



**AXIOMTEK**

## **Q7M100 and Q7B100**

Freescale i.MX28 Series ARM-based  
Qseven System-on-Module and  
Baseboard

**Hardware User's Manual**



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## **ESD Precautions**

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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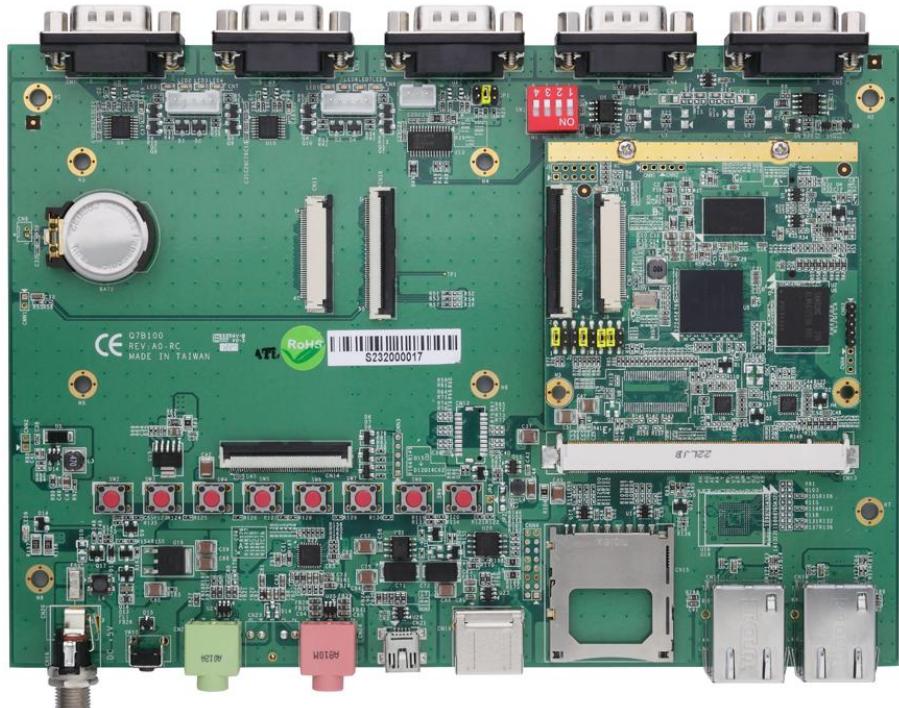
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# Chapter 1

## Introduction



The Q7M100 is a new Qseven module to support Freescale i.MX28 series SoCs. It integrates system memory, storage as eMMC/SDHC socket, TTL LCD, audio, USB host/client, UARTs, CANBus and various I/O features. Taking the low power consumption advantages of ARM RISC architecture, the Q7M100 is extremely suitable to be deployed in the deeply embedded applications; such as HMI, data logger, extended temperature embedded controllers, etc.

## 1.1 Features

- Freescale i.MX28 family SoC information:

| Feature        | i.MX283   | i.MX286   | i.MX287   |
|----------------|---|---|---|
| On-chip RAM    | 128KB   | 128KB   | 128KB   |
| Memory I/F     | NAND Flash, DDR2, mDDR, LV-DDR2                 | NAND Flash, DDR2, mDDR, LV-DDR2                 | NAND Flash, DDR2, mDDR, LV-DDR2                 |
| LCD Interface  | Yes   | Yes   | Yes   |
| Touchscreen    | Yes   | Yes   | Yes   |
| Ethernet       | x1  | x1  | x2  |
| L2 Switch      | -   | -   | Yes   |
| CAN            | -   | x2  | x2  |
| 12-bit ADC     | x8  | x8  | x8  |
| High Speed ADC | x1  | x1  | x1  |
| USB 2.0        | OTG HS with HS PHY x1<br>HS Host with HS PHY x1 | OTG HS with HS PHY x1<br>HS Host with HS PHY x1 | OTG HS with HS PHY x1<br>HS Host with HS PHY x1 |
| SDIO           | x1  | x1  | x1  |
| SPI            | x1  | x1  | x1  |
| UART           | x4  | x4  | x4  |
| PWM            | Built-in  | Built-in  | Built-in  |
| S/PDIF Tx      | -   | Yes   | Yes   |
| Package        | 14x14 0.8mm 289 BGA                             | 14x14 0.8mm 289 BGA                             | 14x14 0.8mm 289 BGA                             |

