Cross Platform

Cross Platform Carrier Board for SECO QSeven™ CPU modules, both with x86 and RISC architectures

User Manual

Cross Platform

REVISION HISTORY

Revision	Date	Note	Rif.
1.0	01/12/2010	First release	SB
1.1	13/12/2010	Official release	SB
1.2	14/03/2011	Jumper JP4 settings corrected	SB

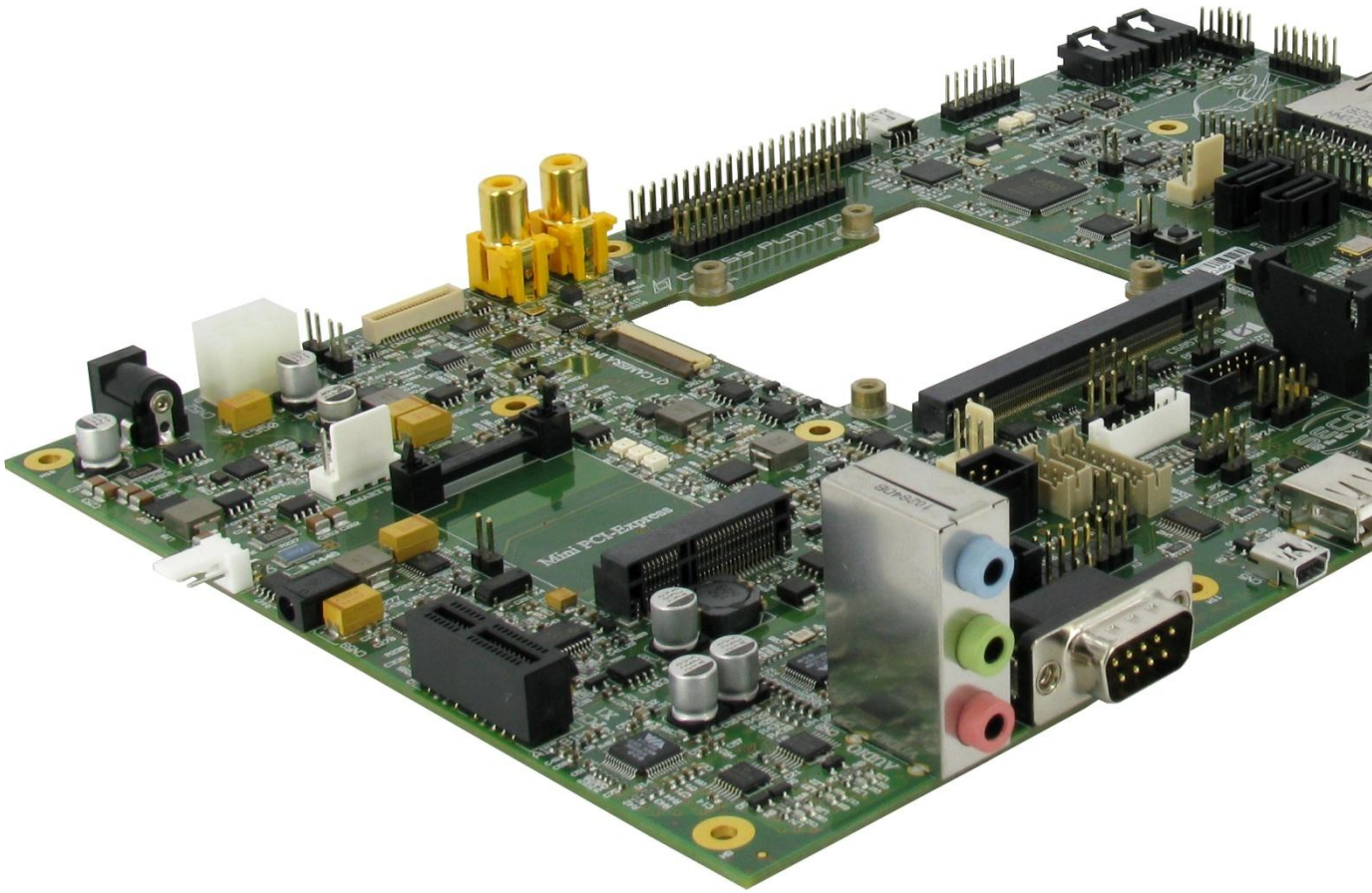
For support and more information on this and other SECO products, please visit our web-site at: http://www.secoqseven.com.

SECO Srl - Via Calamandrei 91
52100 Arezzo – ITALY Ph: +39 0575 26979
Fax: +39 0575 350210

INDEX

Chapter 1 INTRODUCTION

- **Warranty**
- **Information and assistance**
- **RMA number request**
- **Safety**
- **Electrostatic Discharges**
- **RoHS compliance**



1.1 Warranty

This product is subject to Italian law D. Lgs 24/2002, acting European Directive 1999/44/CE on arguments of sale and warranties to consumer.

The warranty for this product lasts 1 year

Under the warranty period the Supplier guarantees the buyer an assistance service for repairing, replacing or credit of the item, at its own discretion.

Shipping costs regarding non conforming items or items that need replacement, are to be paid by the customer.

Items cannot be returned unless formerly authorised by the supplier.

The authorisation is released after compiling the specific form available from the web-site http://www.seco.it (RMA Online). Authorisation number for returning the item must be put both on the packaging and on the documents brought with the items, that have to be not damaged, not tampered, with all accessories in their original packaging.

Error analysis form identifying the fault type has to be compiled by the customer and has to be sent in the packaging of the returned item.

If some of the above mentioned requirements for returning the item is not satisfied, item will be shipped back and customer will have to pay for shipping costs.

The supplier, after a technical analysis, will verify if all the requirements for warranty service are met. If warranty can not be applied, he calculates the minimum cost of this initial analysis on the item and the repairing costs. Costs for replaced components will be calculated aside.

Warning!

All changes or modifications to the equipment not clearly approved by SECO S.r.l. could impair equipment's functionality and lead to the expire of the warranty

1.2 Information and assistance

What do I have to do if the product is faulty?

SECO S.r.l. offers the following services:

- SECO website: visit http://www.secoqseven.com/ to receive the last information on the product. In most of the cases you can find useful information to resolve your problem.
- SECO reseller: the reseller or agent can help you in determining the exact cause of the problem and search the best solution for it.
- SECO Help-Desk: contact by phone the SECO Technical Assistance.

A technician is at your disposal to understand the exact origin of the problem and suggest the right solution.

ITALY Tel. (+39) 0575 340427
Fax. (+39) 0575 340434

- Repairing centre: it is possible to send the faulty product to SECO Repairing Centre. In this case, follow this procedure:

- Returned items have to be provided with RMA Number. Items sent without RMA number will be not accepted.
- Returned items have to be packed in the appropriate manner. SECO is not responsible for damages caused by accidental drop, improper usage, or customer neglects.

Note: We ask to prepare the following information before asking for technical assistance:

- name and serial number of the product;
- description of Customer's peripheral connections;
- description of Customer's software (operative system, version, application software, etc.);
- a complete description of the problem;
- the exact words of every kind of error message received

1.3 RMA number request

To request a RMA number, please, visit SECO's web-site http://www.seco.it. In the home-page select "RMA Online" and follow the described procedure

You will receive an RMA Number within 1 working day (only for on-line RMA request).

1.4 Safety

Cross Platform module only use extremely-low voltages.

While handling the board, it is necessary to be careful in order to avoid any kind of risk or damages to electronic components. Always switch the power off, and unplug the power supply unit, before handling the board and/or connecting cables or other boards.

Don't use metallic components, like paper clips, screws and similar, near the board, when this is supplied, to avoid short circuits due to unwanted contacts with other components of the board.

Never connect the board to an external power supply unit or battery, if the board has become wet.

Make sure that all cables are correctly connected and are not damaged.

1.5 Electrostatic Discharges

Cross Platform, like any other electronic product, is an electrostatic sensitive device and some device on-board could be damaged by high voltages caused by static electricity.

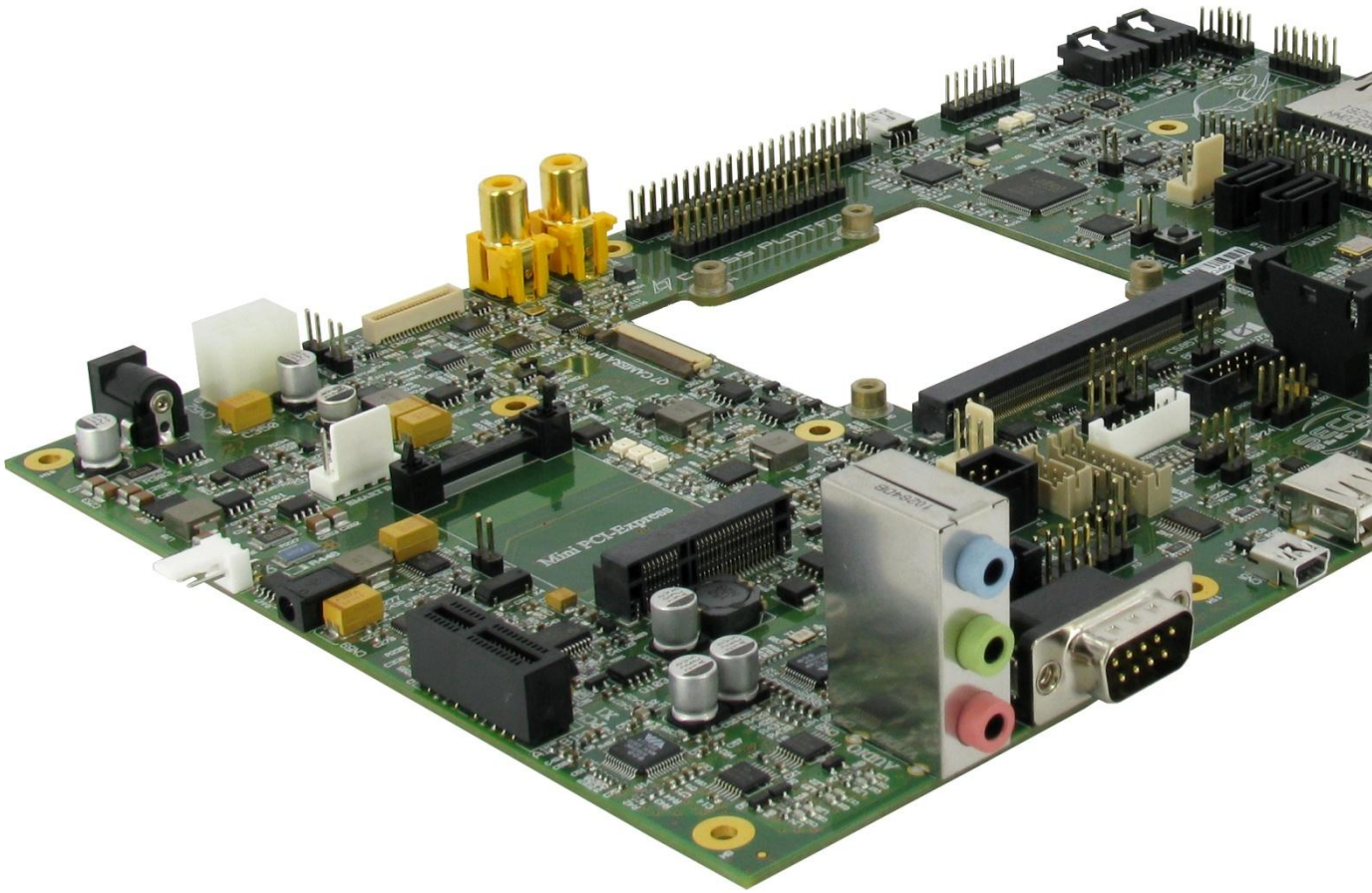
So whenever handling a Cross Platform board, take care to ground yourself through an anti-static wrist strap. Placement of the board on an anti-static surface is also highly recommended.

1.6 RoHS compliance

Cross Platform board is designed using RoHS compliant components and is manufactured on a lead-free production line. It is therefore fully RoHS compliant.

Chapter 2 OVERVIEW

- **Introduction**
- **Cross Platform Development Board Technical Specifications**
- **Mechanical specifications**
- **RTC Battery**



2.1 Introduction

QSeven™ standard has been conceived to integrate in a very small form factor (70x70mm) all the components necessary for realisation of most of the features that are standard for PC-like architectures.

With the latest QSeven™ specifications release (1.20), some modifications to the standard have been made, so that new potentialities have been added, like for example CAN Interface, SPI Bus, and possibility of using AC'97 Audio Codecs in alternative to HD Audio Codecs.

All signals are available through an unique 230-pin gold finger connector, on which all position are defined. Some pin has been left "reserved" for future extensions, and some other pins are defined with a multiple possibility (SDVO signals shared with HDMI and/or Display Port signals).

According to newest release of the specification, SECO realised a set of boards that are 90% interchangeable, both with standard x86 architectures and with RISC microcontrollers. With x86 and RISC architectures, it is possible to cover almost all the needing for each field of application, from mobile to gaming, from industrial to automotive, from medical to avionics…

Following this philosophy, SECO realised Cross Platform board, that is a specific Development Board, that can be used to begin development following the usual ways (that can be indifferently the x86 way or the RISC way), and then see what can be obtained with the other kind of architecture, with a minor effort and without time waste. SECOQSeven philosophy is the ideal way for x86 developers to approach RISC world, and vice-versa, exploring new possibilities and choosing the best solution for the application they have to build.

Cross Platform Development board is able to use all SECO QSeven™ Boards, independently by the fact that the board has an x86 or a RISC architecture, so that the hardware scalability is ensured.

