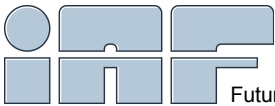
Q7-AMC Adaptor Board Rev1

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Revision Record

Version	Date	Changes	Author
0.1	26.05.14	First draft	MT
0.2	27.05.14	Layout	MT MK
0.3	14.07.14	final	MT MK



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1 Overview

The Q7-AMC Adaptor Board (short Q7 AMC) is a MicroTCA Single-Width Full-Height carrier board (~7,3 cm x 18,3 cm x 3 cm) for Q7 Modules , for convenient integration of a Q7 based computing module in a MicroTCA environment.

Qseven is a standard for small (7cm x 7cm) computer on module (COM). More information are available at <http://www.qseven-standard.org>.

MicroTCA <http://www.picmg.org/> is a standard for integrated systems which are common in Telecommunication.

2 Functional Description

The primary purpose of the Q7 AMC is to integrate Q7 based processor modules in a MicroTCA environment. The Ethernet of the Q7 AMC is connected to the front panel. The PSU of the MicroTCA System is connected via the rear connector. For additional Ethernet connectivity the PCIe lane 0 of the Q7 connector is routed to a standard PCIe 1x connector for connection of small size Ethernet cards. Optional (via soldering MUX) the PCIe lane can be connected to the MicroTCA backplane connector.

The Q7 AMC adaptor can also be used standalone by providing 12V to the power connector.

The main features of the he Q7 Q7 AMC module are listed below:

- PCIe lane 0 is connected to PCIe 1x connector (optional to MicroTCA backplane)
- Ethernet is connected to front connector.
- USB1 is connected to front connector as USB client
- SDIO is connected to micro SD Card connector
- Power supply connected to MicroTCA rear connector

Additional functionalities are available through headers, these are:

- USB 2 and 3 (host) are available on headers.
- UART0, SPI and i2C are available on headers.
- SATA (not tested) is routed to not populated connector, also a power connector for SATA drives can be mounted
- Header for battery

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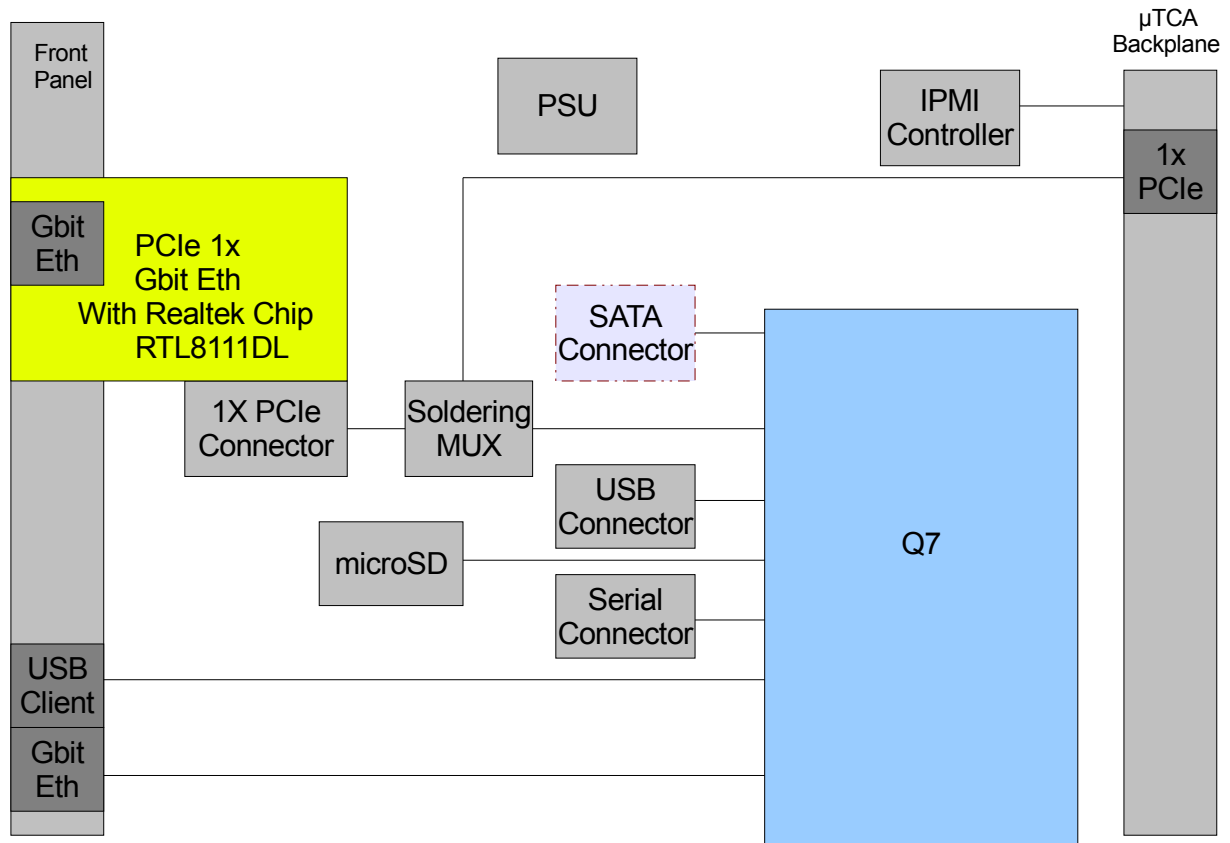


Figure 1: Block Diagram Q7-AMC Adaptor Board

3 Board Interfaces

3.1 PCIe

The PCIe lane 0 of the Q7 connector is connected to the PCIe 1x connector per default. It also can be connected to the MicroTCA backplane by solder MUX.