- Onboard DDR2-667 memory supports up to 128MB capacity
- Onboard eMMC flash as booting device
- 24-bit TTL LCD
- 2 USB 2.0 ports
- 2 100/10 Base-T Ethernet
- IIS Audio

## 1.2 Specifications

- **CPU**
  - Freescale i.MX28 series SoC; default is i.MX287.
  - ARM926EL-S CPU running at 454MHz.
  - 128KB integrated low power on-chip SRAM.
  - 128KB integrated mask-programmable on-chip ROM.
  - 1280 bits of on-chip one-time-programmable (OCOTP) ROM.
- **Boot ROM**
  - Linux kernel 2.6.35 and Windows CE 6.0.  
(Please contact your agent for detail shipping content).
- **System Memory**
  - Maximum up to 128MB DDR2-667 memory.
- **USB Interface**
  - Two USB 2.0 ports comply with USB Spec. Rev. 2.0.
  - One USB port OTG client controller and PHY; and one USB 2.0 host controller and PHY.
- **Storage Interface**
  - One eMMC flash chip on module with up to 20-bit BCH ECC; default is 4GB.
- **Display**
  - Controller integrated into Freescale i.MX28 SoC.
  - Support LCD output interface as maximum 24-bit RGB (DOTCK) modes and 24-bit system-mode TTL LCD.
  - Pixel-processing pipeline (PXP) supports full path from color-space conversion, scaling, alpha-blending to rotation without intermediate memory access.
- **Ethernet**
  - Two 100/10 Base-T with Freescale i.MX28 integrated MAC and SMSC LAN8720A PHY.
  - Compatible with IEEE std 802.3.
  - Support IEEE std 1588-compatible hardware timestamp.
  - Support 50MHz/25MHz clock output for external PHY.
- **Audio**
  - Freescale IIS SGTL5000 codec for MIC-in/headphone via Qseven MXM interface.
- **Serial Port**
  - Support up to four (two as TX/RX/RTS/CTS and two as TX/RX) UARTs up to 3.25Mbps (RS-422/485 only) with hardware flow control.
  - Two RS-232 and one RS-422/485, one TX/RX 3.3V TTL to be transmitted on the baseboard.
- **CANBus**
  - Two 2.0B protocol-compatible Controller Area Network (CAN) interfaces.
  - One via Qseven MXM interface, one via Axiomtek ZIF connector.
- **I<sup>2</sup>C**
  - Two I<sup>2</sup>C Master/Slave interfaces (up to 400kbps) connected to Qseven MXM interface.

- **SPI**
  - One SPI channel for 2 chip select via Qseven MXM interface.
- **GPIO**
  - Eight GPIO interfaces (up to 400kbps) wired to Axiomtek ZIF connector.
- **Other I/Os**
  - 6-channel low resolution A/D converter (LRADC), touch screen signals (4/5-wire touchscreen controller) included via Axiomtek ZIF connector.
  - Eight keypad matrix with button-detect circuit routed to Axiomtek ZIF connector.
- **Power**
  - $+5V \pm 5\%$  DC-in.
- **Form Factor**
  - 70mm x 70mm.
  - Thickness as 1.2mm  $\pm 0.1\text{mm}$ .
  - Qseven specifications v1.2 compliant.
- **Environments**
  - Operating temperature: -40 ~ 85°C (system with 20cm/sec airflow in the surface).
  - Operating humidity: 10% RH ~ 95% RH relative humidity, non-condensing.

