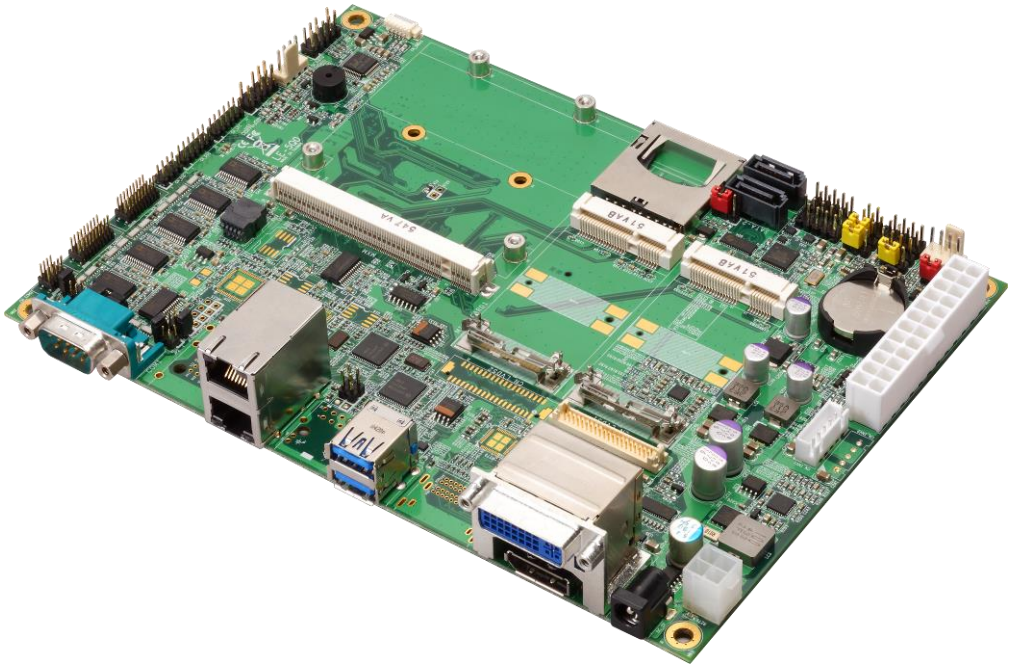
# LE-5Q0

## Qseven Carrier Board

### User's Manual
### Edition 1.3

2017/11/27



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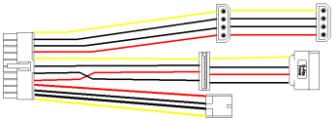
# Packing List:

**Please check the package content before you starting using the board.**

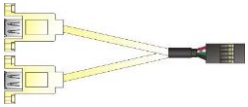
1 x LE-5Q0 Motherboard

2 x SATA Cable
(OALSATA3-L / 1040529)

1 x COM PORT CABLE
(OALES-BKU1NB / 1040086)

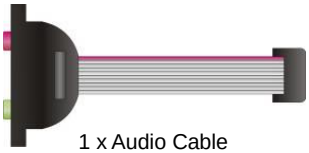


1 x Power Cable
(OALATX-P3S2 / 1040058)



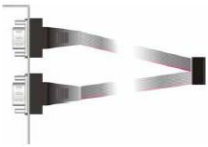
1 x USB2.0 Cable
(OALUSBA-3 / 1040173)

1 x PS/2 Keyboard & Mouse Cable
(OALPS2/KM) / (1040131)



1 x Audio Cable
(OALPJ-HDUNB) / (1040123)

# Optional:



1 x Dual COM port Cable
(OALE-BKU2NB / 1040090)

# Index

# Chapter 1 <Introduction>

## 1.1 <Product Specification>

### System

| | |
|---|---|
| Form Factor | 5.25" Qseven Carrier Board |
| QSEVEN | Base on Qseven Specification Rev. 2.0 |
| SPI | Support 1.8V / 3.3V (Default 1.8V) |
| Expansion | 2 x Mini PCIe (card2 support mSATA) (optional), 1 x SIM slot, 1 x SDIO slot |

### LAN

| | |
|---|---|
| Chip | 4 x Intel® I210-AT Gigabit LAN (optional)<br>(RJ45-4 and Minicard1 can't be enabled simultaneously)<br>(RJ45-5 and Minicard2 can't be enabled simultaneously)<br>1 x Gigabit Ethernet Lan port (optional) (Use GBE signal) |

### I/O

| | |
|---|---|
| Serial ATA | 2 x Serial ATA ports<br>(SATA2 port and mSATA can't be enabled simultaneously) |
| Audio | Realtek ALC262 High Definition Audio Codec |
| Digital I/O | Programmable 8-bit GPIO with 12 pin-header |
| Internal I/O | 2 x SATA , 4 x RS232, 1 x RS232/422/485, 2 x USB2.0, 1 x PS/2, 1 x I2C,<br>1 x Audio, 2 x LVDS (optional), 2 x LCD inverter, 1 x LPC, 1 x SMBUS,<br>1 x DIO (LVDS1 and Display port2 can't be enabled simultaneously)<br>(LVDS2 and Display port3 can't be enabled simultaneously) |
| External I/O | 1 x RS232, 1 x DVI-I or DisplayPort, 2 x DisplayPort (optional), 2 x USB3.0 |