Default connection: Q7 to PCIe 1x connector

J9 PCIe Connector	Connect to J7 (Q7 MXM)
A11 PCIe_RST#	158 PCIE_RST#
A13 PCIe_REFCLK_P	155 PCIE_CLK_REF+
A14 PCIe_REFCLK_N	157 PCIE_CLK_REF-
A16 PCIe_RX_P	180 PCIE0_RX+

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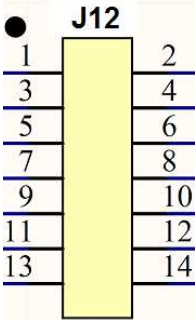
A17 PCIe_RX_N	182 PCIE0_RX-
B05 SMB_CLK	60 SMB_CLK / GP1_I2C_CLK
B06 SMP_DAT	62 SMB_DAT / GP1_I2C_DAT
B11 PCIe_Wake#	156 PCIE_WAKE#
B14 PCIe_TX_P	179 PCIE0_TX+
B15 PCIe_TX_N	181 PCIE0_TX-

Q7 to backplane connection

J7 (Q7 MXM)	Connect to J1 AMC Connector
A11 PCIe_RST#	
A13 PCIe_REFCLK_P	80 FCLKA+
A14 PCIe_REFCLK_N	81 FCLKA-
A16 PCIe_RX_P	47 RX4+
A17 PCIe_RX_N	48 RX4-
B05 SMB_CLK	
B06 SMP_DAT	
B11 PCIe_Wake#	
B14 PCIe_TX_P	44 TX4+
B15 PCIe_TX_N	45 TX4-

3.2 USB Connector

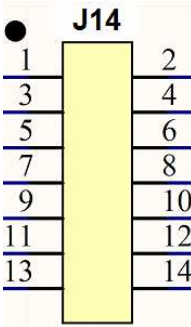
This USB ports are connected to the Q7 MXM as USB-Host with ESD protection. The table shows the pin assignment.

	J12 USB	meaning	Connect to J7 (Q7 MXM)
	1	USB Port2 5V	
	3	USB Port2 D-	88 USB_P2-
	5	USB Port2 D+	90 USB_P2+
	10	USB Port3 5V	
	12	USB Port3 D-	87 USB_P3-
	14	USB Port3 D+	89 USB_P3+
	2,4,6,8,7,9,11,13	GND	

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3.3 Serial Connector

The serial interfaces UART,SPI and I2C from the Q7 module are connected to the Header J14

	J14 Serial	meaning	Connect to J7 (Q7 MXM)
	1	UART0_TX	171 UART0_TX
	3	UART0_RX	177 UART0_RX
	5	I2C_CLK	66 GP0_I2C_CLK
	7	I2C_DAT	68 GP0_I2C_DAT
	9	SPI_MOSI	199 SPI_MOSI
	11	SPI_MISO	201 SPI_MISO
	13	SPI_SCK	203 SPI_SCK
	12	SPI_CS0#	200 SPI_CS0#
	14	SPI_CS1#	202 SPI_CS1#
	4,6,8,10	GND	
	2	VCC 3,3V	

3.4 Backup Cell

J8 is the 3 V backup cell input. VCC_RTC should be connected to a 3V backup cell for RTC operation and storage register non-volatility in the absence of system power.

3.5 Standalone Power Connector

J2 (Phoenix contact MKDS 1/2-3.81) is the power input for standalone use, for polarity see board print. DO NOT power when adaptor is used in a MicroTCA Rack.

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4 Frontpanel



4.1 Gigabit Ethernet ETH1

The ETH1 Jack is connected via magnetics to the Qseven MXM Header

J3 Eth FastJack	Connect to J7 (Q7 MXM)
2 TD0_P	12 GBE_MDI0+
3 TD0_N	10 GBE_MDI0-
4 TD1_P	11 GBE_MDI1+
5 TD1_N	9 GBE_MDI1-
6 TD2_P	6 GBE_MDI2+
7 TD2_N	4 GBE_MDI2-
8 TD3_P	5 GBE_MDI3+
9 TD3_N	3 GBE_MDI3-
12 greenLED	13 GBE_LINK#
14 yellowLED	14 GBE_ACT#

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4.2 Gigabit Ethernet ETH2 via PCIe 1x Connector

ETH2 is provided by a PCIe Ethernet card.

4.3 USB Client

The micro USB Jack is connect to the Qseven as an USB client.

J11 micro USB	Connect to J7 (Q7 MXM)
1 VBus	91 USB_CC
1 VBus	92 USB_ID
2 D-	93 USB_P1-
3 D+	95 USB_P1+

5 Technical data

5.1 PSU

The on-board PSU provide

5V (4 amps)

3,3 V (4 amps)

12 V for PCIe connector are directly used from external supply (backplane or standalone connector).

5.2 Dimensions

The Q7 AMC is MicroTCA Single-Width Full-Height Card, which dimensions are specified as 180,6 mm x 73,5 mm x 28,95 mm.