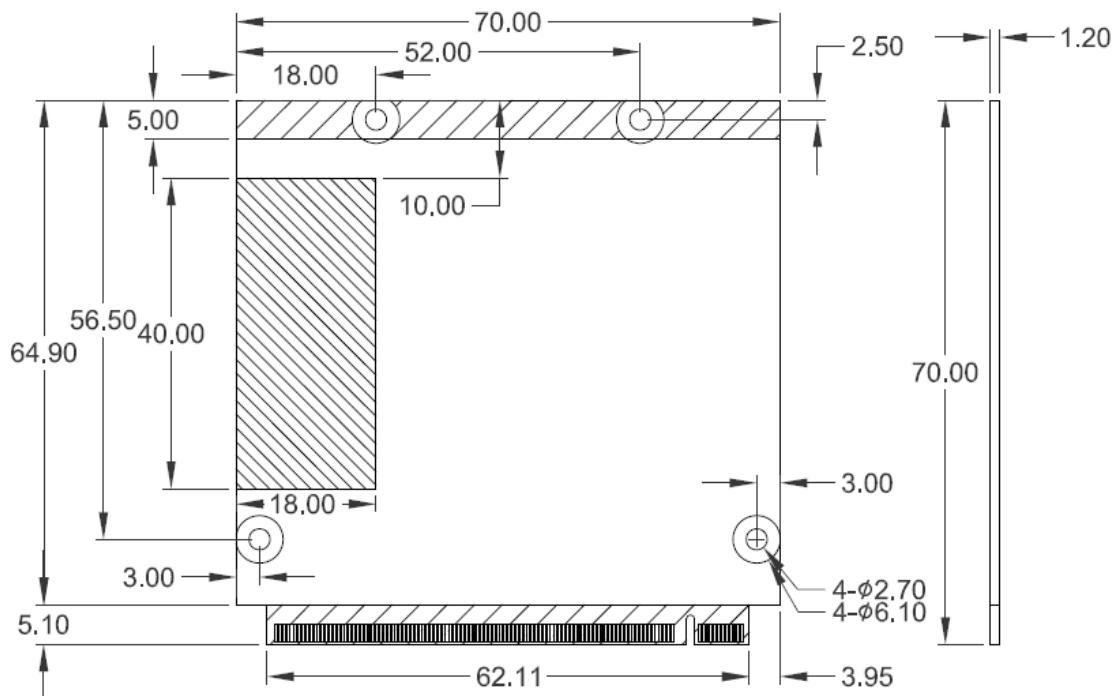


**Note:** All specifications and images are subject to change without notice.

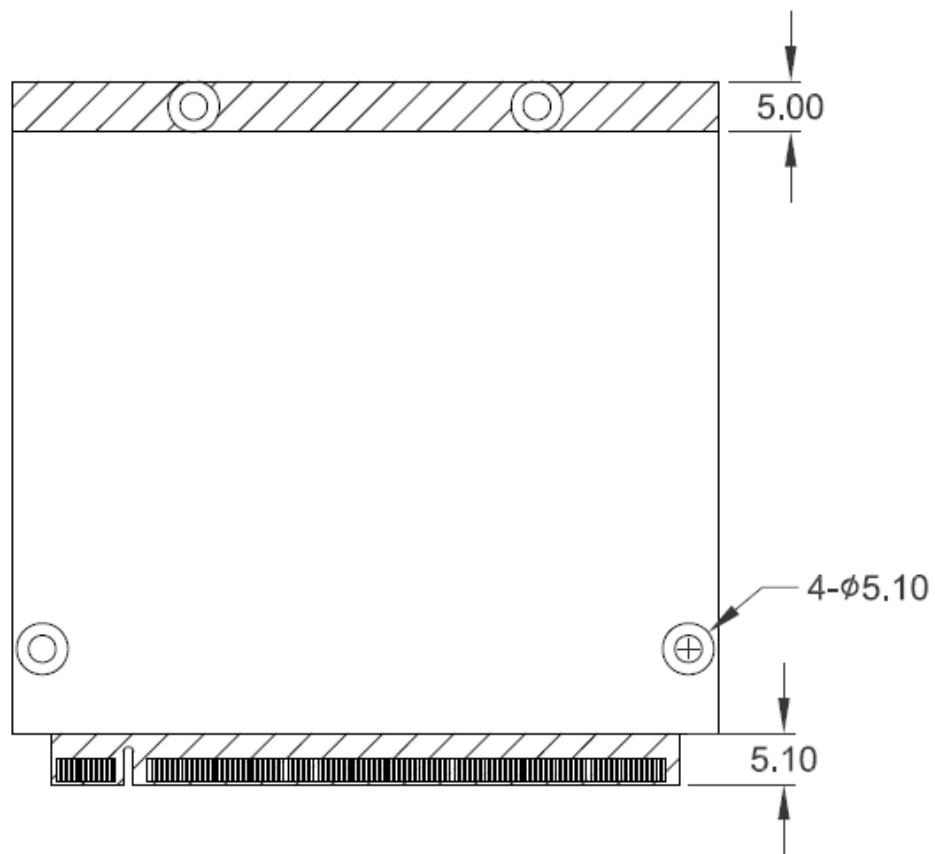
# Chapter 2

## Board and Pin Assignments

### 2.1 Board Dimensions and Fixing Holes

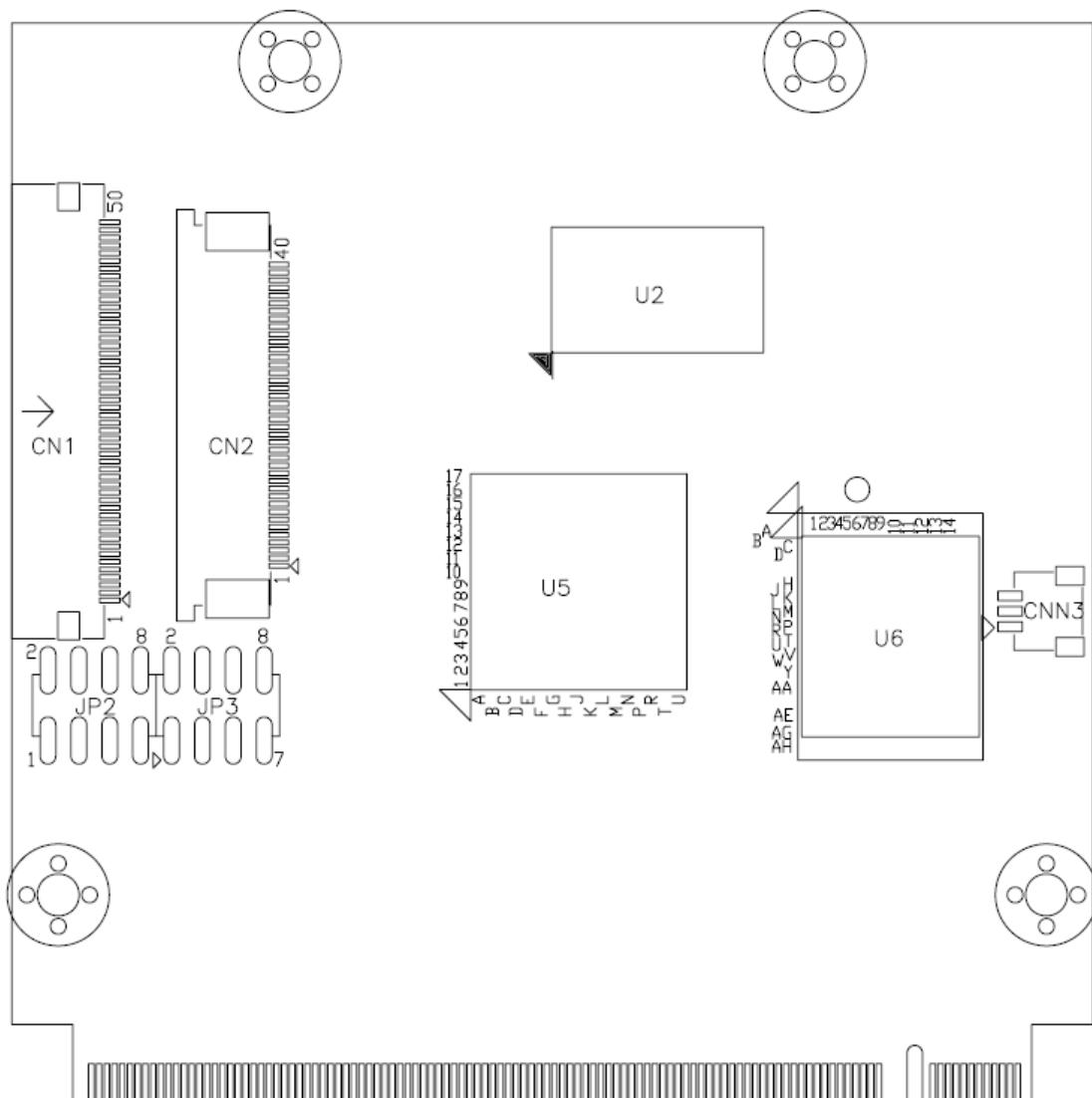


Top View

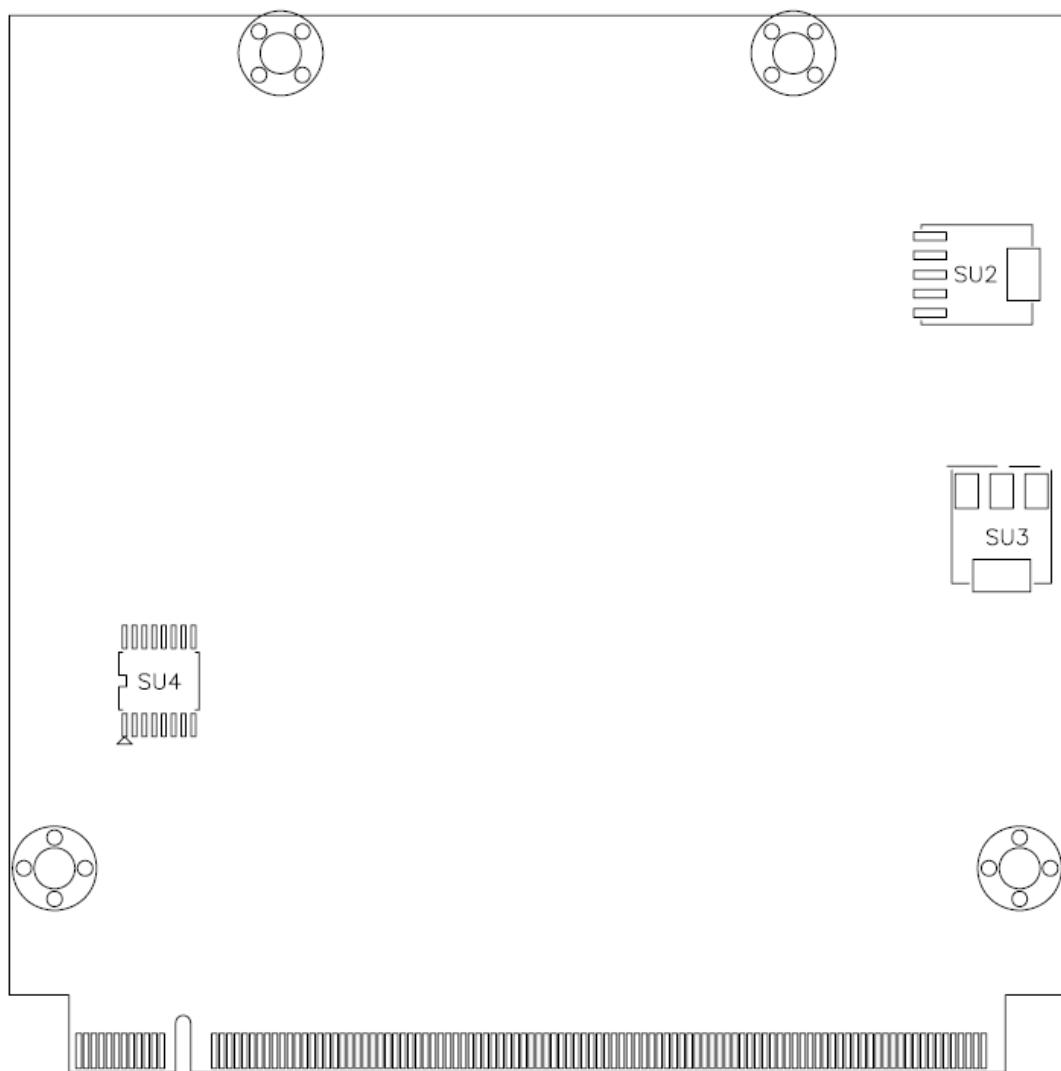


**Bottom View**

## 2.2 Board Layout



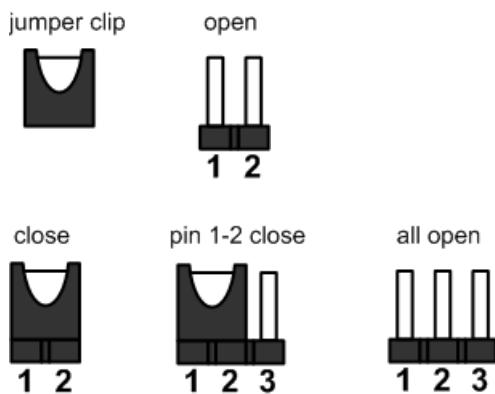