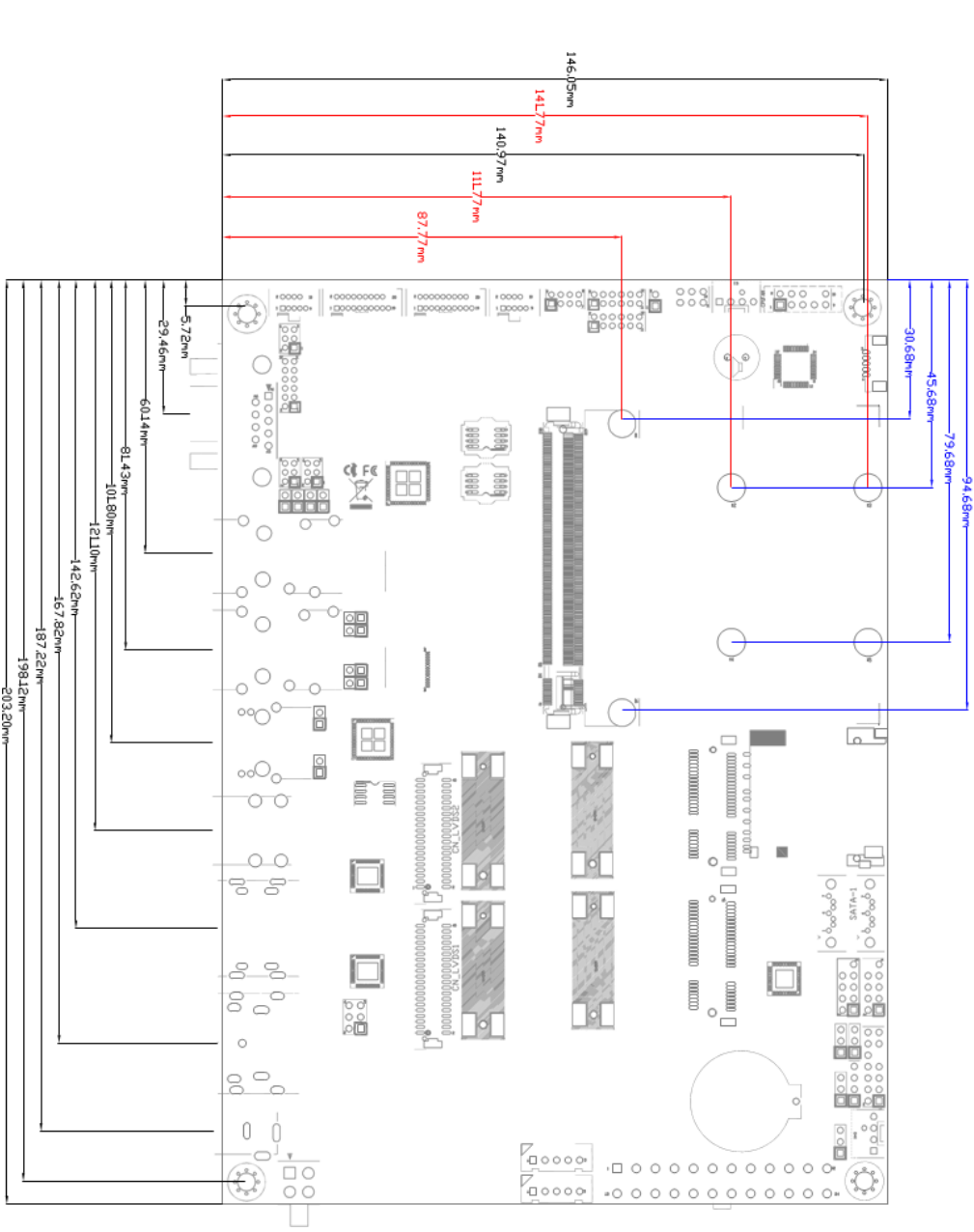
### Mechanical & Environmental

| | |
|---|---|
| Power Requirement | Standard 24-pin ATX power supply or 6~27V full range DC Input |
| Size & Thickness | 203mm x 146mm. (L x W) |
| Temperature | Operating within 0°C~60°C (32°F~140°F)<br>Storage within -20°C~80°C (-4°F~176°F) |
| Relative Humidity | 10% ~ 90%, non-condensing |

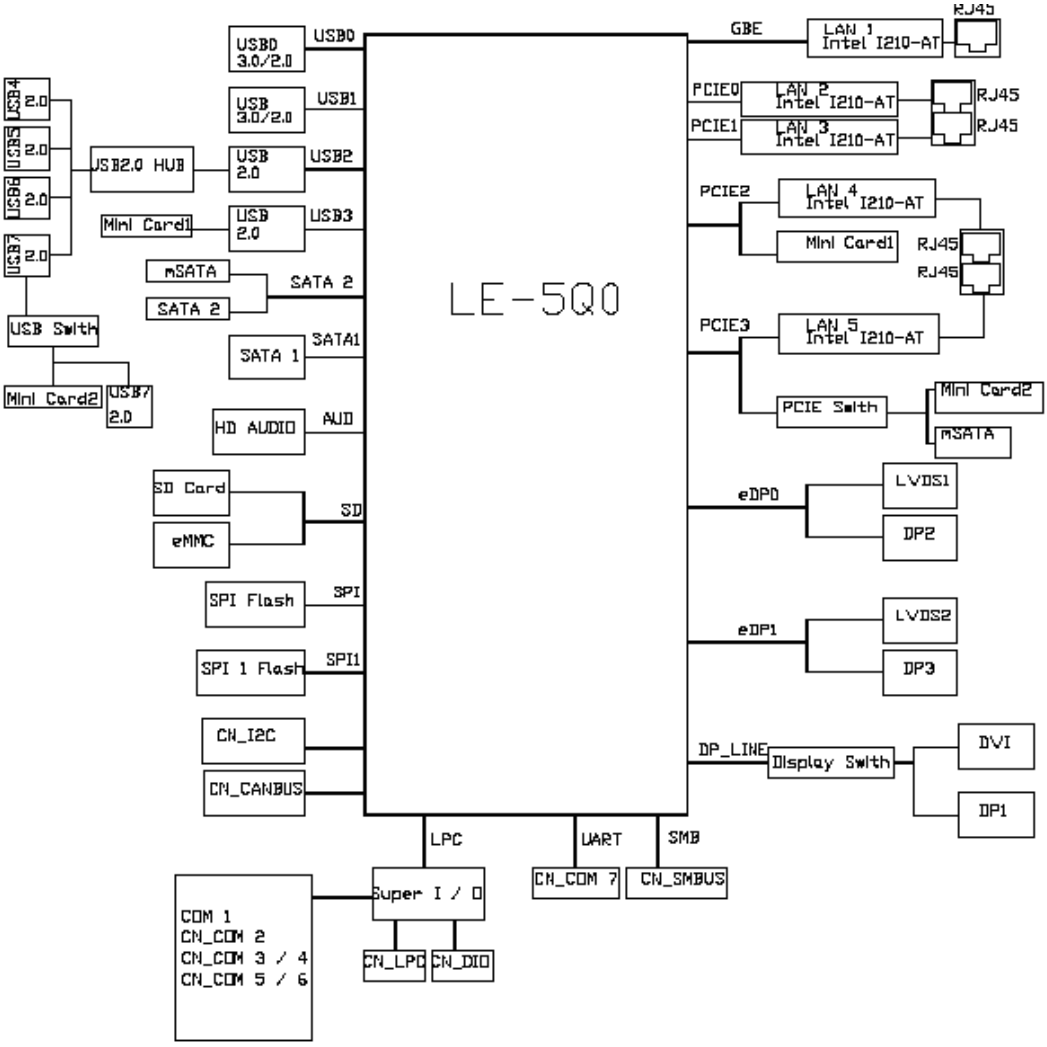
### Ordering Code

| | |
|---|---|
| LE-5Q0G2XD<br>(for QE-E70) | 1 x DVI / DisplayPort exclusive,1 x LVDS, 2 x USB3.0, 4 x USB2.0, SMBus,<br>2 x RJ45 LAN, 2 x SATA, SD Card, GPIO, SPI, LPC, I²C, PS2, AUDIO,<br>2 x MiniPCIe (option one for mSATA ), 5 x RS232, 1 x RS232/RS422/RS485 |
| LE-5Q0G3XPD<br>(for QE-E71) | 1 x DVI / DisplayPort exclusive,1 x LVDS, 2 x USB3.0, 4 x USB2.0, SMBus,<br>3 x RJ45 LAN, 2 x SATA, GPIO, SPI, LPC, PS2, AUDIO,<br>2 x MiniPCIe (option one for mSATA ), 5 x RS232, 1 x RS232/RS422/RS485 |