The most important thing, is that this Carrier Board for Development is the base of SECOQSeven Design Guide: this means that electrical schematics of the boards will be available for developers that began testing with this board, and want to recycle portions of it for their own-designed Carrier Boards, allowing thus a significant reduction of time for Hardware Development.

"Recycling" of the schematic will be also useful for Software Development, since SECO offers also the BSP, drivers and SDK for the single Quadmo boards used with the Development board. Using the same components in your own design, will allow to spare time in Software Development.

Both Windows (Embedded and standard versions) and Linux are supported.

All the materials is available through web-site www.secoqseven.com, where it is possible to find any kind of information needed, and is also possible to ask for help of our Developer's team to solve technical issues related to customer's development.

2.2 Cross Platform Development Board Technical Specifications

- Standard MXM connector for use of QSeven™ boards
- USB Client connector
- 6 x USB 2.0 standard “A” connector (USB0÷3, USB6, USB7)
- 2 x S-ATA connectors
- Hard Disk Power Connector
- GbEthernet Connector
- 2 x SD/MMC slots
- SDI/O Internal Header
- MiniPCI Slot
- 1 x PCI Express x 1 Slot
- Triple Phone jack
- Digital Audio: S/P-DIF Input and Output
- HD Audio Codec VIA VT1708B
- AC’97 Audio Codec VIA VT1613
- Digital Audio interface
- Video Camera Interface, with NTSC/PAL/SECAM video decoder integrated
- DVI-D Single Link interface
- VGA interface
- 2 x RS-232 Serial ports
- 2 x TTL Serial Ports
- 1 x CAN interface
- 4 x GPI/O
- LVDS and Backlight connection
- LCD Voltage and Backlight Voltage Selection
- +5 / +12 V regolable FAN connector
- Feature Expansion Connector
- LPC Interface
- Internal FPGA, with possibility of defining up to 64 User I/O’s
- JTAG connection
- 3x T/S interfaces: 2 x 4-Wire T/S controllers (I2C and SPI interface), 1 x 4- and 5-Wire T/S controller (USB interface)
- I2C applications included: EEPROM, Light Sensor, I/O Extender, A/D Converter
- SPI Interface
- Input Voltage: +5V for Desktop application, +19V for Notebook-like application
- Smart-Battery management

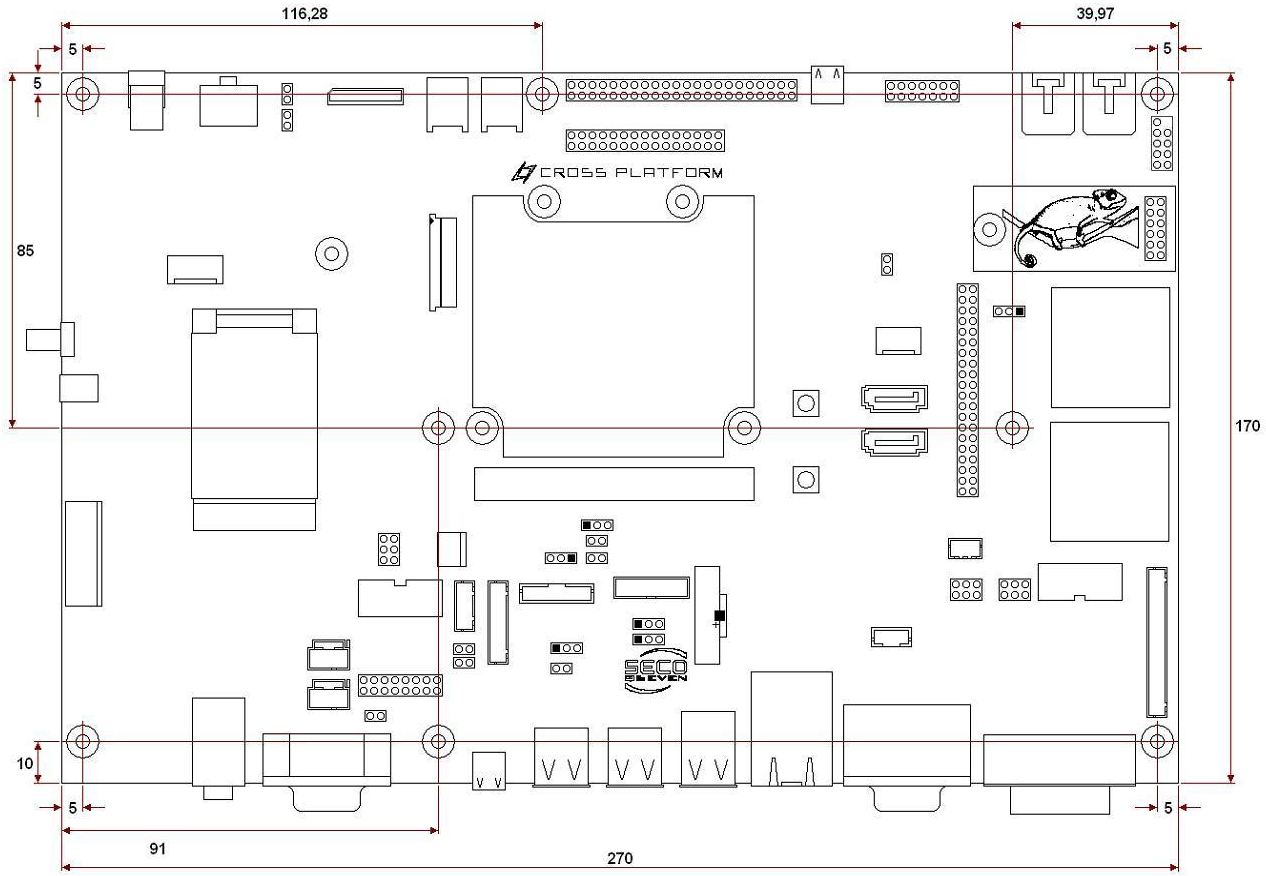
- Li-Ion Single Cell Battery management
- Temperature Range: 0 to 60° C
- Dimensions: 270 x 170 mm (10.63” x 6.69”)

2.3 Mechanical specifications

Board dimensions are 270 x 170 mm (10.63” x 6.69”).

The printed circuit of the board is made of six layers, some of them are ground planes, for disturbance rejection.

In the following drawing, are reported all the quotes of the board, including those of the 8 fixing holes.



For the correct fixing of SECOQSeven™ modules to the carrier board, four metallic spacers of the correct height are directly soldered on board.

2.4 RTC Battery

For the occurrences when the system (Carrier Board + QSeven™ module) is not powered, on board there is a vertical battery holder, for the use of standard coin battery, type CR2032, with a nominal capacity of 220mAh, to supply, with a 3V voltage, the Real Time Clock and CMOS memory mounted on the QSeven™ module.

Current-limiting devices have been implemented to fulfill EN60950 requirements.

They should only be replaced with devices of the same type. Always check the orientation before inserting and make sure that they are aligned correctly and are not damaged or leaking.

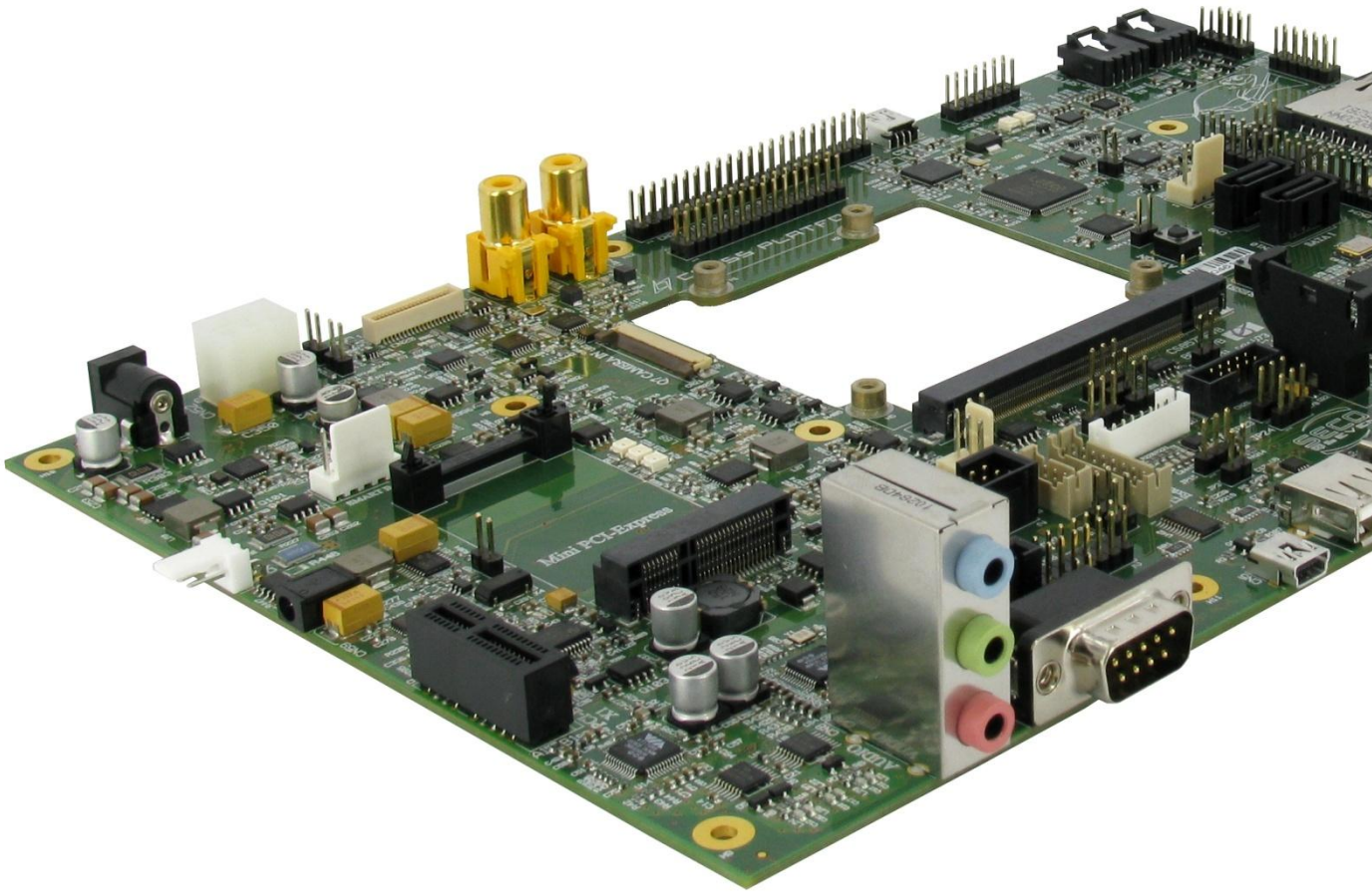
Never allow the batteries to become short-circuited during handling.

CAUTION: handling batteries incorrectly or with not-approved devices may present a risk of fire or explosion.

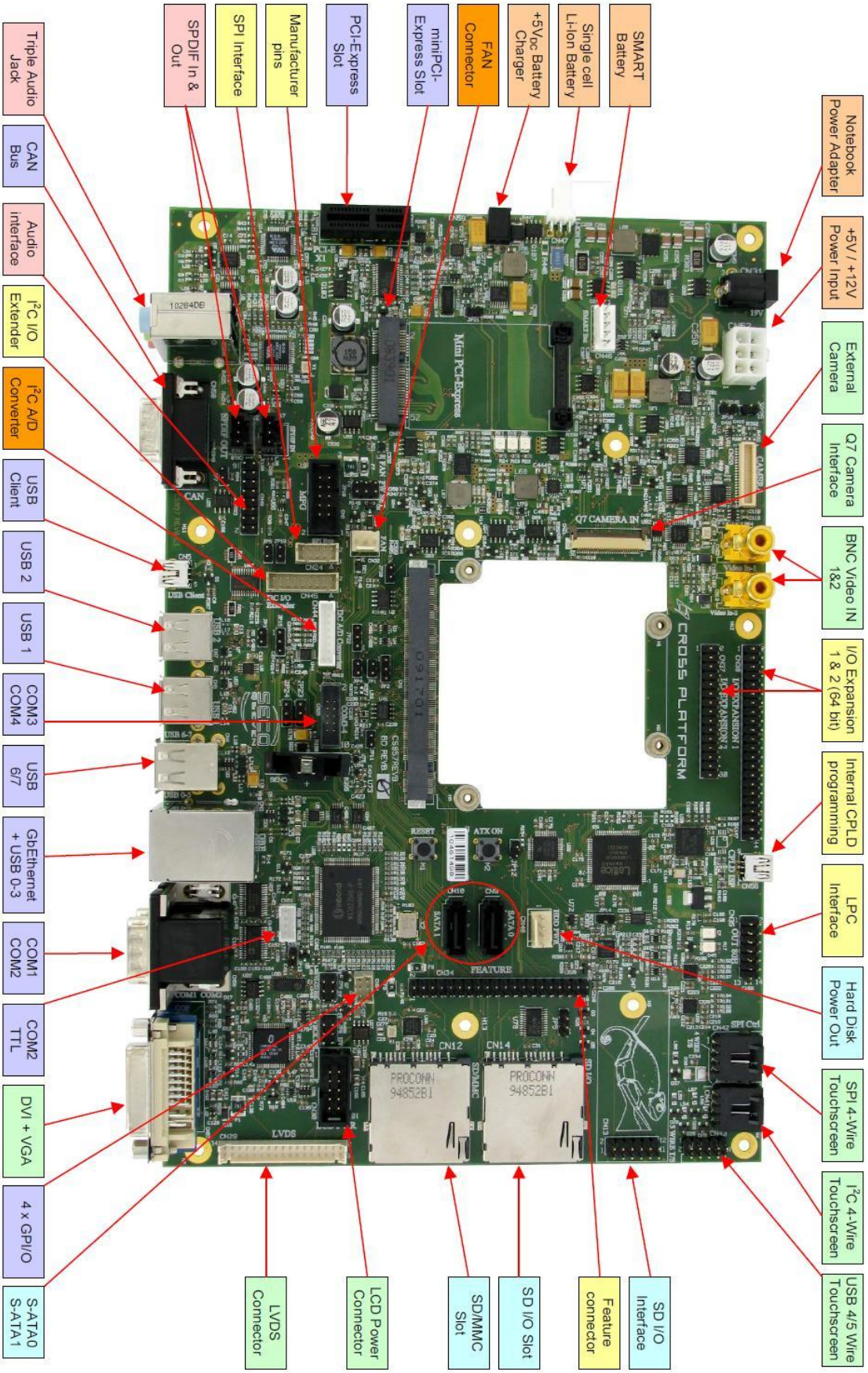
Batteries supplied with Cross Platform board are compliant to requirements of European Directive 2006/66/EC regarding batteries and accumulators. When putting out of order Cross Platform board, remove the batteries from the board in order to collect and dispose them according to the requirement of the same European Directive above mentioned. Even when replacing the batteries, the disposal has to be made according to these requirements.