**Top View**



**Bottom View**

## 2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumpers on the Q7M100 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default setting.



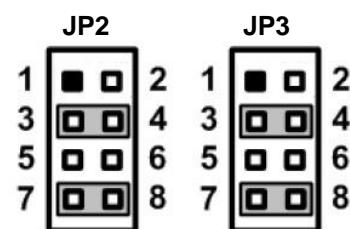
**Note:** Once the default jumper setting needs to be changed, please do it under power-off condition.

| Jumper | Description                 | Setting        |
|--------|-----------------------------|----------------|
| JP2    | Boot Mode Selection         | 3-4, 7-8 Close |
| JP3    | Default: Copy image to eMMC | 3-4, 7-8 Close |

### 2.3.1 Boot Mode Selection (JP2 and JP3)

These jumpers are for boot mode selection.

| Function                        | Setting                                  |
|---------------------------------|--|
| Copy image to eMMC<br>(Default) | JP2 3-4, 7-8 close<br>JP3 3-4, 7-8 close |
| Boot to OS                      | JP2 1-2, 7-8 close<br>JP3 3-4, 5-6 close |



## 2.4 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

| Connector | Description                                      |
|-----------|--|
| CN1       | 50-pin ZIF Connector for Axiomtek Proprietary IO |
| CN2       | 40-pin ZIF Connector for TTL LCD                 |
| CNN3      | Debug Port Connector                             |

### 2.4.1 ZIF Connectors (CN1 and CN2)

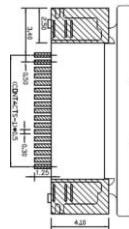
This board has a 50-pin ZIF connector (CN1) for interfacing Axiomtek Proprietary IO to baseboard.