# 1.2 <Mechanical Drawing>

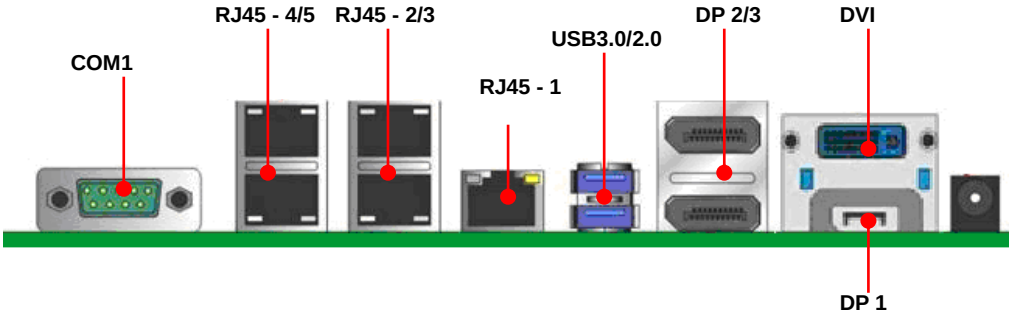


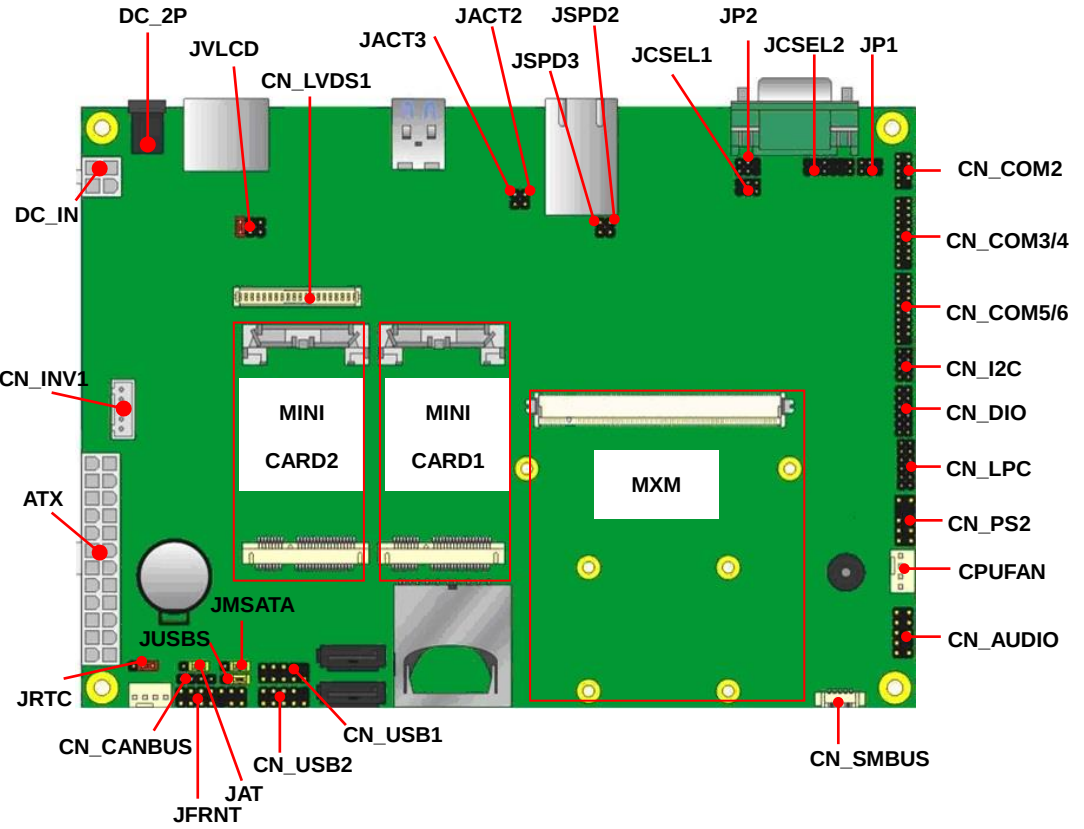
## 1.3 <Block Diagram>



# Chapter 2 <Hardware setup>

## 2.1 <Connector Location and Reference>



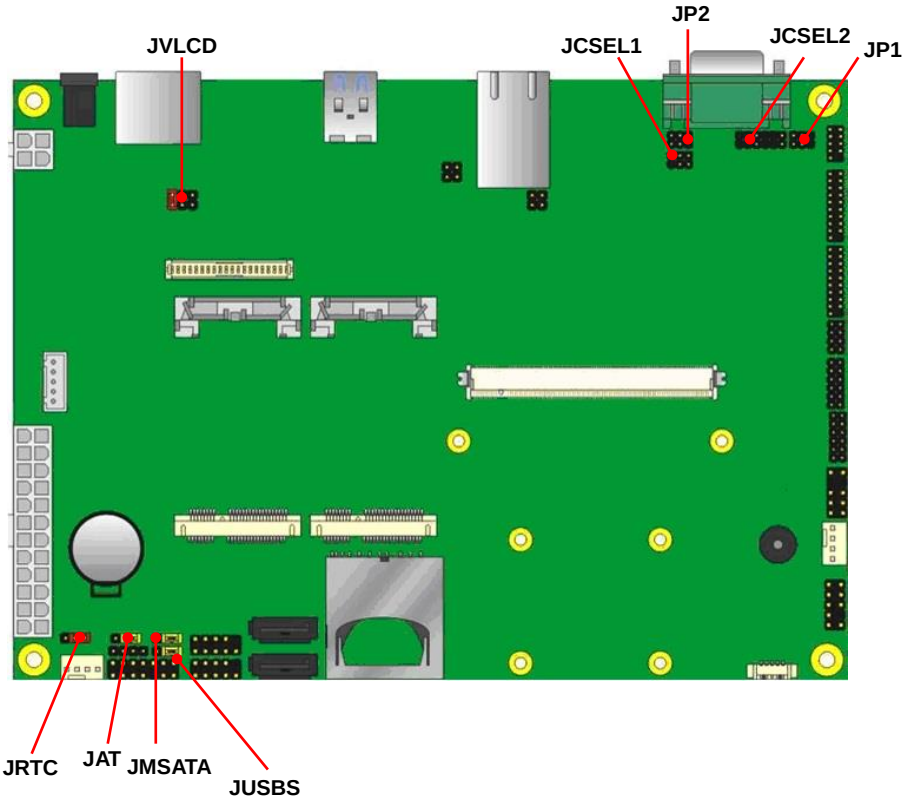
## 2.1.1 <Internal connectors list>

| Connector | Function |
|---|---|
| **MXM** | 230-pin MXM connector (Connector Pinout Description) |
| **DC_IN** | DC 6~27V input connector |
| **DC_2P** | DC 6~27V input connector |
| **ATX** | 24-pin power supply connector |
| **CN_LVDS 1/2** | 20 x 2-pin LVDS connector |
| **CN_INV 1/2** | 5-pin LCD inverter connector |
| **JFRNT** | 20 x 2-pin LVDS connector |
| **CN_USB 1/2** | 10-pin USB connector |
| **CPUFAN** | 4-pin CPU cooler fan connector |
| **SYSFAN** | 4-pin system cooler fan connector |
| **SATA 1/2** | 7-pin Serial ATAII connector |
| **CN_CANBus** | 4-pin CANBUS connector |
| **Mini-PCIE 1/2** | 52-pin Mini-PCIE socket |
| **SDCard** | 13-pin SDIO / 30-pin MMC socket |
| **CN_SMBUS** | 5-pin SMBUS connector |
| **CN_AUDIO** | 5 x 2-pin audio connector |
| **CN_PS2** | 5 x 2-pin PS2 connector |
| **CN_LPC** | 5 x 2-pin LPC connector |
| **CN_DIO** | 6 x 2-pin digital I/O connector |
| **CN_COM2/3/4/5/6** | 9-pin COM2-RS232/442/485 COM3/4/5/6-RS232 |
| **SIM** | 6-pin socket |
| **JSPD 1/2/3/4/5** | LAN Speed LED connector |
| **JACT 1/2/3/4/5** | LAN Activity LED connector |
| **SPI2** | 8-pin BIOS connector |
| **SPI2X** | 8-pin BIOS connector |

## 2.1.2 <External connectors list>

| Connector | Function |
|---|---|
| **COM1** | DB9 male connector |
| **RJ45 1/2/3/4/5** | 5 x RJ45 LAN connector |
| **DVI** | 24 pin DVI connector |
| **DisplayPort 1/2/3** | 3 x 20-pin DisplayPort connector |

## 2.2 <Jumper Location and Reference>




### 2.2.1 <Jumper list>

| Jumper | Function |
|---|---|
| **JAT** | Power mode select |
| **JRTC** | CMOS Normal/Clear Setting |
| **JUSBS** | Mini Card2 USB Setting |
| **JVLCD** | Panel Voltage Setting |
| **JMSATA** | MiniCard2 mSATA Setting |
| **JCSEL1** | COM2 RS-232, RS422, RS485 setting |
| **JCSEL2** | COM2 RS-232, RS422, RS485 setting |
| **JP1** | Com2 Voltage Setting (For Pin 9) |
| **JP2** | Com1 Voltage Setting (For Pin 9) |