Chapter 3 INTERFACES

- **Connectors placement**
- **Connectors Overview**
- **Power Supply Subsystem**
- **QSeven™ module connector**
- **Video Section**
- **Audio Section**
- **Mass Storage interfaces**
- **Standard Communications Interface**
- **Other Expansion Interfaces**
- **Miscellaneous**



3.1 Connectors placement



3.2 Connectors Overview

3.2.1 Connectors Overview

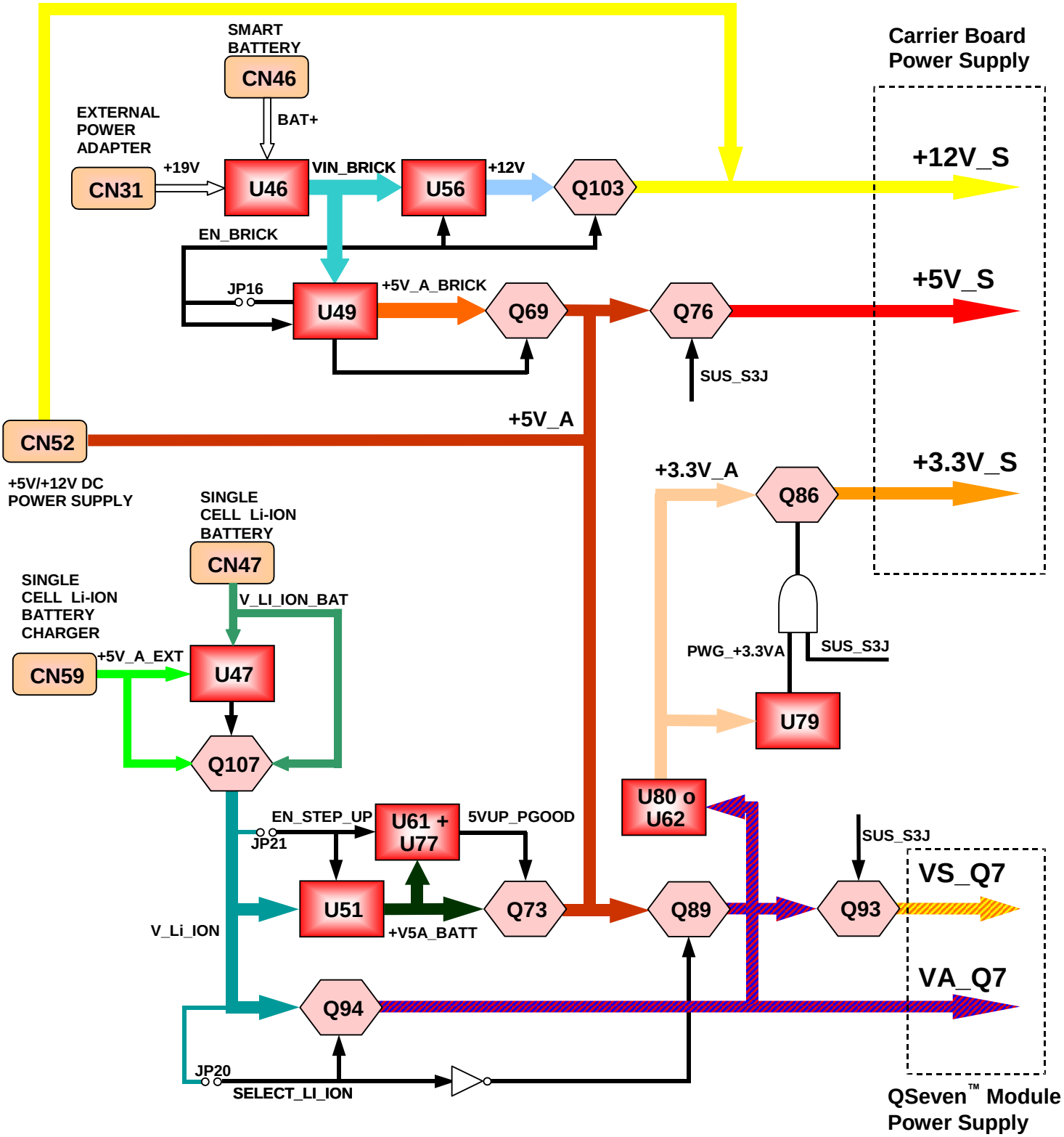
Name	Description	Name	Description
CN1	QSeven™ Connector	CN31	+19V Power Jack
CN2	Manufacturer Pins interface	CN32	FAN
CN3	USB 0-3 + Gigabit Ethernet	CN34	Feature Connector
CN4	USB 6-7	CN35	LPC strip
CN5	USB Client	CN36	Battery Holder
CN6	USB 1	CN37	I/O Expansion 2
CN7	USB 2	CN38	I/O Expansion 1
CN8	Audio Jacks	CN41	I2C 4 Wire T/S Interface
CN9	S-ATA 0	CN42	SPI 4 Wire T/S Interface
CN10	S-ATA 1	CN43	USB 4&5 Wire T/S interface
CN12	SD/MMC Slot	CN44	I2C A/D Converter
CN13	SD I/O Interface	CN45	I2C I/O Extender
CN14	SD I/O Slot	CN46	Smart Battery Connector
CN15	Mini PCI Express Slot	CN47	Li-Ion Battery Connector
CN16	PCI-Express Slot	CN48	Hard Disk Power
CN17	S/P-DIF audio IN	CN49	Audio Direct Interface
CN18	S/P-DIF audio OUT	CN50	CAN Interface
CN19	BNC Video In-2	CN51	COM2 TTL Interface
CN20	External Camera interface	CN52	+5V / +12V Power In
CN21	Qseven™ Camera Interface	CN54	GP I/O Connector
CN22	BNC Video In-1	CN56	Internal Lattice CPLD programmer
CN24	SPI Interface	CN57	DVI + VGA
CN25	COM3-4 interface	CN58	COM1 + COM2 Connector
CN29	LVDS Connector	CN59	Single Cell Battery Charger
CN30	LCD Power Connector		

3.2.2 Jumper Overview

Name	Description	Name	Description
JP1 + JP2	PENIRQ I/O pin selector	JP13	DVI / CRT Select
JP3	USB2 / SDI/O Card Selector	JP14	4/5 Wire T/S Selection
JP4	USB Host/Client Select	JP15	External Signal / Battery Voltage Input Selector for A/D conversion
JP5	SD I/O out selection	JP16	External Brick Power Supply Enable
JP6	AC'97 / HD Audio Codec Selector	JP19	Audio Codec Reset Connection
JP7	CAN Termination insertion	JP20	Li-ION Battery Selector
JP8	LCD Voltage Select	JP21	Enable Step-up Voltage Regulator
JP9	Backlight Voltage Select	JP22	Smart Battery / Li-Ion Battery Voltage reading
JP10	FAN Voltage Select	JP23	COM3 selector
JP11	External Firmware Hub Select	JP24	COM4 selector
JP12	Lattice CPLD Sleep Mode	JP25	Camera Input Selector

3.3 Power Supply Subsystem

In the following diagram, it is shown the logical scheme of power supply subsystem.



Referring to the previous image, we can evidence that:

- it is possible to supply the board in many ways:
  - with an external Notebook Power Adapter (+19V_{DC})
  - with a Smart Battery, whose recharge is made using the external Power Adapter
  - with a Single Cell Li-Ion Battery, recharged using the USB Client connection or using a +5V External Charger
  - directly with the +5V External
  - directly using a +5V/+12V_{DC} Power Supply
- there are 7 main power rails used in the Cross Platform board: VS_Q7 and VA_Q7 are used to supply the QSeven™ module. **VS_Q7** depends on the status of SUS_S3J signal, so it is **Sectioned** and can be turned off for power saving states of the board. **VA_Q7** is, instead, **Always** present, and has to be used as a **stand-by voltage**.

  +12V_S, +5V_S and +3.3V_S are used, instead, for giving power to all the components mounted on the Carrier Board; internally, also +3.3V_A and +5V_A are used, as Always present voltages, i.e., voltages that are active also in standby condition.

Please notice that +12V_S power line can be active only when the board is supplied using the Smart Battery, the external +19V_{DC} Power Adapter or the +5V_{DC}/+12V_{DC} Power Supply.

When the board is supplied using the Single Cell Li-Ion Battery and/or the +5V battery charger, +12V_S will not be available. This voltage is not used for the board, so that the board will continue to work, but external peripherals requiring this voltage can not work under this conditions. +12V_S voltage is carried out only on PCI Express slot (CN16), CAN connector (CN50), Backlight connector (CN30) and Fan connector (CN32).

VA_Q7 voltage can have different values, depending on the type of power supply given to the board and to the configuration of jumpers JP20 and JP21.

When JP20 is inserted, then VA_Q7 and VS_Q7 will have the same voltage of the single cell Li-Ion battery (typically 3.7V). This configuration can be used exclusively with SECO RISC modules, that can accept a voltage lower than +5V_{DC} (standard for QSeven™ modules). In case the external +5V_{DC} charger is connected to the board, then VA_Q7 and VS_Q7 will be at +5V_{DC} value

When the board is supplied through single cell Li-Ion battery and/or external battery charger (CN59), it is ALWAYS necessary to insert jumper JP21, to enable the Step-Up voltage regulator, that generates the +5V_A power rail, necessary to give power to internal circuitry of the Carrier Board.

In case of use of Smart Battery and/or external Power Adapter, it is necessary to insert jumper JP16, to enable the output on +12V_S power rail.

In the following table is summarised the configuration that **must** have jumpers JP16, JP20 and JP21 depending on the type of Power Supply used, and the subsequent values of voltages VA_Q7 and VS_Q7.

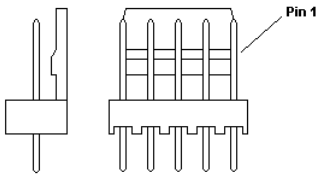
Power Supply connected to:	JP16	JP20	JP21	VA_Q7 and VS_Q7 value
CN46 and/or CN31	**ON**	OFF	OFF	+5V_{DC}
CN47 and/or CN59	OFF	**ON**	**ON**	Equal to Li-Ion single cell voltage, or +5V_{DC} in case the external charger is connected to CN59
CN47 and/or CN59	OFF	OFF	**ON**	+5V_{DC}
CN52	OFF	OFF	OFF	+5V_{DC}

3.3.1 Smart Battery Connector

Cross Platform board mounts a battery charger, so that is possible to connect the board to a Smart Battery, like typical batteries for notebooks, so that the system (Carrier board + QSeven™ module) can operate even in absence of direct connection to voltage lines.

Smart battery management is made through SMBus, and related signals are carried on a 5pin, p2.54mm, single row connector, type MOLEX 22-27-2051 or equivalent.

Smart Battery Connector – CN46	
Pin	**Signal**
1	V_Battery
2	SMB_CLK
3	SMB_DAT
4	Safety_Signal
5	GND



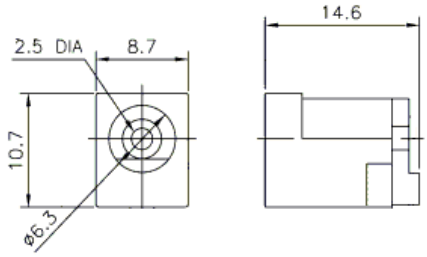
Smart Battery Voltage can be in range $14.4V_{DC}$ ÷ $+19V_{DC}$.

3.3.2 Notebook Power Adapter Connector

For the connection of a notebook–like Power Adapter, onboard there is a standard 6.3mm (internal pin, diameter 2.5mm) Power jack.

Input Voltage rating can vary from a minimum of $+16V_{DC}$ up to a maximum of $+27V_{DC}$. The use of a $+19V_{DC}$ ± 5% power adapter is recommended.

Internal pin is V_{IN} power line.



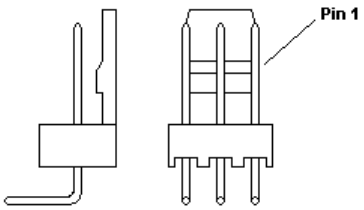
3.3.3 Single Cell Li-Ion Battery Connector

As described in chapter 3.3, for applications requiring a very small power consumption (especially those RISC based), Cross Platform board can be supplied also using a simple Li-Ion $3.7V_{DC}$ battery.

Onboard there is a Single Cell Li-Ion battery charger, ST Microelectronics STW4102, with internal gas gauge for reading of battery charge level.