| Pin | Signal      | Pin | Signal      |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | GPIO3_27    |
| 3   | GPIO2_14    | 4   | GPIO1_30    |
| 5   | GPIO1_29    | 6   | GPIO1_28    |
| 7   | GPIO0_27    | 8   | GPIO0_26    |
| 9   | GPIO0_24    | 10  | GPIO0_17    |
| 11  | GPIO0_16    | 12  | USB1_PWR_EN |
| 13  | USB0_PWR_EN | 14  | CAN_PWDN    |
| 15  | GND         | 16  | HSADC0      |
| 17  | GND         | 18  | LRADC1      |
| 19  | GND         | 20  | LRADC6      |
| 21  | GND         | 22  | LRADC3      |
| 23  | GND         | 24  | LRADC5      |
| 25  | GND         | 26  | LRADC2      |
| 27  | GND         | 28  | LRADC4      |
| 29  | GND         | 30  | CAN1_RX     |
| 31  | CAN1_TX     | 32  | GND         |
| 33  | COM3_TX     | 34  | GPIO2_26    |
| 35  | COM3_RX     | 36  | N.C.        |
| 37  | GND         | 38  | COM2_CTS    |
| 39  | COM2_RX     | 40  | COM2_RTS    |
| 41  | COM2_TX     | 42  | GND         |
| 43  | COM1_CTS    | 44  | COM1_RX     |
| 45  | COM1_RTS    | 46  | COM1_TX     |
| 47  | GND         | 48  | COM4_TX     |
| 49  | COM4_RX     | 50  | GND         |



This board also has a 40-pin ZIF connector (CN2) for interfacing TTL LCD to baseboard.

| Pin | Signal    | Pin | Signal      |
|-----|-----------|-----|-------------|
| 1   | GND       | 2   | GND         |
| 3   | N.C.      | 4   | N.C.        |
| 5   | LCD_D16   | 6   | LCD_D17     |
| 7   | LCD_D18   | 8   | LCD_D19     |
| 9   | LCD_D20   | 10  | LCD_D21     |
| 11  | LCD_D22   | 12  | LCD_D23     |
| 13  | LCD_D08   | 14  | LCD_D09     |
| 15  | LCD_D10   | 16  | LCD_D11     |
| 17  | LCD_D12   | 18  | LCD_D13     |
| 19  | LCD_D14   | 20  | LCD_D15     |
| 21  | LCD_D00   | 22  | LCD_D01     |
| 23  | LCD_D02   | 24  | LCD_D03     |
| 25  | LCD_D04   | 26  | LCD_D05     |
| 27  | LCD_D06   | 28  | LCD_D07     |
| 29  | GND       | 30  | LCD_CLOCKIN |
| 31  | LCD_DISP  | 32  | LCD_HSYNC   |
| 33  | LCD_VSYNC | 34  | LCD_ENABLE  |
| 35  | N.C.      | 36  | N.C.        |
| 37  | GND       | 38  | GND         |
| 39  | N.C.      | 40  | N.C.        |



**Note:** Gently connect Q7B100 baseboard to these CN1 and CN2 (see chapter 3 for information of Q7B100).

#### 2.4.2 Debug Port Connector (CNN3)

The CNN3 is a 3-pin wafer connector for TX/RX debug UART port, see table below.

| Pin | Signal   |
|-----|----------|
| 1   | Debug TX |
| 2   | Debug RX |
| 3   | GND      |



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# Chapter 3

## Q7B100 Baseboard

The Q7B100 is a baseboard for Q7M100 SoM. Connect this baseboard properly to CN1 and CN2 of Q7M100. Its specifications and detailed information are given in this chapter.