Mini Card2 USB and CN_USB2 (USB7) can't be enabled simultaneously

Mini Card2 and RJ45-5 LAN port can't be enabled simultaneously

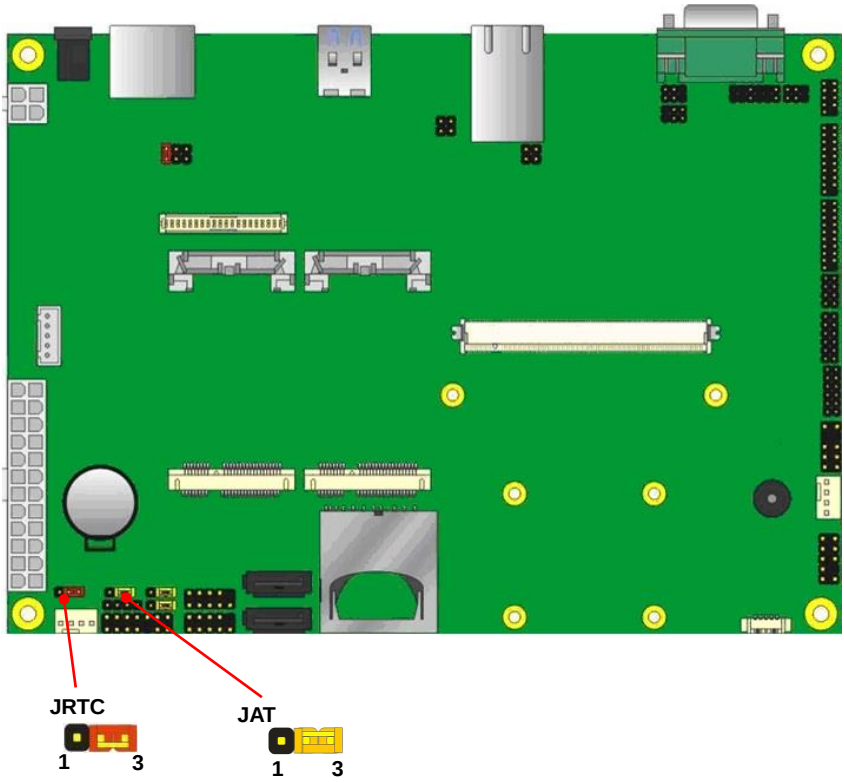
## 2.3 <Clear CMOS and Power on type selection>

**JRTC**: Clear CMOS data jumper

| Jumper settings | Function |
|---|---|
| **1-2** | Clear CMOS |
| **2-3** | Normal (Default) |

**JAT**: AT/ATX mode select jumper

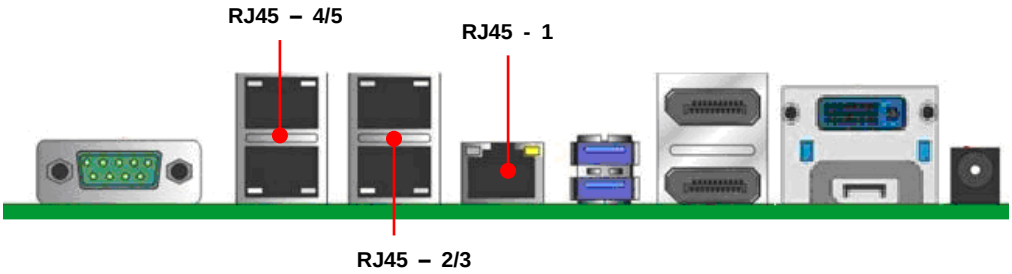
| Jumper settings | Function |
|---|---|
| **1-2** | AT mode |
| **2-3** | ATX mode (Default) |



# 2.4 <I/O interface>

## 2.4.1 <Ethernet interface>

The board integrates RJ45-2/3/4/5 (optional) with Intel I210 Gigabit Ethernet and RJ45-1 with Qseven CPU Module provided , RJ45-2/3/4/5 as the PCI Express bus. The Intel I210 supports triple speed of 10/100/1000 Base-T, with IEEE802.3 compliance and Wake-On-LAN supported.



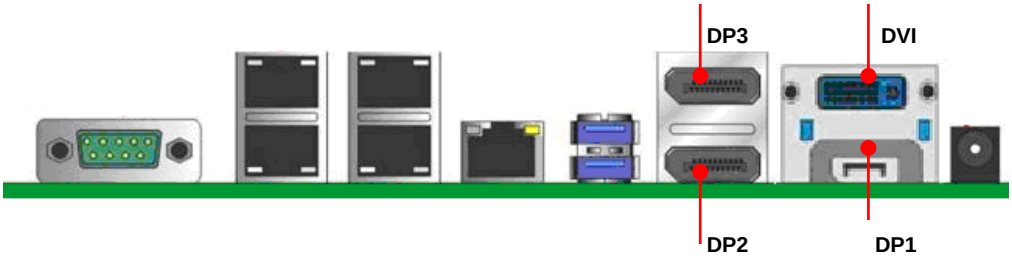

Mini_card1 and RJ45-4 LAN port can't be enabled simultaneously
Mini_card2 and RJ45-5 LAN port can't be enabled simultaneously

## 2.4.2 <Display interface>

The board provides one DVI or Display port connector & two Display port(optional) on real external I/O port, two 40-pin LVDS interface with 5-pin LCD backlight inverter connector.

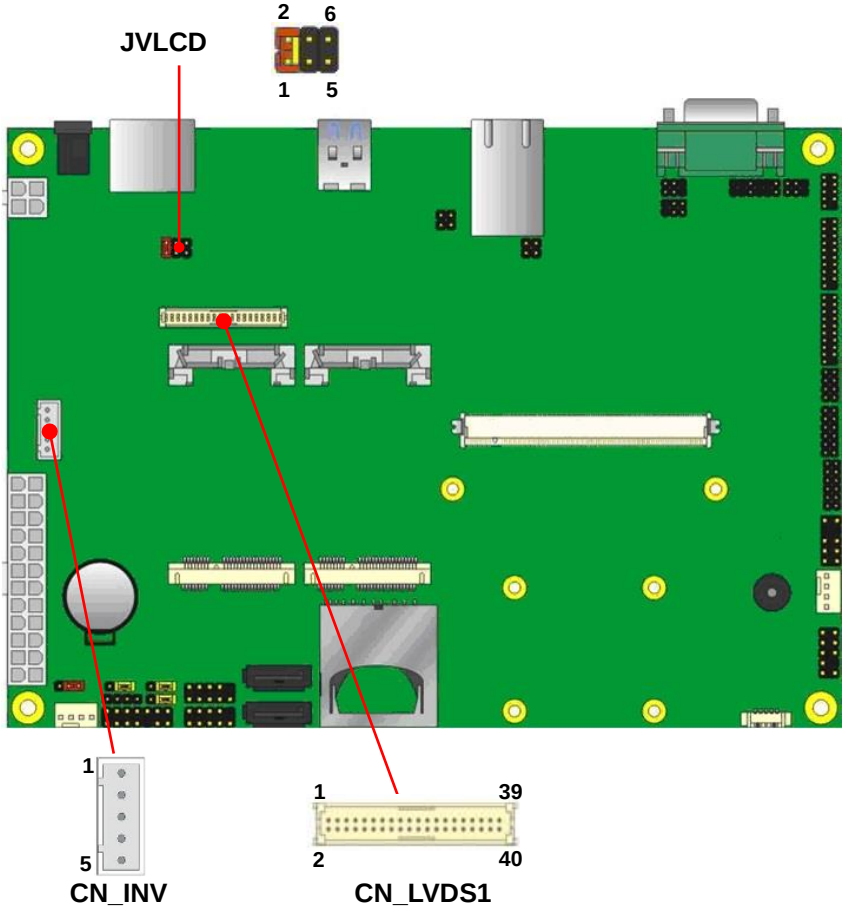
### 2.4.2.1 <DVI /Display port>

Please connect your DVI / Display port or LCD monitor with male connector to the onboard female connector on rear I/O port.



### 2.4.2.2 <LVDS>

The board provides two 40-pin LVDS connector(optional), with two LCD backlight inverter connector (optional)and one jumper for panel voltage setting. Please install LVDS cable before boot up.