For connection to the battery there is a 3-pin connector, type MOLEX 22-05-7038 or equivalent.

Li-Ion Battery Connector – CN47	
Pin	**Signal**
1	V_Li-Ion_Battery
2	TBAT
3	Gas_Gauge_Sense

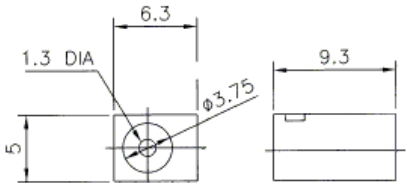


Single Cell Li-Ion Battery Voltage can be in range $3.7V_{DC}$ ÷ $+4.2V_{DC}$, and can be recharged using an external $+5V_{DC}$ Charger (see next paragraph) or using an USB Client connection (see par. 3.8.1).

TBAT signal can be read using the internal I^2C A/D converter (see par. 3.10.2).

3.3.4 +5V$_{DC}$ External Charger Connector

To recharge the single cell battery, or just to supply the board using a +5V$_{DC}$ wall power adapter, a second DC jack is present, that is a standard 3.8mm (internal pin, diameter 1.3mm) power jack.



Use this power jack only to connect +5V$_{DC}$ ± 5% Power Adapter.

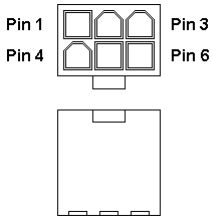
Internal pin is V$_{IN}$ power line (+5V_A_EXT).

3.3.5 Direct DC (+5V$_{DC}$, +12V$_{DC}$) Connector

Another chance to supply Cross Platform board is to use an external AT/ATX PSU, which can provide +5V$_{DC}$ and +12V$_{DC}$ voltages.

This connector is type MOLEX Mini-Fit Jr connector, p/n 39-28-1063, or equivalent, with the pinout indicated in the following table.

Direct DC Connector – CN52			
Pin	**Signal**	**Pin**	**Signal**
1	+12V_S	4	+12V_S
2	GND	5	GND
3	+5V_A	6	+5V_A



3.3.6 Power and Reset Button

To perform the power on sequence, or initiate a reset sequence, of QSeven™ CPU module, on Cross Platform Carrier board there are two power buttons, named respectively M2 and M1.

M2 (ATX On) button is connected directly to PWRBTN# QSeven™ module signal.

M1 (RESET) button is connected directly to RSTIN# QSeven™ module signal.

3.4 QSeven™ module connector

According to QSeven™ specifications rel. 1.20, for the insertion of the CPU module there is a standard MXM connector, height 6.5mm, type LOTES AAA-MXM-006-K01.

Pinout here reported is compliant to QSeven™ specifications release 1.20, with the only exception of signals written in bold characters in the table, that are peculiar of SECOQSeven philosophy.

For standard signals, please refer to QSeven™ Specifications Rel.1.20 for a more exhaustive explanation.

There are some SECOQSeven specific signals that are explained more i detail in Appendix, at the end of this User Manual.

PIN	Signal	Description	PIN	Signal	Description
1	GND	Power Ground	2	GND	Power Ground
3	GBE_MDI3-	GigabitEthernet differential pair 3-	4	GBE_MDI2-	GigabitEthernet differential pair 2-
5	GBE_MDI3+	GigabitEthernet differential pair 3+	6	GBE_MDI2+	GigabitEthernet differential pair 2+
7	GBE_LINK100#	Ethernet 100Mb/s link indicator	8	GBE_LINK1000#	Ethernet 1000Mb/s link indicator
9	GBE_MDI1-	Ethernet differential pair 1-	10	GBE_MDI0-	Ethernet differential pair 0-
11	GBE_MDI1+	Ethernet differential pair 1+	12	GBE_MDI0+	Ethernet differential pair 0+
13	N.C.	Not Connected	14	GBE_ACT#	Ethernet Activity indicator
15	GBE_CTREF	Ethernet Reference Voltage	16	SUS_S5#	Soft Off (S5) Signal
17	WAKE#	External System Wake event	18	SUS_S3#	Suspend to RAM (S3) signal
19	SUS_STAT#	Suspend Status Signal Output	20	PWR_BTN#	Power Button Input
21	SLP_BTN#	Sleep Button	22	LID_BTN#	LID Button Input
23	GND	Power Ground	24	GND	Power Ground
25	GND	Power Ground	26	PWGIN	QSeven™ module Power Good In
27	BATLOW#	Battery Low Input	28	RSTBTN#	Reset Button Input
29	SATA0_TX+	Serial ATA Channel 0 Transmit +	30	SATA1_TX+	Serial ATA Channel 1 Transmit +
31	SATA0_TX-	Serial ATA Channel 0 Transmit -	32	SATA1_TX-	Serial ATA Channel 1 Transmit -
33	SATA_ACT#	Serial ATA Activity LED	34	GND	Power Ground
35	SATA0_RX+	Serial ATA Channel 0 Receive +	36	SATA1_RX+	Serial ATA Channel 1 Receive +
37	SATA0_RX-	Serial ATA Channel 0 Receive -	38	SATA1_RX-	Serial ATA Channel 1 Receive -
39	GND	Power Ground	40	GND	Power Ground
41	BIOS_DISABLE#	Module BIOS disable / BOOT alternate Firmware	42	SDIO_CLK	SDIO Clock
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
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 Signal
57	GND	Power Ground	58	GND	Power Ground
59	HDA_SYNC	HDAudio/AC'97 Sync signal	60	SMB_CLK	System Management Bus Clock
61	HDA_RST#	HDAudio/AC'97 Codec Reset	62	SMB_DAT	System Management Bus Data
63	HDA_BITCLK	HDAudio/AC'97 Bit Clock	64	SMB_ALERT#	System Management Bus Alert Input

65	HDA_SDI	HDAudio/AC'97 Serial Data Input	66	I2C_CLK	I^2C Bus Clock Line
67	HDA_SDO	HDAudio/AC'97 Serial Data Out	68	I2C_DAT	I^2C Bus Data Line
69	THRM#	Thermal Alarm signal	70	WDTRIG#	Watchdog trigger signal
71	THRMTRIP#	Thermal Shutdown signal	72	WDOUT	Watchdog event indicator
73	GND	Power Ground	74	GND	Power Ground
75	USBP7-	USB Data Port 7 -	76	USBP6-	USB Data Port 6 -
77	USBP7+	USB Data Port 7 +	78	USBP6+	USB Data Port 6 +
79	USB_6_7_OC#	USB ports 6 / 7 overcurrent detect	80	USB_4_5_OC#	USB ports 4 / 5 overcurrent detect
81	USBP5-	USB Data Port 5 -	82	USBP4-	USB Data Port 4 -
83	USBP5+	USB Data Port 5 +	84	USBP4+	USB Data Port 4 +
85	USB_2_3_OC#	USB ports 2 / 3 overcurrent detect	86	USB_0_1_OC#	USB ports 0 / 1 overcurrent detect
87	USBP3-	USB Data Port 3 -	88	USBP2-	USB Data Port 2 -
89	USBP3+	USB Data Port 3 +	90	USBP2+	USB Data Port 2 +
91	USB_CC	USB Client Connect	92	USB_ID	USB Port 1 mode configuration
93	USBP1-	USB Data Port 1 -	94	USBP0-	USB Data Port 0 -
95	USBP1+	USB Data Port 1 +	96	USBP0+	USB Data Port 0 +
97	GND	Power Ground	98	GND	Power Ground
99	LVDS_A0+	LVDS channel A pair 0 +	100	LVDS_B0+	LVDS channel B pair 0 +
101	LVDS_A0-	LVDS channel A pair 0 -	102	LVDS_B0-	LVDS channel B pair 0 -
103	LVDS_A1+	LVDS channel A pair 1 +	104	LVDS_B1+	LVDS channel B pair 1 +
105	LVDS_A1-	LVDS channel A pair 1 -	106	LVDS_B1-	LVDS channel B pair 1 -
107	LVDS_A2+	LVDS channel A pair 2 +	108	LVDS_B2+	LVDS channel B pair 2 +
109	LVDS_A2-	LVDS channel A pair 2 -	110	LVDS_B2-	LVDS channel B pair 2 -
111	LVDS_PPEN	LCD Panel Power Enable	112	LVDS_BLEN	LCD Panel Backlight Enable
113	LVDS_A3+	LVDS channel A pair 3 +	114	LVDS_B3+	LVDS channel B pair 3 +
115	LVDS_A3-	LVDS channel A pair 3 -	116	LVDS_B3-	LVDS channel B pair 3 -
117	GND	Power Ground	118	GND	Power Ground
119	LVDS_A_CLK+	LVDS Channel A Clock +	120	LVDS_B_CLK+	LVDS channel B Clock +
121	LVDS_A_CLK-	LVDS Channel A Clock -	122	LVDS_B_CLK-	LVDS channel B Clock -
123	LVDS_BLT_CTRL	LCD Panel brightness control	124	ONE_WIRE	One Wire Bus Line
125	LVDS_DID_DAT	LVDS DisplayID (I^2C) Data	126	GPIO_0	General Purpose I/O 0
127	LVDS_DID_CLK	LVDS DisplayID (I^2C) Clock	128	GPIO_1	General Purpose I/O 1
129	CAN_TX	CAN Port TX output	130	CAN_RX	CAN Port RX input
131	SDVO_BCLK+	SDVO Clock +	132	N.C.	Not Connected
133	SDVO_BCLK-	SDVO Clock -	134	N.C.	Not Connected
135	GND	Power Ground	136	GND	Power Ground
137	SDVO_GREEN+	SDVO Green Data Line +	138	N.C.	Not Connected
139	SDVO_GREEN-	SDVO Green Data Line -	140	N.C.	Not Connected
141	GND	Power Ground	142	GND	Power Ground
143	SDVO_BLUE+	SDVO Blue Data Line +	144	N.C.	Not Connected
145	SDVO_BLUE-	SDVO Blue Data Line -	146	N.C.	Not Connected
147	GND	Power Ground	148	GND	Power Ground
149	SDVO_RED+	SDVO Red Data Line +	150	SDVO_CTRL_DAT	SDVO I^2C Control Data Line

151	SDVO_RED-	SDVO Red Data Line -	152	SDVO_CTRL_CLK	SDVO I^2C Control Clock Line
153	HDMI_HPD#	HDMI Hot Plug Detect	154	N.C.	Not Connected
155	PCIE_CLK_REF+	PCI-E Reference Clock +	156	PCIE_WAKE#	Wake signal from external devices
157	PCIE_CLK_REF-	PCI-E Reference Clock -	158	PCIE_RST#	Reset signal to external devices
159	GND	Power Ground	160	GND	Power Ground
161	RISC_UART1_RTS	RISC Module COM1 RTS Signal	162	RISC_UART1_CTS	RISC Module COM1 CTS Signal
163	RISC_UART1_TX	RISC Module COM1 TX Signal	164	RISC_UART1_RX	RISC Module COM1 RX Signal
165	GND	Power Ground	166	GND	Power Ground
167	RISC_UART2_RTS	RISC Module COM2 RTS Signal	168	RISC_UART2_CTS	RISC Module COM2 CTS Signal
169	RISC_UART2_TX	RISC Module COM2 TX Signal	170	RISC_UART2_RX	RISC Module COM2 RX Signal
171	N.C.	Not Connected	172	N.C.	Not Connected
173	PCIE1_TX+	PCI-E Channel 1 Transmit +	174	PCIE1_RX+	PCI-E Channel 1 Receive +
175	PCIE1_TX-	PCI-E Channel 1 Transmit -	176	PCIE1_RX-	PCI-E Channel 1 Receive -
177	IRQ_WiFi	WiFi Card IRQ line	178	N.C.	Not Connected
179	PCIE0_TX+	PCI-E Channel 0 Transmit +	180	PCIE0_RX+	PCI-E Channel 0 Receive +
181	PCIE0_TX-	PCI-E Channel 0 Transmit -	182	PCIE0_RX-	PCI-E Channel 0 Receive -
183	GND	Power Ground	184	GND	Power Ground
185	LPC_AD0	LPC Bus Address/Data 0	186	LPC_AD1	LPC Bus Address/Data 1
187	LPC_AD2	LPC Bus Address/Data 2	188	LPC_AD3	LPC Bus Address/Data 3
189	LPC_CLK	LPC Bus Clock	190	LPC_FRAME#	LPC Bus Frame signal
191	SERIRQ	Serialised Interrupt	192	N.C.	Not Connected
193	VCC_RTC	RTC Power Line (coming from CR2032 Battery)	194	SPKR	Speaker signal
195	FAN_TACHOIN	Fan Tachometer Input	196	FAN_PWMOUT	FAN Speed Control
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
201	SPI_MISO	SPI Master Serial Input / Slave Serial Output	202	SPI_CS1#	SPI Chip Select 1
203	SPI_SCK	SPI Clock	204	MFG_NC4	Manufacturer Reserved Pin
205	VA_Q7	Standby Power Supply Line	206	VA_Q7	Standby Power Supply Line
207	MFG_NC0	Manufacturer Reserved Pin	208	MFG_NC2	Manufacturer Reserved Pin
209	MFG_NC1	Manufacturer Reserved Pin	210	MFG_NC3	Manufacturer Reserved Pin
211	MUX_SEL_FS	MFG Pin selection signal	212	VS_Q7	Sectioned Power Supply Line
213	VS_Q7	Sectioned Power Supply Line	214	VS_Q7	Sectioned Power Supply Line
215	VS_Q7	Sectioned Power Supply Line	216	VS_Q7	Sectioned Power Supply Line
217	VS_Q7	Sectioned Power Supply Line	218	VS_Q7	Sectioned Power Supply Line
219	VS_Q7	Sectioned Power Supply Line	220	VS_Q7	Sectioned Power Supply Line
221	VS_Q7	Sectioned Power Supply Line	222	VS_Q7	Sectioned Power Supply Line
223	VS_Q7	Sectioned Power Supply Line	224	VS_Q7	Sectioned Power Supply Line
225	VS_Q7	Sectioned Power Supply Line	226	VS_Q7	Sectioned Power Supply Line
227	VS_Q7	Sectioned Power Supply Line	228	VS_Q7	Sectioned Power Supply Line
229	VS_Q7	Sectioned Power Supply Line	230	VS_Q7	Sectioned Power Supply Line

3.5 Video Section

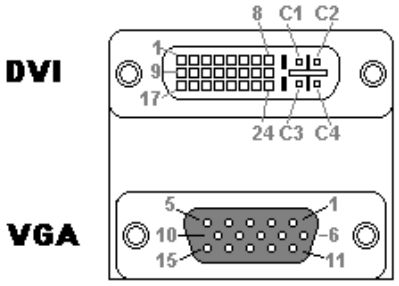
3.5.1 DVI + VGA Combo Connector

QSeven™ standard doesn't include VGA signals, therefore for use of standard CRT monitors on Cross Platform board is included an SDVO Video controller, able to use SDVO signals coming from QSeven™ connector to generate signals for an external CRT.