**JVLCD**: LVDS panel power select jumper

| Jumper settings | Function |
|---|---|
| **1-2** | 3.3V (Default) |
| **3-4** | 5V |
| **5-6** | 12V |

**Effective patterns of connection:1-2 / 3-4 5-6 ,Other may cause damage .**

**CN_LVDS**: LVDS 40-pin connector (Model: HIROSE DF13-40DP-1.25V compatible)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **2** | Set by JVLCD | **1** | Set by JVLCD |
| **4** | GND | **3** | GND |
| **6** | A_LVDS_0- | **5** | B_LVDS_0- |
| **8** | A_LVDS_0+ | **7** | B_LVDS_0+ |
| **10** | GND | **9** | GND |
| **12** | A_LVDS_1- | **11** | B_LVDS_1- |
| **14** | A_LVDS_1+ | **13** | B_LVDS_1+ |
| **16** | GND | **15** | GND |
| **18** | A_LVDS_2- | **17** | B_LVDS_2- |
| **20** | A_LVDS_2+ | **19** | B_LVDS_2+ |
| **22** | GND | **21** | GND |
| **24** | A_LVDS_CLK- | **23** | B_LVDS_3- |
| **26** | A_LVDS_CLK+ | **25** | B_LVDS_3+ |
| **28** | GND | **27** | GND |
| **30** | A_LVDS_3- | **29** | B_LVDS_CLK- |
| **32** | A_LVDS_3+ | **31** | B_LVDS_CLK+ |
| **34** | GND | **33** | GND |
| **36** | LVDS_DDCSCL | **35** | NC |
| **38** | LVDS_DDCSDA | **37** | NC |
| **40** | NC | **39** | NC |

**CN_INV**: LVDS 5-pin Backlight power header

| Pin | Signal |
|---|---|
| **1** | 12V |
| **2** | Backlight Control |
| **3** | GND |
| **4** | GND |
| **5** | Enable Backlight |

## 2.4.3 <Audio interface>

The board integrated onboard audio interface with Realtek ALC262 code, with Intel next generation of audio standard as High Definition Audio, it offers more vivid sound and other advantages than former HD audio compliance.

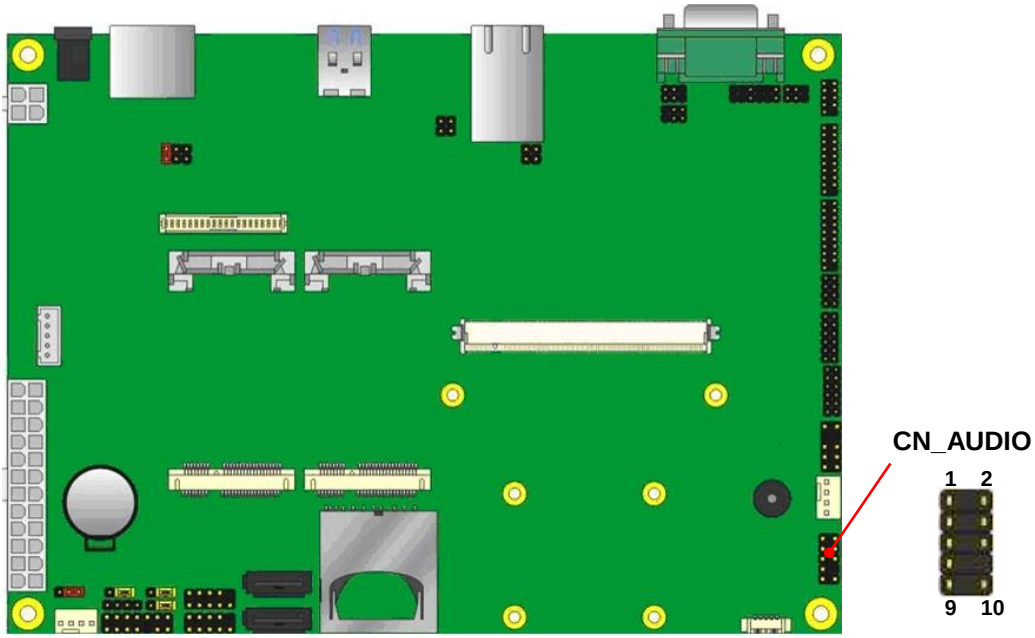
The main specifications of ALC262 are:

-High-performance DACs with 100dB S/N ratio.

-2 DAC channels support 16/20/24-bit PCM format for 2 audio solutions.

-Compatible with HD.

-Meets Microsoft WHQL/WLP 2.0 audio requirements.

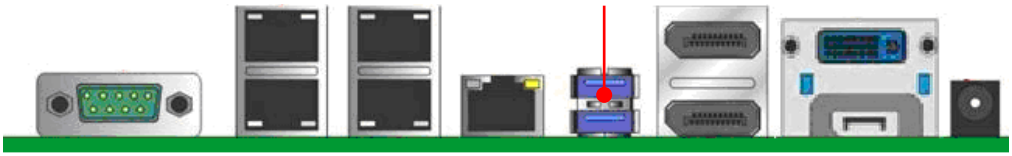



**CN_AUDIO**: Front panel audio 10-pin header (Pitch 2.54mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | MIC_L | **2** | GND |
| **3** | MIC_R | **4** | NC |
| **5** | FP_OUT_R | **6** | MIC_DETECT |
| **7** | SENSE | **8** | Key |
| **9** | FP_OUT_L | **10** | FP_OUT_DETECT |

## 2.4.4 <USB interface>

**USB3.0/2.0**



**LE-5Q0** integrates 2 x USB3.0 / 2.0, The specifications of USB3.0 are listed below:

| Interface | USB3.0 |
|---|---|
| Transfer Rate | Up to 5Gb/s |
| Voltage | 5V |

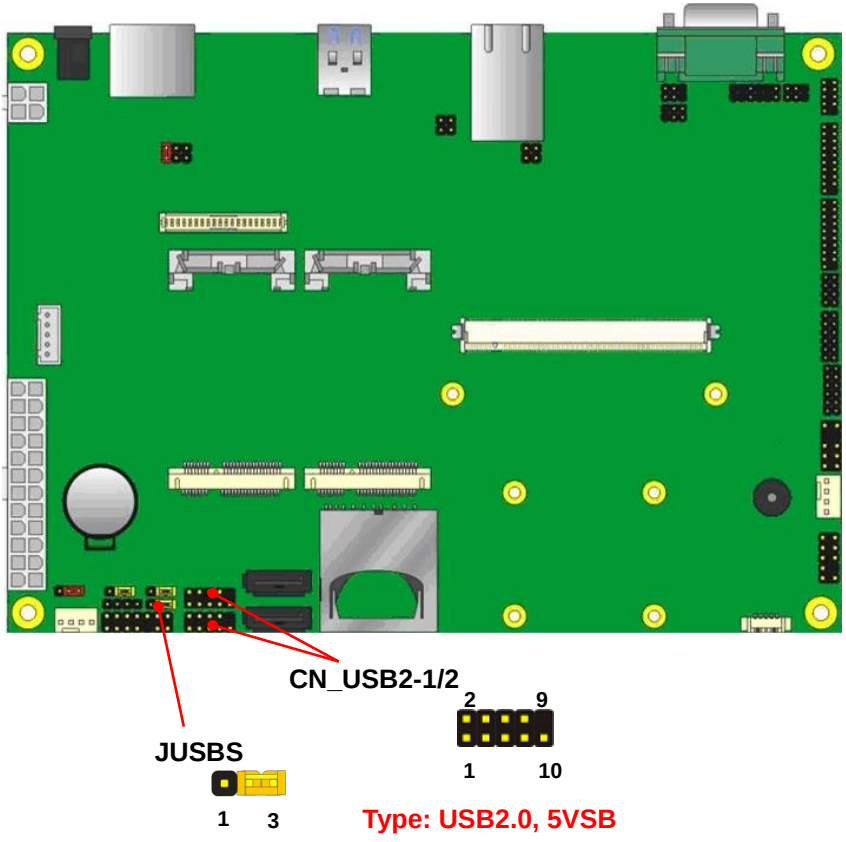
The specifications of USB2.0 are list:

| Interface | USB2.0 |
|---|---|
| Transfer Rate | Up to 480Mb/s |
| Voltage | 5V |

Connector: **CN_USB1/2**

Type: 10-pin (2 x 5) header (pitch = 2.54mm)

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | VCC (5V) | 2 | VCC (5V) |
| 3 | Data0- | 4 | Data1- |
| 5 | Data0+ | 6 | Data1+ |
| 7 | Ground | 8 | Ground |
| 9 | Ground | 10 | N/C |