These RGB signals are carried out on a standard DB-15 HD connector, CN57, which is a combo DB-15 HD female + DVI-I female connector, type ASTRON p/n 1860044-002-R.

Pinout follows VGA VESA DDC2 standard; related pinout is reported in the following table, however, for completeness of documentation.

VGA Connector – CN57			
Pin	**Signal**	**Pin**	**Signal**
1	RED	2	GREEN
3	BLUE	4	N.C.
5	GND	6	GND
7	GND	8	GND
9	$+5V_{CRT}$	10	GND
11	N.C.	12	CRT DDC DATA
13	HSYNC	14	VSYNC
15	CRT DDC CLOCK		



According to QSeven™ specifications, SDVO signal pins are also shared with TMDS differential pairs, to manage DVI/HDMI monitors. These signals are carried on the same combo connector CN57, where is implemented, therefore a **DVI-D** Single Link connection.

Please refer to QSeven™ specifications rel. 1.20 for the correspondence between SDVO and TMDS signals on golden finger connector.

DVI-D connector pinout – CN57					
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+
3	GND	11	GND	19	GND
4	---	12	---	20	---
5	---	13	---	21	---
6	HDMI_CTRL_CLK	14	+5V_S	22	GND
7	HDMI_CTRL_DAT	15	GND	23	TMDS Clock 0+
8	---	16	HDMI_HPD#	24	TMDS Clock 0-
C1	---				
C2	---				
C3	---				
C4	---				
C5	---				

Please notice that SDVO interface is used, internally, also for generation of CRT signals on same connector. Only one of these two interfaces at a time can be used. Selection is made using jumper JP13, according to the following table. Please also notice that CRT and / or DVI functionalities depends also on CPU module used, i.e., if SDVO and/or TMDS signals are supported by the module.

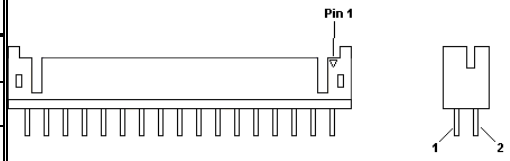
JP13	Interface enabled
Inserted	DVI Enabled
Not inserted	CRT enabled

3.5.2 LVDS Connector

Cross Platform board can be interfaced to LCD displays using its LVDS interface, which allows the connection of displays with a color depth of 18 or 24 bit, single or dual channel. Type of LCD displays supported depends on QSeven™ CPU module used, since LVDS interface comes directly through QSeven™ golden finger connector. Please refer to QSeven™ connectors pinout for a description of the signals.

For the connection, a connector type JST B34B-PHDSS or equivalent (2 x 17p, male, straight, P2, low profile, polarized) is provided, with the following pin-out.

LVDS Connector – CN29			
Pin	**Signal**	**Pin**	**Signal**
1	LVDS_DID_CLK	2	LVDS_DID_DAT
3	N.C.	4	N.C.
5	LVDS_A0-	6	GND
7	LVDS_PPEN	8	LVDS_A0+
9	LVDS_A1+	10	LVDS_A1-
11	LVDS_A2+	12	LVDS_BLEN
13	N.C.	14	LVDS_A2-
15	LVDS_A_CK+	16	LVDS_A_CK-
17	LVDS_A3+	18	LVDS_BLT_CTRL
19	GND	20	LVDS_A3-
21	LVDS_B0+	22	LVDS_B0-
23	LVDS_B1-	24	GND
25	GND	26	LVDS_B1+
27	LVDS_B2+	28	LVDS_B2-
29	LVDS_B_CK+	30	GND
31	N.C.	32	LVDS_B_CK-
33	LVDS_B3-	34	LVDS_B3+

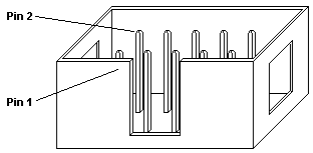


3.5.3 LCD Power connector

Onboard there is also a small connector intended for carrying out power supplies, for the connection to an eventual panel backlight's module. This connector carries out both Power supplies and control signals.

The connector, CN20, is an IDC connector, dual row, 10 pin, p2.54 mm connector, type MATSUYAMA LN210 or equivalent, with following pinout.

LCD Power Connector – CN30			
Pin	**Signal**	**Pin**	**Signal**
1	SW_VDD	2	SW_BACK
3	VLCD	4	VBCK
5	LVDS_PPEN	6	LVDS_BLEN
7	N.C.	8	N.C.
9	GND	10	GND

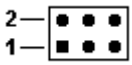


SW_VDD and SW_BACK means Switched_VDD and Switched_Backlight, i.e., these are the voltage that can be supplied to LCD and backlight, respectively.

They can be activated via BIOS / OS driver by driving signals LVDS_PPEN and LVDS_BLEN, that are also reported on this same connector.

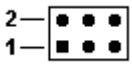
LCD software-driven voltage, i.e. signal SW_VDD, can also be connected to +5V_S or +3.3V_S power rails, using jumper JP8, which is a standard pin header, P2.54mm, 2x3 pin.

JP8 position	SW_VDD Voltage Value
1-2	+5V_S
3-4	N.C.
5-6	+3.3V_S



Similarly, backlight software-driven voltage, signal SW_BACK, can be connected to +5V_S or +12V_S power rails, using jumper JP9, which is another standard pin header, P2.54mm, 2x3 pin.

JP9 position	SW_BACK Voltage Value
1-2	+12V_S
3-4	N.C.
5-6	+5V_S



3.5.4 Camera interface

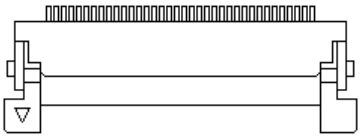
Some CPU modules can include an Image Signal Processing Subsystem, that can be used for video applications, like video-preview, video recording and frame grabbing.

This set of signals are not included between QSeven™ signals carried on golden finger, therefore SECOQSeven modules has an additional FFC/FPC connector on a side, always in the same position, with a standardised pinout.

On Cross Platform Carrier board, therefore, there is an identical FFC/FPC connector, type HIROSE p/n FH12A-36-S-0.5SH(55), near the position of QSeven™ module Camera connector, to allow the connection of module's ISP to an external camera, directly (through dedicated connector CN20) or using an internal NTSC/PAL/SECAM Video Decoder (Texas Instruments® TVP5150A), that can be connected to any video source using two dedicated BNC Connectors, CN19 and CN22.

Signals coming from external Camera interface CN20 must be at the same electrical level of QSeven™ Camera Voltage Module (V_CAM), while signals coming through the two BNC connectors must be at $3.3V_{DC}$ electrical level.

Qseven™ CAMERA INTERFACE – CN21			
Pin	**Signal**	**Pin**	**Signal**
1	Cam_External_Clock_A	19	CAM_EXP1
2	GND	20	CAM_EXP2
3	Cam_External_Clock_B	21	CAM_EXP3
4	GND	22	CAM_EXP4
5	CAM_PCLK	23	CAM_I2C_SCL
6	CAM_VS	24	CAM_I2C_SDA
7	CAM_HS	25	CAM_RESETB
8	CAM_FIELD	26	GND
9	GND	27	V_EXT
10	CAM_D0	28	V_EXT
11	CAM_D1	29	V_CAM
12	CAM_D2	30	V_CAM
13	CAM_D3	31	CAM_EXP5
14	CAM_D4	32	CAM_EXP6
15	CAM_D5	33	CAM_EXP7
16	CAM_D6	34	CAM_EXP8
17	CAM_D7	35	CAM_EXP9
18	CAM_EXP0	36	CAM_EXP10



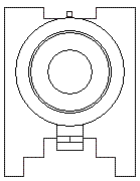
Note: CAM_D[0÷7] signals are standard signals for an external 8-bit video source. CAM_EXP[0÷10] are expansion signals for Qseven™ modules that can manage video sources wider than 8-bit and or multiple video sources.

To use the Direct External Camera Interface or the two external BNC connectors, it is necessary to select one of the two interfaces using jumper JP25.

JP25	Interface enabled
Inserted	Direct External camera connection CN20
Not inserted	Internal TVP5150A video Decoder, BNC

To the two separate BNC connectors, it is possible to connect one Composite video source (use connector CN22, in that case) or one S-Video source, using both connectors.

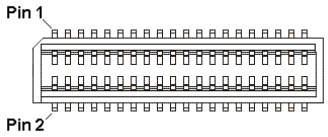
BNC Video In 1 – CN22	
Internal Pin	Composite In / S-Video Luma
External	Analog GND



BNC Video In 2 – CN19	
Internal Pin	S-Video Chroma
External	Analog GND

External Camera connector is 40 pin p 0.8mm dual row connector, type NELTRON p/n 2011-40G-415 or equivalent.

External Camera Connector – CN20			
Pin	**Signal**	**Pin**	**Signal**
1	Cam_External_Clock_A	2	CAM_EXP0
3	Cam_External_Clock_B	4	CAM_EXP1
5	CAM_PCLK	6	CAM_EXP2
7	CAM_VS	8	CAM_EXP3
9	CAM_HS	10	CAM_EXP4
11	CAM_FIELD	12	CAM_EXP5
13	CAM_D0	14	CAM_EXP6
15	CAM_D1	16	CAM_EXP7
17	CAM_D2	18	CAM_EXP8
19	CAM_D3	20	CAM_EXP9
21	CAM_D4	22	CAM_EXP10
23	CAM_D5	24	V_EXT
25	CAM_D6	26	V_EXT
27	CAM_D7	28	V_EXT
29	CAM_I2C_SCL	30	V_CAM
31	CAM_I2C_SDA	32	V_CAM
33	CAM_RESETB	34	V_CAM
35	GND	36	GND
37	GND	38	GND
39	GND	40	GND

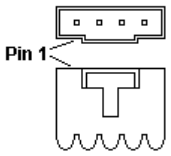


3.5.5 Touch Screen Controllers

Since it is designed for Development Purposes, Cross Platform Carrier board offers three different Touch Screen controllers, that have different bus interfaces.

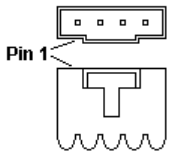
First controller (Texas Instruments® TSC2004) is placed on I2C bus, and its external interface is available on connector CN41, that is a 4-pin single row connector, type TYCO p/n 5-103634-3 or equivalent, with following pinout:

I^2C 4-Wire Touch Screen Interface – CN41	
Pin	**Signal**
1	X_Right
2	Y_Top
3	X_Left
4	Y_Bottom



First controller (Texas Instruments® TSC2006) is placed on SPI bus, and its external interface is available on connector CN42, that is another 4-pin single row connector, type TYCO p/n 5-103634-3 or equivalent, with following pinout:

SPI 4-Wire Touch Screen Interface – CN42	
Pin	**Signal**
1	X_Right
2	Y_Top
3	X_Left
4	Y_Bottom



The last Touch Screen Controller (E-Galax ETP-CP-S45XUR) is placed on USB Lane#5 coming out from QSeven™ CPU module. It can control both 4-Wire and 5-Wire Touch Screen, therefore it has a double interface, carried out on a 9-pin straight pin header, p 2.54mm, with following pinout:

USB 4 & 5 Wire Touch Screen Interface – CN43			
Pin	**Signal**	**Pin**	**Signal**
1	5Wire_UL	2	4Wire_X+
3	5Wire_UR	4	4Wire_Y+
5	5Wire_Probe	6	4Wire_X-
7	5Wire_LL	8	4Wire_Y-
9	5Wire_LR		

Selection between 4-Wire and 5-Wire Interface for CN43 is made using jumper JP14, which is another standard pin header, P2.54mm, 1x2 pin.

JP14	Touch Screen Interface
Inserted	4-Wire
Not inserted	5-Wire

All these Touch Screen Controller manages a PEN_IRQ signal, that is a signal not included in QSeven™ standard signals. However, according to SECOQSeven philosophy, it is possible to manage this signal by connecting it to a generic input pin on golden finger, depending on what signals are effectively used on golden finger connector.

Selection of this kind of connection is made using jumpers JP1 and JP2, accordin to following tables:

JP1	PEN_IRQ connected to:
Inserted	WAKE# (pin17)
Not inserted	Not connected to pin 17

JP2 Position	PEN_IRQ connected to:
1-2	FAN_TACHOIN (Pin 195)
2-3	ONE_WIRE (Pin 124)

Only one jumper at a time must be inserted, so that the PEN_IRQ signal is directed to only one pin on the golden finger QSeven™ connector-

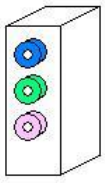
3.6 Audio Section

QSeven™ specifications Rel. 1.20 contemplate the possibility of having indifferently AC'97 or HD audio interface on the module, signals carried on golden finger connector are the same.

For this reason, Cross Platform Carrier Board, integrates both an High Definition Audio Codec, VIA VT1708B, and an AC'97 Audio Codec, VIA VT1613.

Audio signals of both codecs are carried, through a switch, on the same triple jack connector, type TOP YANG 27305-A3A1100N (light blue/light green/pink) or equivalent.

Triple Audio Jack – CN8	
Color	**Signal**
Light Blue	Line IN (Left + Right)
Light Green	Front OUT (Left + Right)
Pink	MIC IN (Left + Right)



Selection between AC'97 and HD Audio Codec is made using jumper JP6, which is another standard pin header, P2.54mm, 1x2 pin.

JP6	Audio Codec enabled
Inserted	HD Audio Codec
Not inserted	AC'97 Audio Codec

It is also possible not to use any one of the two Audio Codec mounted on board, for example, when the QSeven™ CPU module has an I2S interface. In this case, audio signals are carried on a 16 pin dual row P2.54 mm pin header, with the following pinout:

Audio Direct Interface – CN49			
Pin	**Signal**	**Pin**	**Signal**
1	+3.3V_S	2	+3.3V_S
3	GND	4	I2C_DAT
5	HDA_SDO	6	I2C_CLK
7	HDA_SI	8	GND
9	GND	10	HDA_BITCLK
11	HDA_SYNC	12	GND
13	HDA_RST#	14	CODEC_SEL(*)
15	GND	16	GND

(*) CODEC_SEL signal is the Codec Enabling Signal generated internally from +3.3V_S Power rail using jumper JP6, previously described. When JP6 is not inserted, this signal is high.

Selection between AC'97 and HD Audio Codec is made using jumper JP6, which is another standard pin header, P2.54mm, 1x2 pin.

When using the Audio Direct interface, it is necessary to disconnect the HDA_RST# switch from the two internal decoder (in this case, they are forced to remain always in a reset state), using jumper JP19.

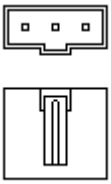
JP19	Configuration for use of:
Inserted	Integrated Audio Codecs
Not inserted	Direct Audio Interface

Finally, in case the Carrier Board is used in conjunction with QSeven™ modules offering an HD Audio interface (HD Audio internal Codec must be enabled using JP6), there are also two S/PDIF connectors, for the link to digital audio media, like for example CD players.

Connectors are type TYCO 103669-2 or equivalent.

S/PDIF OUT connector – CN18	
Pin	**Signal**
1	+3.3V_S
2	S/PDIF_OUT
3	Audio_GND

S/PDIF IN connector – CN17	
Pin	**Signal**
1	+3.3V_S
2	S/PDIF_IN
3	Audio_GND



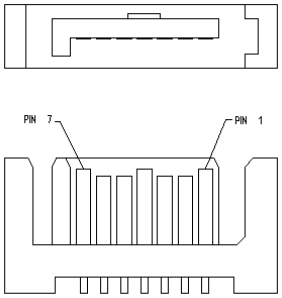
3.7 Mass Storage interfaces

3.7.1 S-ATA Connectors

For the connection of external Hard Disk Drives, there are two standard S-ATA connectors, carrying out S-ATA signals coming from QSeven™ CPU module.

S-ATA Channel 0 is carried on connector CN9, while S-ATA Channel 1 is present on connector CN10.

S-ATA connector – CN9 & CN10	
Pin	**Signal**
1	GND
2	SATAx_Tx+
3	SATAx_Tx-
4	GND
5	SATAx_Rx-
6	SATAx_Rx+
7	GND

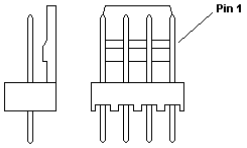


3.7.2 Hard Disk Power

When using and external Hard Disk Drive, it is possible to give power supply to it directly by the Carrier Board, without the need of another external PSU, using the +5V_S Power rail.

For this reason, onboard there is a dedicated 4-pin connector, type MOLEX 22-27-2041 or equivalent, with following pinout.

Hard Disk Power – CN48	
Pin	**Signal**
1	+5V_S
2	GND
3	GND
4	---



3.7.3 SD/MMC Card slot

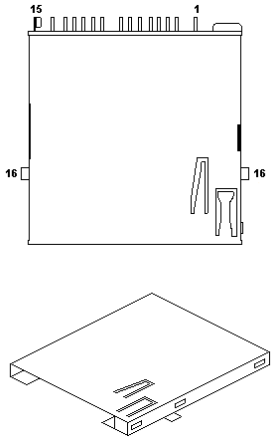
Using USB2 Lane, coming from QSeven™ module, on the carrier board Cross Platform there is an USB to SD/MMC bridge, that makes any board able to use standard SD or MMC Cards, to be used as Mass Storage Devices.

USB2 lane is internally switched, so that it is also possible to use it as a standard USB interface. Selection between standard use

JP3	USB Lane #2 used for
Inserted	SD/MMC Bridge
Not inserted	Standard USB interface CN7

The connector used is a combo SD/MMC slot, push-push type, H=3.2 mm., type PROCONN SDSN13-A0-0005 or equivalent. Pinout here reported is related only to signal routing on specific connector, internally the pin-out is the same of any standard SD or MMC 4.0 card

SD/MMC Card Slot – CN12	
Pin	**Signal**
1	SD_DATA_2
2	SD_DATA_3
3	SD_DATA_4
4	SD_Command
5	SD_DATA_5
6	SD_CardDetect#
7	GND
8	SD_Power (+3.3V)
9	SD_Clock
10	SD_DATA_6
11	GND
12	SD_DATA_7
13	SD_DATA_0
14	SD_DATA_1
15	SD_WriteProtect
16	GND



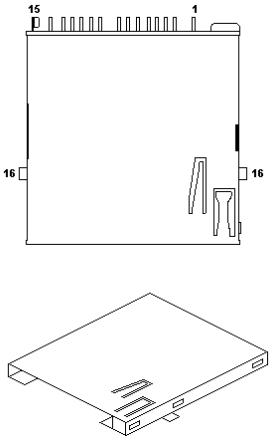
3.7.4 SD /IO Interface

Since QSeven™ standard contemplates signals for Secure Digital Input/Output and MultiMedia Cards, on Cross Platform board there is also a socket, for the use of this type of cards, to be used as Mass Storage Device and/or Boot Device (if the QSeven™ module you are using with this carrier board implements this functionality) and/or I/O expansion slot.

Please refer to your QSeven™ module for information about Card types supported by the chipset.

The connector is another combo SD/MMC connector, push-push type, H=3.2 mm., type PROCONN SDSN13-A0-0005 or equivalent. Pinout here reported is related only to signal routing on specific connector, internally the pin-out is the same of any standard SD I/O card.

SD I/O Card Connector – CN14	
Pin	**Signal**
1	SDIO_DAT2
2	SDIO_DAT3
3	SDIO_DAT4
4	SDIO_CMD
5	SD_DATA_5
6	SDIO_CD#
7	GND
8	SDIO_Power(+3.3V_S)
9	SDIO_CLK
10	SDIO_DAT6
11	GND
12	SDIO_DAT7
13	SDIO_DAT0
14	SDIO_DAT1
15	SDIO_WP
16	GND



SDI/O signals, however, can also be switched to an internal pin header, 2x6 pin, p2.54mm, for users that intend to use SD I/O interface to develop their own device. For this purpose, on this connector it is also reported the additional IRQ dedicated line that has been carried on QSeven™ connector (see par. 3.4 for further details).

SD I/O Pin Header – CN13			
Pin	**Signal**	**Pin**	**Signal**
1	+3.3V_S	2	IRQ_WiFi
3	SDIO_PWR#	4	GND
5	SDIO_DAT0	6	SDIO_WP
7	SDIO_DAT1	8	SDIO_CD#
9	SDIO_DAT2	10	SDIO_CLK
11	SDIO_DAT3	12	SDIO_CMD

Only one interface at a time (SD I/O Pin header or SD I/O slot) at a time can be working, to prevent any possible conflict. For this reason, another jumper can be used to select whether to activate external SD I/O interface or internal SD I/O slot.

JP5 Position	SD I/O interface available on
1-2	SD I/O Pin Header CN13
2-3	SD I/O slot CN14

Another possibility to select if to activate the Pin Header or the SD I/O slot is to drive the signal SDIO_Select via software, using the I^2C I/O extender described in par. 0.

3.8 Standard Communications Interface

3.8.1 USB + Gigabit Ethernet interfaces

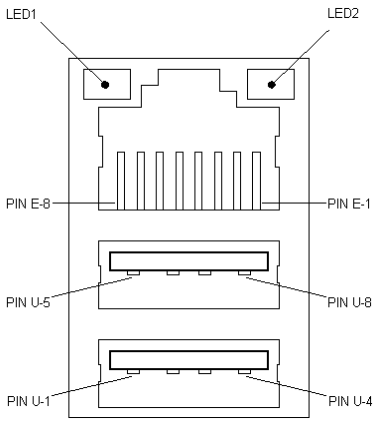
Cross Platform Carrier board offers a wide range of possibilities for connection of USB devices, also considering that QSeven™ CPU modules can have up to 8 different USB Lanes.

USB Lanes #0 and #3 are carried out directly on a combo connector, that carries out also Ethernet signals coming out from QSeven™ CPU module.

The connector is type Speedtech P25-152-P9W9 or equivalent, with integrated transformer, 100 Ohm impedance.

Left LED is bicolor, Green/Orange, and shows 10/100 or 1000 connection. Right LED is Orange, and shows ACTIVITY on the LAN.

Gigabit LAN connector + USB 0-3 – CN3			
Pin	**Signal**	**Pin**	**Signal**
E-1	GBE_MDI0+	E-5	GBE_MDI2+
E-2	GBE_MDI0-	E-6	GBE_MDI2-
E-3	GBE_MDI1+	E-7	GBE_MDI3+
E-4	GBE_MDI1-	E-8	GBE_MDI3-
U-1	+5V$_{DC}$ (*)	U-3	USBP0+
U-2	USBP0-	U-4	GND
U-5	+5V$_{DC}$ (*)	U-7	USBP3+
U-6	USBP2-	U-8	GND

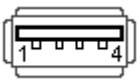


+5V$_{DC}$ (*): this power line is generated starting from +5V_A power rail using a power distribution switch, that keep the voltage stable and limit the current to 500mA, as per USB specifications rel. 2.0.

USB Ports #1 and #2 are carried directly out on two separate single USB connectors, type MATSUYAMA p/n LV005 or equivalent. It is a standard USB type A connector, pinout is reported only for completeness of documentation.

USB#1 Connector – CN6	
Pin	**Signal**
1	+5V$_{DC}$ (*)
2	USBP1-
3	USBP1+
4	GND

USB#2 Connector – CN7	
Pin	**Signal**
1	+5V$_{DC}$ (*)
2	USBP2-
3	USBP2+
4	GND

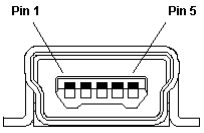


(*) see note above about +5V$_{DC}$

USB Port #1, according to QSeven™ specifications rel. 1.20, can optionally be set to work as USB Client.

For this type of connection, a mini-USB “B” connector, type MOLEX p-n 67503-1020 or equivalent, is provided.

MiniUSB connector – CN5	
Pin	**Signal**
1	+5V_Client
2	USB_Client-
3	USB_Client+
4	N.C.
5	GND



Note: +5V_Client is a voltage that is supplied to the board from outside. It can be used as an alternative power source to recharge the single cell Li-Ion battery

As already told, USB client is alternative to USB port #1. The selection between this port, and the USB client, can be made using jumper JP4, which is a standard pin header, P2.54mm.

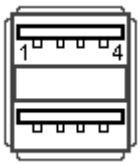
JP4	USB Client	USB port #1
Inserted	Disabled	Enabled
Not inserted	Enabled	Disabled

In any case, if an host is connected to USB Client connector, this will take control, and the USB port #1 will work exclusively in Client mode.

Finally, on board there is also a connector, referred as CN4, carrying out the signals of USB ports #6 and #7 (in case the QSeven™ CPU module does implement these ports).

USB ports are supplied directly with +5V_S Power rail, so they can not be used to implement the “Wake-Up on USB” functionality, if the QSeven™ module you use does implement this feature.