Connector: **JUSBS**

Type: 3-pin Power select jumper

| Pin | Description |
|---|---|
| 1-2 | USB7 |
| 2-3 | Mini Card2 USB |

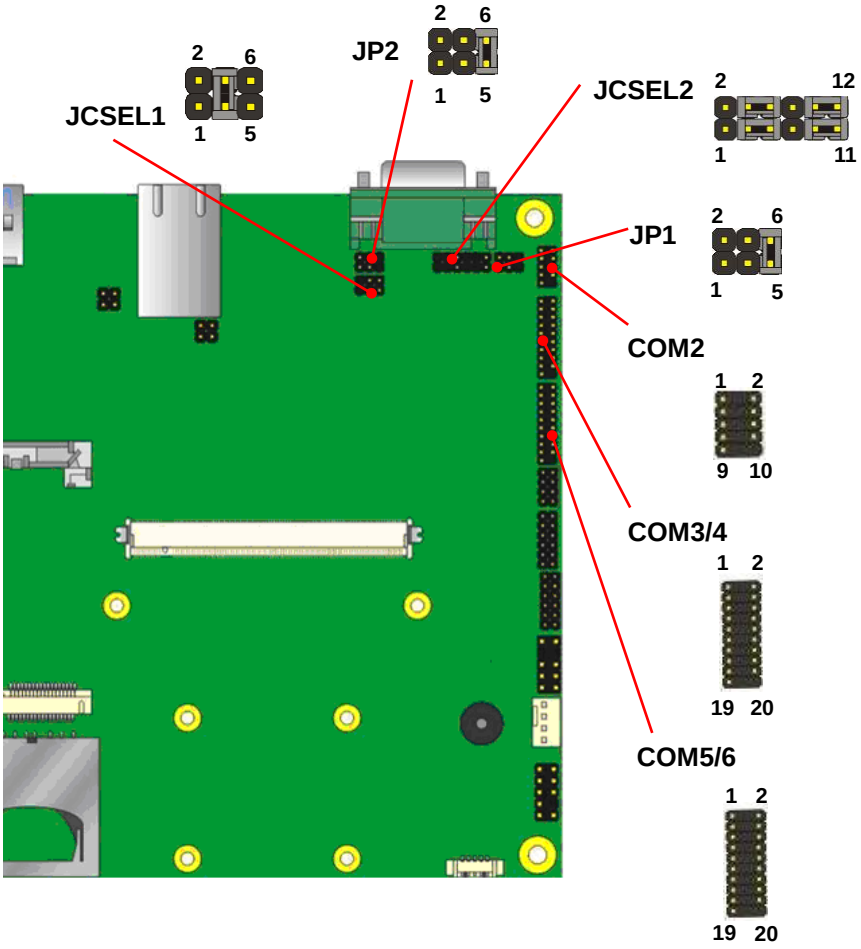
**Default: 2-3**

**Note:**

Mini Card2 USB and CN_USB2 (USB7) can't be enabled simultaneously

## 2.4.5 <Serial Port interface>

The board supports five RS232 serial port and one jumper selectable RS232/422/485 serial ports. The jumper JCSEL1 & JCSEL2 can let you configure the communicating modes for CN_COM2.



**COM1**: RS232 DB9 connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD | **2** | RXD |
| **3** | TXD | **4** | DTR |
| **5** | GND | **6** | DSR |
| **7** | RTS | **8** | CTS |
| **9** | Set by JP1 | | |

**COM2**: RS232/422/485 connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD/ 422TX-/ 485- | **2** | RXD/ 422TX+/ 485+ |
| **3** | TXD/ 422RX+ | **4** | DTR/ 422RX- |
| **5** | GND | **6** | DSR |
| **7** | RTS | **8** | CTS |
| **9** | Set by JP2 | | |

**COM3/4**: COM 20-pin header (Pitch 2.54 x 1.27mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD1 | **2** | RXD1 |
| **3** | TXD1 | **4** | DTR1 |
| **5** | GND | **6** | DSR1 |
| **7** | RTS1 | **8** | CTS1 |
| **9** | COM3 Set by JP3 | **10** | NC |
| **11** | DCD2 | **12** | RXD2 |
| **13** | TXD2 | **14** | DTR2 |
| **15** | GND | **16** | DSR2 |
| **17** | RTS2 | **18** | CTS2 |
| **19** | COM4 Set by JP4 | **20** | Key |

**COM5/6**: COM 20-pin header (Pitch 2.54 x 1.27mm)

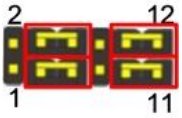
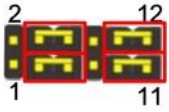
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | DCD1 | **2** | RXD1 |
| **3** | TXD1 | **4** | DTR1 |
| **5** | GND | **6** | DSR1 |
| **7** | RTS1 | **8** | CTS1 |
| **9** | RI1 | **10** | NC |
| **11** | DCD2 | **12** | RXD2 |
| **13** | TXD2 | **14** | DTR2 |
| **15** | GND | **16** | DSR2 |
| **17** | RTS2 | **18** | CTS2 |
| **19** | RI2 | **20** | Key |

**JP1**(COM2)**, JP2**(COM1): pin-9 setting

| Jumper settings | Function |
|---|---|
| **1-2** | 5V |
| **3-4** | 12V |
| **5-6** | RI (Default) |

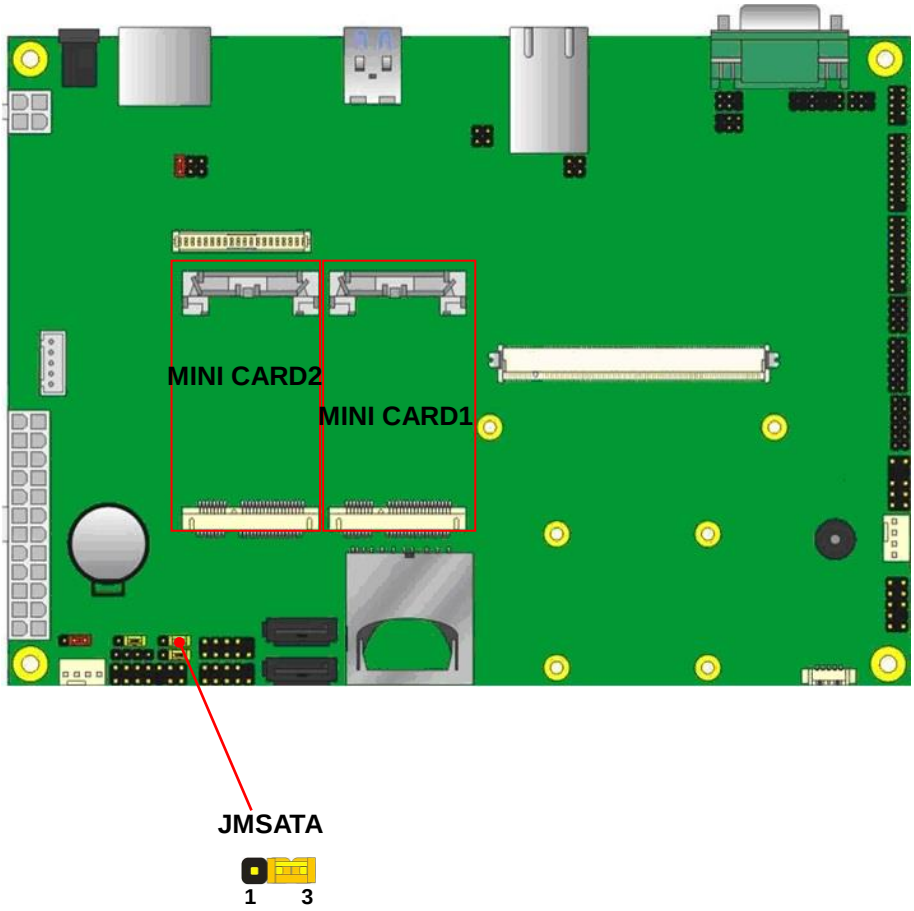
**Effective patterns of connection: 1-2 / 3-4 / 5-6**
**Other may cause damage**

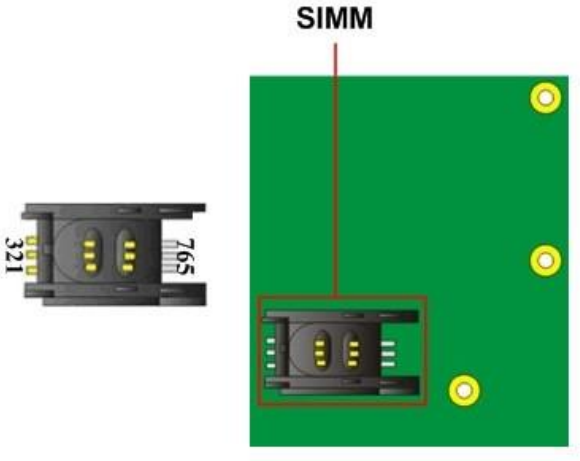
**JCSEL1, JCSEL2**: For configure COM2 communication mode

| Function | JCSEL2 | JCSEL1 |
|---|---|---|
| **RS-422** |  |  |
| **RS-485** |  |  |
| **RS-232** **(Default)** |  |  |

## 2.4.6 <Expansion slot>

The board provides two PCIE mini card sockets and a SIM socket.
**MINI_CARD** is the Mini-PCIe slot for half / full size Mini-PCIe cards and Mini Card2 supports mSATA.





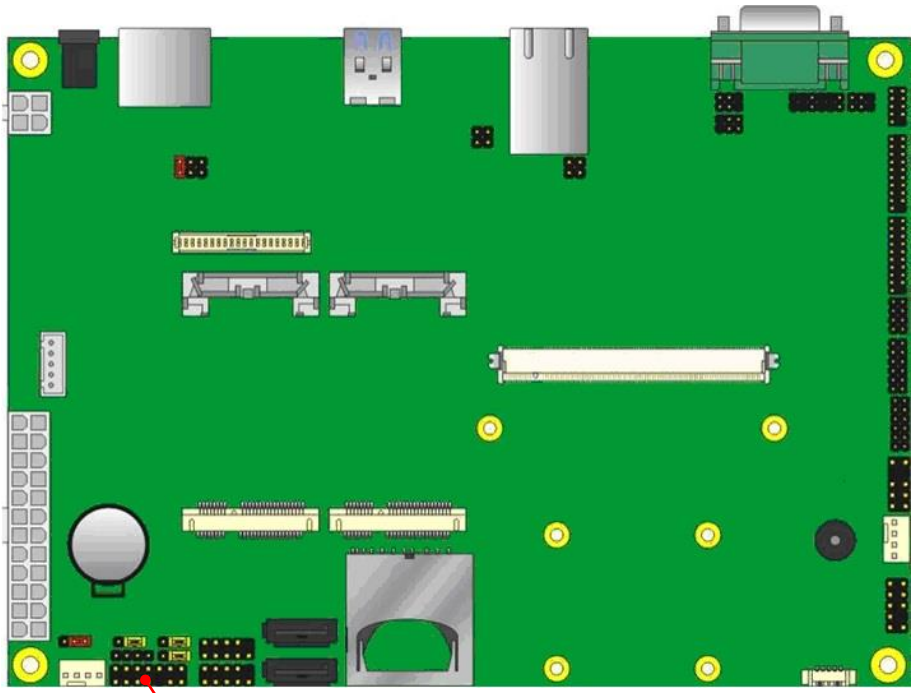

Connector: **SIM (3G MiniPcie Model)**
Type: 6-pin SIM socket

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | SIMVCC | 2 | SIMRST |
| 3 | SIMCLK | 4 | NC |
| 5 | GND | 6 | SIMVPP |
| 7 | SIMDATA | | |

Jumper: **JMSATA**

| MINI_CARD Mode | JMSATA |
|---|---|
| mSATA | 1-2(Note) |
| MINI_CARD2 | 2-3 |
| **Default: 2-3** | |

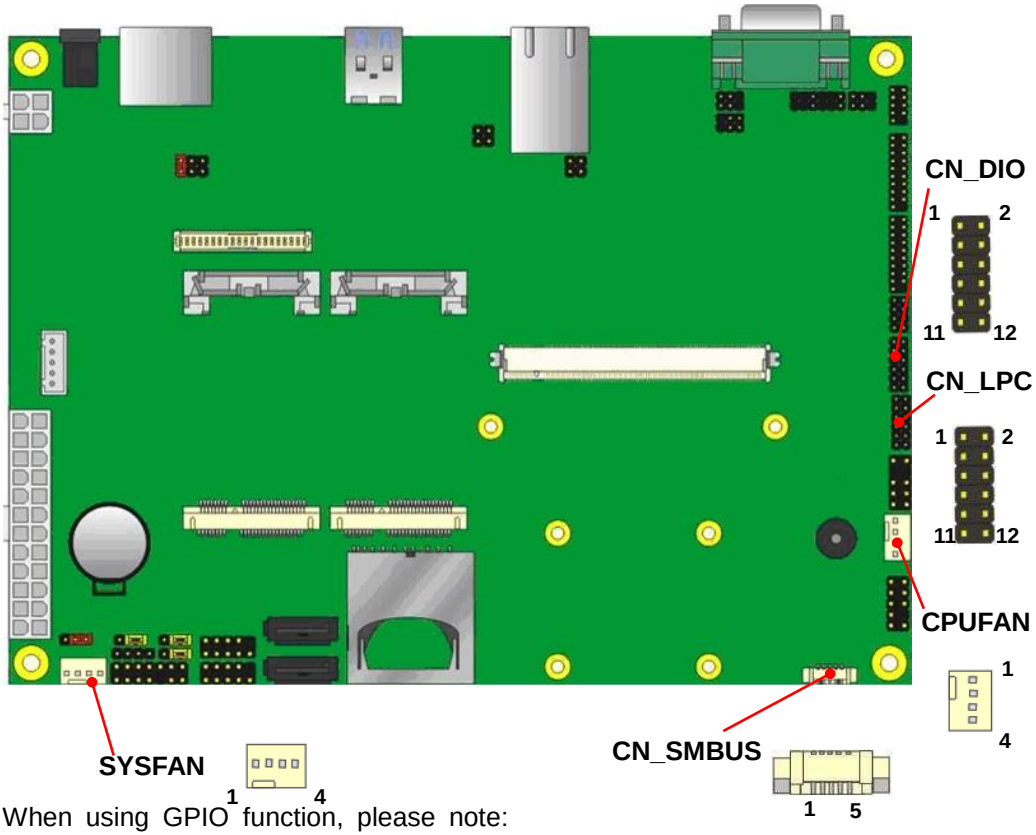
## 2.4.7 <Switch and indicator>




**JFRNT**: Front panel switch and indicator 14-pin header (Pitch 2.54mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | HDD_LED+ | **2** | Power_LED+ |
| **3** | HDD_LED- | **4** | NC |
| **5** | Reset+ | **6** | Power_LED- |
| **7** | Reset- | **8** | Speaker+ |
| **9** | Key | **10** | NC |
| **11** | Power_ON+ | **12** | NC |
| **13** | Power_ON- | **14** | Speaker- |

## 2.4.8 <GPIO and Other interface>




When using GPIO function, please note:

As Output: Open-drain, most applications need use an external pull up resistor. (If not may cause damage)

As Input: TTL-level.