USB #6 & #7 connector – CN4			
Pin	**Signal**	**Pin**	**Signal**
1	+5V_S	5	+5V_S
2	USBP7-	6	USBP6-
3	USBP7+	7	USBP6+
4	GND	8	GND

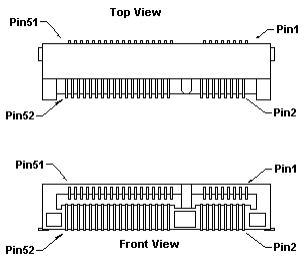


3.8.2 Mini PCI Express Slot

Another chance of connection of external devices is represented by the miniPCI Express Slot CN15, that makes externally available PCI Express Channel 0 signals and USB Port #4 signals

CN15 is a standard 52pin miniPCI Express connector, type LOTES AAA-PCI-047-K01 or equivalent, H=9mm, with the pinout shown in the following table:

Mini PCI Express Connectors – CN34			
Pin	**Signal**	**Pin**	**Signal**
1	PCIE_WAKE#	2	+3.3V_S
3	N.C.	4	GND
5	N.C.	6	+1.5V_S
7	CLOCK_REQUEST_CE0#	8	N.C.
9	GND	10	N.C.
11	PCIE_Clock_C0-	12	N.C.
13	PCIE_Clock_C0+	14	N.C.
15	GND	16	N.C.
17	N.C.	18	GND
19	N.C.	20	N.C.
21	GND	22	PCIE_RST#
23	PCIE0_RX-	24	+3.3V_A
25	PCIE0_RX+	26	GND
27	GND	28	+1.5V_S
29	GND	30	SMB_CLK
31	PCIE0_TX-	32	SMB_DAT
33	PCIE0_TX+	34	GND
35	GND	36	USBP4-
37	N.C.	38	USBP4+
39	N.C.	40	GND
41	N.C.	42	LED_WWAN#
43	N.C.	44	LED_WLAN#
45	N.C.	46	LED_WPAN#
47	N.C.	48	+1.5V_S
49	N.C.	50	GND
51	N.C.	52	+3.3V_S



Three SMT RED LEDs are present near this Mini PCI-Express Card Slot to show the activity of an eventual Wi-Fi PCI-Express Card inserted in the slot. These LEDs can work only if the Wi-Fi Mini PCI Express Card you are using does support them.

Red Led, D9: Wireless_WAN activity (cellular data, like GSM/GPRS/UMTS)

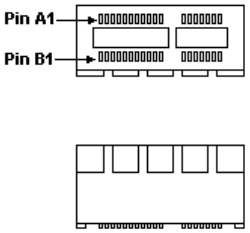
Red Led, D10: Wireless_LAN activity (for wireless networks 802.11b/g/a)

Red Led, D11: Wireless_PAN activity (bluetooth)

3.8.3 PCI Express Slot

The second PCI Express Channel coming from QSeven™ golden finger connector is available through a standard PCI Express x1 card edge connector, which is type TOP YANG p/n 105036-B2A110T or equivalent, with following pinout:

PCI Express Slot – CN16			
Pin	**Signal**	**Pin**	**Signal**
A1	PRSNT#1 (tied to GND)	B1	+12V_S
A2	+12V_S	B2	+12V_S
A3	+12V_S	B3	N.C.
A4	GND	B4	GND
A5	N.C.	B5	SMB_CLK
A6	N.C.	B6	SMB_DAT
A7	N.C.	B7	GND
A8	N.C.	B8	+3.3V_S
A9	+3.3V_S	B9	N.C.
A10	+3.3V_S	B10	+3.3V_A
A11	PCIE_RST#	B11	PCIE_WAKE#
A12	GND	B12	N.C.
A13	PCIE_CLKS1+	B13	GND
A14	PCIE_CLKS1+	B14	PCIE1_TX+
A15	GND	B15	PCIE1_TX-
A16	PCIE1_RX+	B16	GND
A17	PCIE1_RX-	B17	PRSNT#2 (4K7Ω Pull-up to +3.3V_S)
A18	GND	B18	GND



3.8.4 Serial Ports

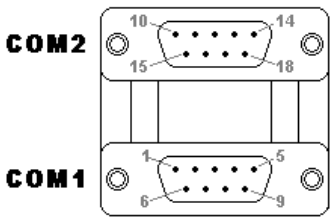
QSeven™ standard specifications contemplates the use of an LPC Super I/O controller integrated onboard to implement RS-232 compliant serial ports on the board.

For this reason, onboard it is integrated one of the two Super/O controller writtenin the specification, i.e. Winbond/Nuvoton W83627DHG-P, that is used for integration of two standard Serial Ports and four General Purpose I/O (see further on, par.3.8.6)

Signals for both serial ports COM1 and COM2 are carried on combo connector CN58, that is a standard dual DB-9 male connector.

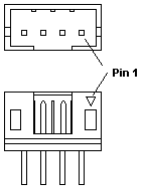
The pinout is the standard for this kind of connector, but it is reported here following for completeness of documentation.

COM1 Connector – CN58				COM2 Connector – CN58			
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	DCD_1	6	DSR_1	10	DCD_2	15	DSR_2
2	RX_1	7	RTS_1	11	RX_2	16	RTS_2
3	TX_1	8	CTS_1	12	TX_2	17	CTS_2
4	DTR_1	9	RI_1	13	DTR_2	18	RI_2
5	GND			14	GND		



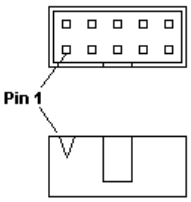
Serial port COM2 is also available directly at TTL electrical level (only TX and RX signals) on a single row connector, 4 pin, p2 mm, type MOLEX p/n 89400-0420 or equivalent, with following pinout:

COM2 TTL interface– CN51	
Pin	**Signal**
1	+3.3V_S
2	TX_2_{TTL}
3	RX_2_{TTL}
4	GND



Other two serial ports, that are those coming out directly from QSeven™ golden finger (according both to QSeven™ specifications rel. 1.20 and to SECOQseven philosophy, as described in par. 2.1), are carried out on a 10 pin Dual Row, male connector, p2.54mm, type AMTEK BH2S-10GB-U or equivalent, with pinout reported in the following table.

COM3/COM4 Connector – CN25			
Pin	**Signal**	**Pin**	**Signal**
1	UART_DBG_TX	2	RISC_UART2_TX
3	UART_DBG_RX	4	RISC_UART2_RX
5	RISC_UART1_RTS	6	RISC_UART2_RTS
7	RISC_UART1_CTS	8	RISC_UART2_CTS
9	+3.3V_S	10	GND



UART_DBG_TX and UART_DBG_RX are signals that are connected to different pins on QSeven™ golden finger connector, depending on configuration of jumpers JP24 and JP25, as described in the following tables.

JP24 Position	UART_DBG_TX connected to:
1-2	MFG_NC1
2-3	RISC_UART1_TX

JP25 Position	UART_DBG_RX connected to:
1-2	MFG_NC2
2-3	RISC_UART1_RX

3.8.5 CAN Bus

With release 1.20 of Qseven™ specifications, it has been introduced the possibility to have directly a CAN interface on golden finger connector, to take advantage of architectures that offers this interface natively.

CAN interface is carried out on a single DB9 male connector, with following pinout:

CAN Connector – CN50			
Pin	**Signal**	**Pin**	**Signal**
1	N.C.	6	GND
2	CAN_L	7	CAN_H
3	GND	8	N.C.
4	N.C.	9	+12V_S
5	GND		

* +12V_S power output is available only in case the board is supplied using the Smart Battery, the external +19V_{DC} Power Adapter or the +5V_{DC}/+12V_{DC} Power Supply Connector.

CAN interface can optionally be terminated with a 120Ω Resistor, in case Cross Platform Carrier Board is at one of the end of CAN line. To enable this termination, is necessary to use jumper JP7.

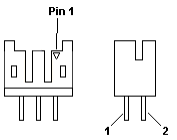
JP7	124Ω CAN Termination
Inserted	Termination present
Not inserted	Termination disconnected

3.8.6 GPI/O Connector

As already described in par. 3.8.4, on Cross Platform carrier board is available a Winbond/Nuvoton W83627DHG-P Super I/O Controller, that makes 4 GPI/O signals available.

These signals are carried out on a 6-pin, dual row, p2mm connector, type JOY-DAY A2004WV-2*03P or equivalent, with following pinout.

GPI/O Connector – CN54			
Pin	**Signal**	**Pin**	**Signal**
1	GPI/O_1	2	GPI/O_2
3	GPI/O_3	4	GPI/O_4
5	GND	6	GND



These signals corresponds to Super I/O Port 2, bit 0 ÷ 3 respectively, and have all a 10Kohm Pull-down resistor. Please refer to Winbond W83627DHG Manual for programming instructions.

3.9 Other Expansion Interfaces

3.9.1 Programmable I/O pins

To increase at maximum the flexibility of Cross Platform Carrier Board, and of all boards developed according to SECOQseven Design Guide, there is also a Lattice® Semiconductors CPLD, family MachXO (LCMXO640), with the possibility of defining up to 64 User I/O's.

Inside this CPLD it is possible to program any features that are not already included on Cross Platform Carrier Board. SECO can offer its library of IP for this CPLD for standard features. Please contact us for a list of available IPs.

Communications between CPU module and the CPLD occurs through LPC bus.

The 64 programmable I/Os are available through two separate dual row pin headers.

I/O Expansion #1 – CN38			
Pin	**Signal**	**Pin**	**Signal**
1	+3.3V_S	2	+3.3V_S
3	USER_01	4	USER_21
5	USER_02	6	USER_22
7	USER_03	8	USER_23
9	USER_04	10	USER_24
11	USER_05	12	USER_25
13	USER_06	14	USER_26
15	USER_07	16	USER_27
17	USER_08	18	USER_28
19	USER_09	20	USER_29
21	USER_10	22	USER_30
23	USER_11	24	USER_31
25	USER_12	26	USER_32
27	USER_13	28	USER_33
29	USER_14	30	USER_34
31	USER_15	32	USER_35
33	USER_16	34	USER_36
35	USER_17	36	USER_37
37	USER_18	38	USER_38
39	USER_19	40	USER_39
41	USER_20	42	USER_40
43	GND	44	GND

I/O Expansion #2 – CN37			
Pin	**Signal**	**Pin**	**Signal**
1	+3.3V_S	2	+3.3V_S
3	USER_53	4	USER_41
5	USER_54	6	USER_42
7	USER_55	8	USER_43
9	USER_56	10	USER_44
11	USER_57	12	USER_45
13	USER_58	14	USER_46
15	USER_59	16	USER_47
17	USER_60	18	USER_48
19	USER_61	20	USER_49
21	USER_62	22	USER_50
23	USER_63	24	USER_51
25	GND	26	USER_52
27	GND	28	GND
29	GND	30	GND

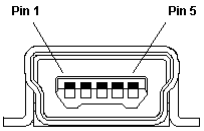
In case it is not used, the internal Lattice® CPLD can be put in Sleep Mode to allow power savings, simply using jumper JP12

JP12	Lattice® CPLD working
Inserted	Sleep Mode
Not inserted	Normal working

Programming of Lattice® CPLD can be made using the dedicated connector, a mini-USB “B” connector, type MOLEX p-n 67503-1020 or equivalent.

Voltage for the whole programming section must be supplied through this connector

Internal Lattice® CPLD programmer - CN56	
Pin	**Signal**
1	+5V_USB_Prog
2	USB_Prog-
3	USB_Prog+
4	N.C.
5	GND

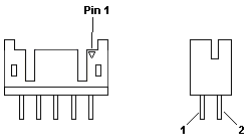


3.9.2 SPI Interface

SPI signals coming out from QSeven™ CPU module are used internally to the carrier board only for the connection of one Touch Screen controller, as already described in par. 3.5.5.

Like for LPC bus, also SPI bus can also be used for further external expansion, and is therefore carried out on a 10pin p2mm connector, type JST p/n B10B-PHDSS or equivalent, with following pinout.

SPI Interface – CN24			
Pin	**Signal**	**Pin**	**Signal**
1	+3.3V_S	2	+3.3V_S
3	SPI_MOSI	4	SPI_CS0#
5	SPI_MISO	6	SPI_CS1#
7	SPI_SCK	8	N.C.
9	GND	10	GND



3.9.3 Feature Connector

For further expandability of the system, on board there is an expansion connector, which is a standard pin header, dual row, 40 pin, p2.54 mm.

On the pins of this connector, there are signals related to I^2C bus, SMB Bus and power management, so there is a wide chance of expandability using these general purpose I/O buses.

Feature Connector – CN20			
Pin	**Signal**	**Pin**	**Signal**
1	+5V_S (through 750mA fuse)	2	+5V_A (through 750mA fuse)
3	+5V_S (through 750mA fuse and 330 Ohm pull-up resistor)	4	N.C.
5	I2C_DAT	6	SMB_CLK
7	I2C_CK	8	SMB_DAT
9	THRM#	10	N.C.
11	THRMTRIP#	12	N.C.
13	N.C.	14	N.C.
15	SUS_S3#	16	N.C.
17	GND	18	N.C.
19	WDOUT	20	SMB_ALERT#
21	GND	22	SUS_S5#
23	SUS_STAT#	24	LPC_CLK
25	GND	26	GND
27	WDTRIG#	28	SLP_BTN#
29	GND	30	GNDN
31	BATLOW#	32	LID_BTN#
33	GND	34	GND
35	WAKE#	36	N.C.
37	GND	38	GND
39	PWR_BTN#	40	RSTBTN#

3.9.4 LPC Bus Strip

LPC bus coming from QSeven™ CPU module is used internally to the carrier board for the connection of a programmable CPLD (described further on , in par. XXXX) and for the connection of the SuperI/O needed for implementation of serial ports and GPI/Os. This bus, however, can also be used for further external expansion.

Therefore, all signals needed for LPC bus are carried on a double row pin strip, p 2.54 mm, 14 pin, male, with the following pinout:

LPC Strip – CN30			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO_0	2	LPC_AD0
3	GPIO_1	4	LPC_AD1
5	SERIRQ	6	LPC_AD2
7	LPC_FRAME#	8	LPC_AD3
9	PCIE_RST#	10	GND
11	LPC_CLK	12	GND
13	+3.3V_S	14	+3.3V_S

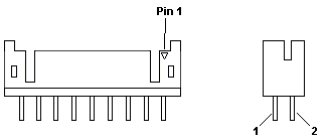
3.9.5 I²C Generic I/O Extender

Interfaced to I2C bus of Cross Platform Carrier board there is a device, NXP Semiconductors PCA9535PW, that is able to provide 16 General Purpose I/O pins.