**GPIO DC characteristics**

| 5V TTL-level Input Pin | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Unit** | **Conditions** |
| Input Low Threshold Voltage | $V_{t-}$ | 0.5 | 0.8 | 1.1 | V | $V_{CC}$ = 3.3V |
| Input High Threshold Voltage | $V_{t+}$ | 1.6 | 2.0 | 2.4 | V | $V_{CC}$ =3.3V |
| Hystersis | $V_{TH}$ | 0.5 | 1.2 | | V | $V_{CC}$ =3.3V |
| Input High Leakage | $I_{LIH}$ | | | +10 | μA | $V_{IN}$ = 3.3V |
| Input Low Leakage | $I_{LIL}$ | | | -10 | μA | $V_{IN}$ = 0V |
| **Open-drain output pin with 12-mA sink capability** | | | | | | |
| Output Low Voltage | $V_{OL}$ | | | 0.4 | V | $I_{OL}$ = 12 mA |

**CN_DIO**: GPIO 12-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | GND | **2** | GND |
| **3** | GPIO0 | **4** | GPIO4 |
| **5** | GPIO1 | **6** | GPIO5 |
| **7** | GPIO2 | **8** | GPIO6 |
| **9** | GPIO3 | **10** | GPIO7 |
| **11** | 5V | **12** | 12V |

**CN_LPC**: LPC 12-pin header (Pitch 2.00mm)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | CLK | **2** | RST |
| **3** | -LFRAME | **4** | LAD3 |
| **5** | LAD2 | **6** | LAD1 |
| **7** | LAD0 | **8** | 3.3V |
| **9** | SERIRQ | **10** | GND |
| **11** | 3.3VSB | **12** | NC |

CN_LPC support TPM module.

**CN_SMBUS**: SMBus 5-pin header (Pitch 2.54mm)

| Pin | Signal |
|---|---|
| **1** | VCC (5V) |
| **2** | Key |
| **3** | SMBDAT |
| **4** | SMBCLK |
| **5** | GND |

**CPUFAN**: CPU cooler Smart fan 4-pin header

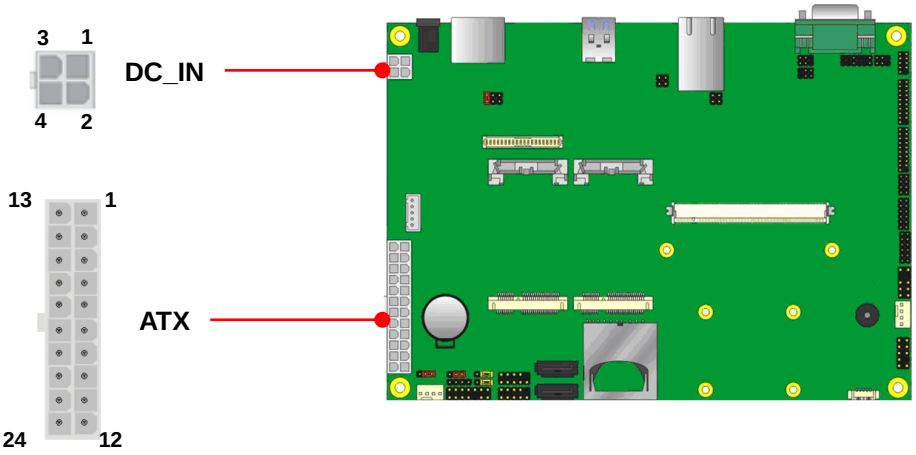
| Pin | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Signal** | GND | 12V | Sensor | Control |

**SYSFAN**: System cooler fan 3-pin header

| Pin | 1 | 2 | 3 |
|---|---|---|---|
| **Signal** | GND | 12V | Sensor |

# 2.5 <Power supply>

## 2.5.1 <Power input>




The DC_IN supports 9~24V wide voltage input.

**Note that the DC_IN and ATX do not use at the same time, it will certainly cause damage.**

**DC_IN**: ATX12V 4-pin connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | GND | **2** | GND |
| **3** | 9~24V | **4** | 9~24V |

**ATX**: main power 24-pin connector (As input)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| **1** | 3.3V | **13** | 3.3V |
| **2** | 3.3V | **14** | -12V |
| **3** | GND | **15** | GND |
| **4** | 5V | **16** | -PSON |
| **5** | GND | **17** | GND |
| **6** | 5V | **18** | GND |
| **7** | GND | **19** | GND |
| **8** | Power_OK | **20** | -5V |

| | | | |
|---|---|---|---|
| **9** | 5VSB | **21** | 5V |
| **10** | 12V | **22** | 5V |
| **11** | 12V | **23** | 5V |
| **12** | 3.3V | **24** | GND |

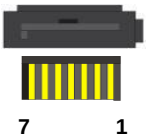
# Appendix A

## Appendix A <I/O Port Pin Assignment>

### A.1 <Serial ATA Port>

Connector: **SATA1/2**
Type: 7-pin wafer connector

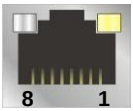
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| GND | RSATA_TXP1 | RSATA_TXN1 | GND | RSATA_RXN1 | RSATA_RXP1 | GND |




### A.2 <LAN Port>

Connector: **RJ45**

| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | MI0+ | MI0- | MI1+ | MI2+ | MI2- | MI1- | MI3+ | MI3- |




### A.3 < SDIO / MMC socket >

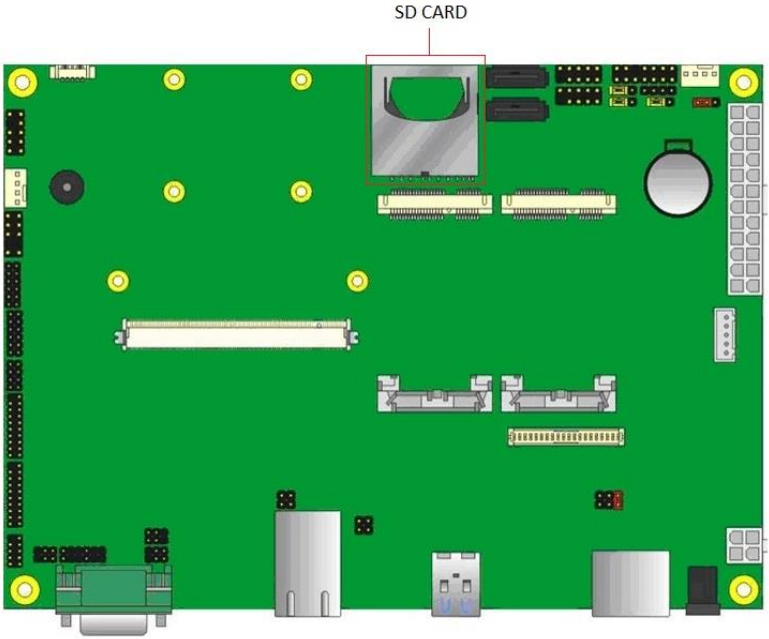
Connector: **SDCard**
Type: 13-pin header for SDIO Port

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | SD_D3 | 2 | SD_CMD |
| 3 | Ground | 4 | +3.3V |
| 5 | SD_CLK | 6 | Ground |
| 7 | SD_D0 | 8 | SD_D1 |
| 9 | SD_D2 | 10 | SDIO_WP |
| 11 | SDIO_CD# | 12 | Ground |
| 13 | Ground | | |

Connector: **SDCard**

Type: 30-pin header for MMC Port

| Pin | Description | Pin | Description |
|---|---|---|---|
| VDDI | Ground | VCC4 | +3.3V |
| VCC3 | +3.3V | VCC2 | +3.3V |
| VCC1 | +3.3V | VCCQ5 | +3.3V |
| VCCQ4 | +3.3V | VCCQ3 | +3.3V |
| VCCQ2 | +3.3V | VCCQ1 | +3.3V |
| CLK | SDIO_CLK | CMD | SDIO_CMD |
| RESET# | N/C | VSS4 | Ground |
| VSS3 | Ground | VSS2 | Ground |
| VSS1 | Ground | VSSQ5 | Ground |
| VSSQ4 | Ground | VSSQ3 | Ground |
| VSSQ2 | Ground | VSSQ1 | Ground |
| DAT7 | SDIO_D7 | DAT6 | SDIO_D6 |
| DAT5 | SDIO_D5 | DAT4 | SDIO_D4 |
| DAT3 | SDIO_D3 | DAT2 | SDIO_D2 |
| DAT1 | SDIO_D1 | DAT0 | SDIO_D0 |



# Contact information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.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