The device acts as a slave according to I2C protocol, and can be addressed at address 0100000 binary, and all signals have a 10K Ohm pull-up resistor to +3.3V_S.

Access to these extended I/O comes through a18pin p2mm connector, type JST p/n B18B-PHDSS, with following pinout.

I²C I/O Extender – CN45			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO_01	2	GPIO_09
3	GPIO_02	4	GPIO_10
5	GPIO_03	6	GPIO_11
7	GPIO_04	8	GPIO_12
9	GPIO_05	10	GPIO_13
11	GPIO_06	12	GPIO_14
13	GPIO_07	14	GPIO_15
15	GPIO_08	16	GPIO_16
17	GND	18	GND



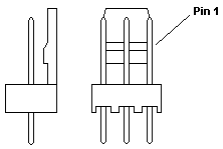
3.10 Miscellaneous

3.10.1 FAN Connector

Cross Platform carrier board is able to manage both +5V_{DC} and +12V_{DC} fans, with speed control (speed control can be used only if your QSeven™ module supports this feature, using signals FAN_TACHOIN and FAN_PWMOUT).

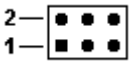
For the connection of the fan, a connector type MOLEX 22-27-2031 or equivalent is available, with the following pinout:

FAN Connector – CN32	
Pin	**Signal**
1	GND
2	V_FAN
3	FAN_TACHOIN



Fan Voltage, V_FAN, can be regulated using jumper JP10, which is a standard pin header, P2.54mm, 2x3 pin.

JP10 position	V_FAN Voltage Value
1-2	+12V_S (default)
3-4	N.C.
5-6	+5V_S



3.10.2 I²C A/D Converter

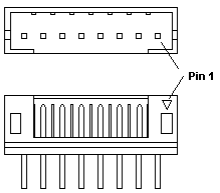
Cross Platform Carrier Board has also the possibility to make A/D conversion of up to 4 different analog signals, ranging from 0V to 3.3V_{DC}.

For 12-bit digital conversion, on I²C bus is present a Texas Instruments® ADS1015, that can also be configured to have 4 Single-Ended signal inputs or 2 differential signal inputs. All is programmable via software. Please refer to ADS1015 datasheet for details about this programming.

Due to electrical connection of the IC, the A/D converter can be addressed as slave device at address 1001000.

External signals that have to be sampled and converted can be connected to connector CN44, that is a single row connector, 8 pin, p2 mm, type MOLEX p/n 89400-0810 or equivalent, with following pinout:

I2C A/D Converter– CN44	
Pin	**Signal**
1	IN_1
2	GND
3	IN_2
4	GND
5	IN_3
6	GND
7	IN_4
8	GND



IN_1, IN_2 and IN_3 signals are connected, through an RC filter, directly to AIN0, AIN1 and AIN2 pins of ADS1015 device.

AIN3 pin of ADS1015 device, instead, can be used differently, according to the configuration of jumpers JP15 and JP22:

JP15 Position	AIN3 pin connected to:
1-2	IN_4 (pin7 of CN44)
2-3	Pin 2 of JP22

JP22 Position	Pin 2 connected to:
1-2	BQ24721C smart battery charger IOUT signal
2-3	TBAT (pin2 of CN47)

This way, it is possible to use the I2C A/D converter also to read the parameters related to the temperature of external Li-ION battery or to the charge current of Smart Battery, instead of a fourth external signal.

3.10.3 I²C EEPROM

For data storage, on Cross Platform Carrier Board is also available a 16Kbit I²C serial EEPROM, type ST Microelectronics M24C16-WMN6P.

The device acts as a slave according to I²C protocol, and can be addressed at address $1010A_{10}A_9A_8$ binary, where A_{10}, A_9 and A_8 are the most significant bit of the 10bit address space necessary to address the whole capacity of the EEPROM.

Please check ST Microelectronics M24C16-W datasheet for further details about use of the EEPROM

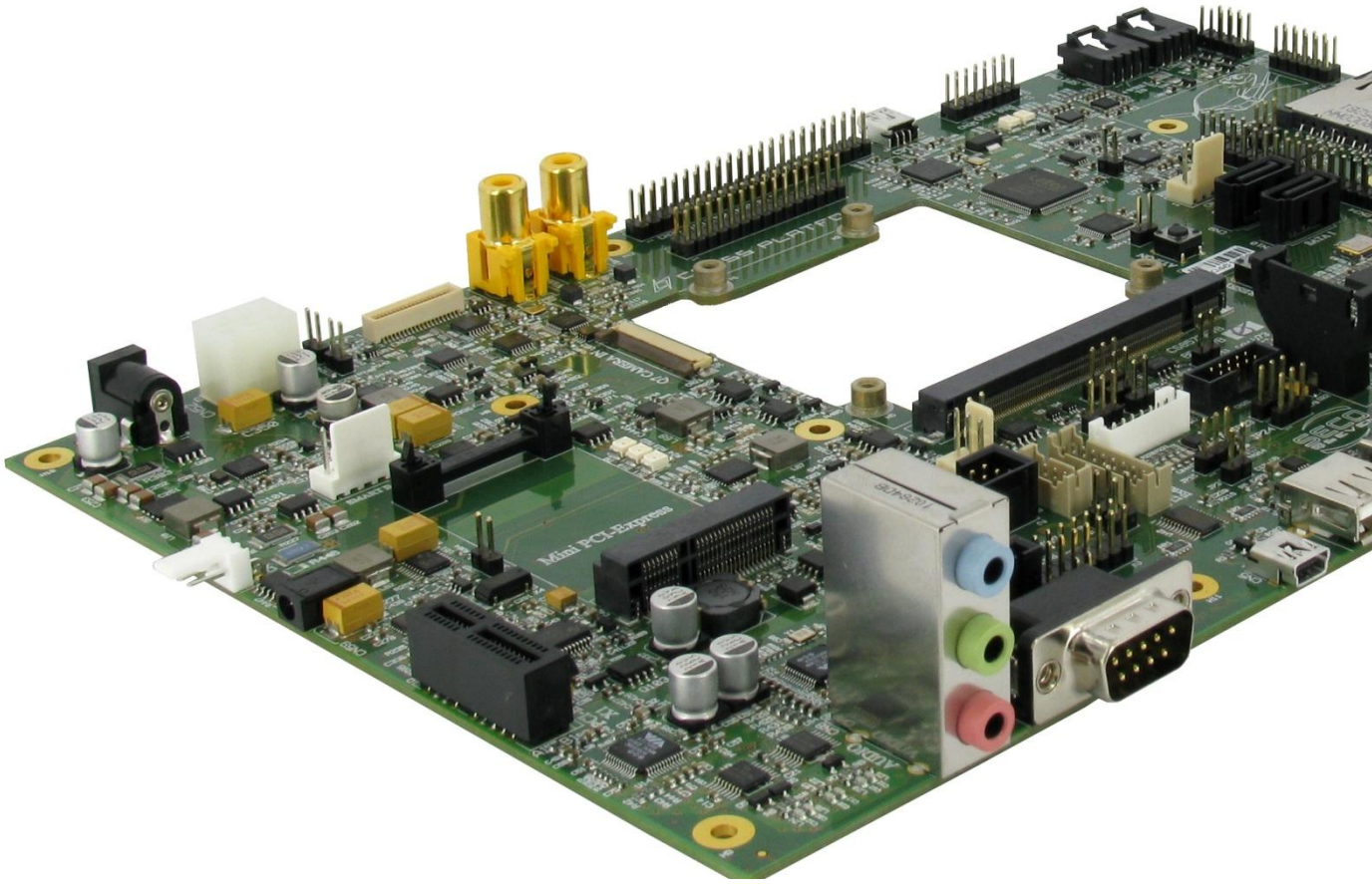
3.10.4 I²C Light Sensor

Another application that is included on Cross Platform Carrier Board, is an integrated Light Sensor, type Intersil® ISL29023, able to filter 50Hz and 60Hz flickering due to ambient light sources. The device is also able to reject IR and UV radiation, therefore measuring only human eye's visible spectrum intensity.

The device has interrupt functionality and can be reached at slave address 1000100 binary according to I²C protocol.

For details about use of this integrated light sensor, please refer to Intersil® ISL29023 datasheet.

APPENDIX: SECOQSeven Philosophy specific signals



As stated in paragraph 3.4, there are some signals on MXM connector that are not included in QSeven™ specifications Release 1.20.

These signals, have been introduced to enrich the functionality offered by QSeven™ modules. However, they have been placed on QSeven™ CPU Modules in a way that doesn't cause incompatibilities with other manufacturers Carrier Boards (i.e., Carrier Boards not designed according to SECOQSeven philosophy's Design Guide).

The following signals are not included in the standard:

One-Wire Signal

Pin 124: ONE_WIRE: One-Wire protocol data line

One-Wire is a communication protocol, intended for low speed serial communications, that is widely used for simple, cheap devices like sensors and so on. All communications come through an unique line, that carry both power and signaling.

Many RISC architectures offer this interface natively, therefore this signal has been carried out on QSeven™ connector on pin 124, that is a pin defined as "Reserved" by QSeven™ specifications Rel. 1.20 (and previous releases). Therefore, CPU Modules that leave pin 124 not connected can be used without problem on Cross Platform Carrier Board

UART Signals

Pin 161: RISC_UART1_RTS: QSeven™ CPU Module internal Uart #1 RTS signal
Pin 163: RISC_UART1_TX: QSeven™ CPU Module internal Uart #1 TX signal
Pin 162: RISC_UART1_CTS: QSeven™ CPU Module internal Uart #1 CTS signal
Pin 164: RISC_UART1_RX: QSeven™ CPU Module internal Uart #1 RX signal
Pin 167: RISC_UART2_RTS: QSeven™ CPU Module internal Uart #2 RTS signal
Pin 168: RISC_UART2_CTS: QSeven™ CPU Module internal Uart #2 CTS signal
Pin 169: RISC_UART2_TX: QSeven™ CPU Module internal Uart #2 TX signal
Pin 170: RISC_UART2_RX: QSeven™ CPU Module internal Uart #2 RX signal

Many architectures, especially RISC architectures, have an Internal UART interface, that would not be used following strictly QSeven™ Rel.1.20 specifications.

To take advantage of these signals, in SECOQSeven philosophy signals related to these UART interfaces have been carried on pins that according to QSeven™ Specifications rel.1.20, are usually reserved for PCI Express lanes #2 and #3. These two lanes have been chosen since only few architectures can offer a total of 4 free PCI Express lanes, so in most of the CPU modules these lanes would remain not connected.

Anyway, SECOQSeven CPU modules are designed in a way that it is possible, in any moment, to disconnect output lanes, turning them in an high-impedance status. This means that Carrier Boards designed to use PCI-Express lanes #2 and #3 can use also SECOQSeven CPU modules, since there aren't electrical problems (obviously, PCI-Express lanes #2 and #3 will not work, in that case).

Cross Platform Carrier Board is designed to take advantage of these two additional UART interfaces, making them available on external connector CN25 (see further on). This means that Cross Platform Carrier Board can be used also with QSeven™ standard CPU modules that have PCI_E lanes #2 and #3 connected, since these signals are only made available for an external connection, they are not used internally.

WiFi IRQ line

Pin 177: IRQ_WiFi: WiFi Card IRQ line

Cross Platform Carrier Board has an internal Pin Header (CN13) that can be used for connection of external SD I/O devices. Some of them can have an IRQ dedicated line. For this reason, on Cross Platform Carrier board this additional signal has been carried to Qsevn™ connector pin 177, that, according to QSeven™ standard specifications, should be used for ExpressCard Slot 0# request pin (an input).

Since the nature of the signal is similar, there aren't incompatibilities between Cross Platform Carrier Board and QSeven™ CPU modules that have this pin used for Express Cards (obviously, Express Cards will not be supported using Cross Platform Carrier Board).

General Purpose Input/Output

Pin 126: GPIO0: general Purpose Input/Output#0

Pin 128: GPIO1: general Purpose Input/Output#1

Pin #126 and Pin #128 are defined, according to QSeven™ specifications release 1.20, as I/O signals to drive an external SSC Clock Chip for LVDS.

On Cross Platform Carrier Board, these signals are carried externally on connector CN35 and are not internally used. This means a big flexibility of using both CPU modules that implement external SSC control and CPU modules that implement GP I/Os, since their use come through CN35 connector.

Manufacturer pin switch

Pin 56: RSVD: reserved signal, see below

Pin 211: MUX_SEL_FS: selection of internal function of MFG pins

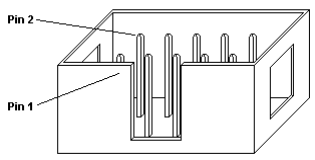
According to QSeven™ specifications release 1.20, MFG_NCx pins can be used as JTAG signals or UART signals. Their functionality can be selected using an external signal that, for QSeven™ Specifications Rel. 1.20, it is MFG_NC4 pin.

Anyway, some boards could use RSVD pin #56, or pin 211, as here described, to implement the switch control signal.

For this reason, all MFG_NCx signals, MUX_SEL_FS and RSVD pin #56 signal, are carried exclusively on an internal connector, CN2. Using this connector, it is possible to implement and control both JTAG and internal UART interface, depending on what the QSeven™ CPU module offers.

CN2 is a standard 2x5 pin, p2mm connector, type MATSUYAMA p/n LN210 or equivalent, with following pinout:

Manufacturer Pins interface – CN2			
Pin	**Signal**	**Pin**	**Signal**
1	MUX_SEL_FS	2	MFG_NC4
3	N.C.	4	RSVD
5	MFG_NC3	6	MFG_NC0
7	MFG_NC2	8	MFG_NC1
9	GND	10	+3.3V_A



www.secoqseven.com