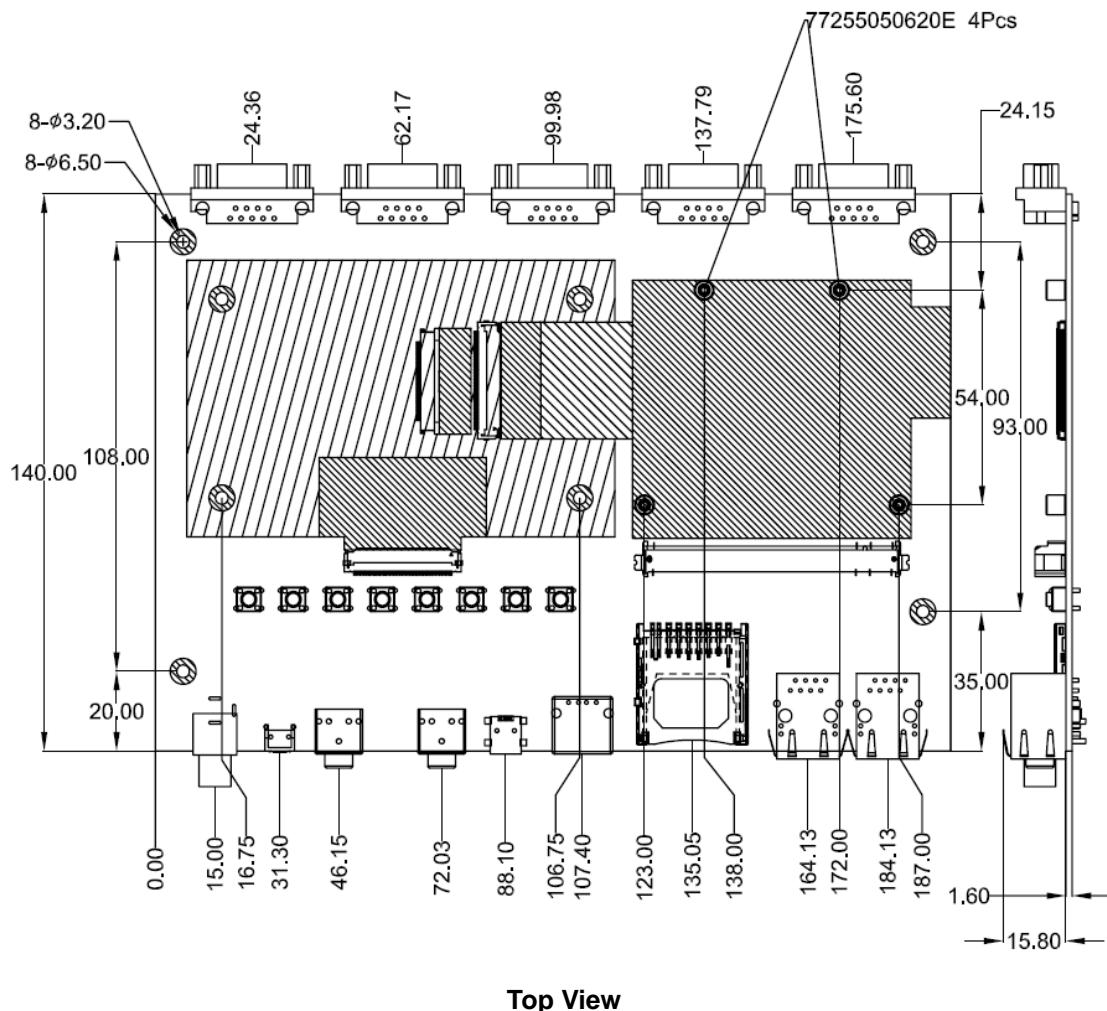
### 3.1 Q7B100 Specifications

- **Size**
  - 140mm x 200mm
- **Features**
  - Support audio jack (MIC-in/headphone).
  - One SDHC Card socket.
  - One USB 2.0 Host and OTG for Client.
  - Two RJ-45 interfaces for 100/10 Base-T with Freescale i.MX28 integrated MAC and SMSC LAN8720A PHY.
  - Serial Ports: Two RS-232 and one RS-422/485, one TX/RX 3.3V TTL.
  - Two CANBus with 2.0B protocol compliant.
  - Two wafer connectors for 8 GPIOs.
  - User buttons for keypad and reset button.

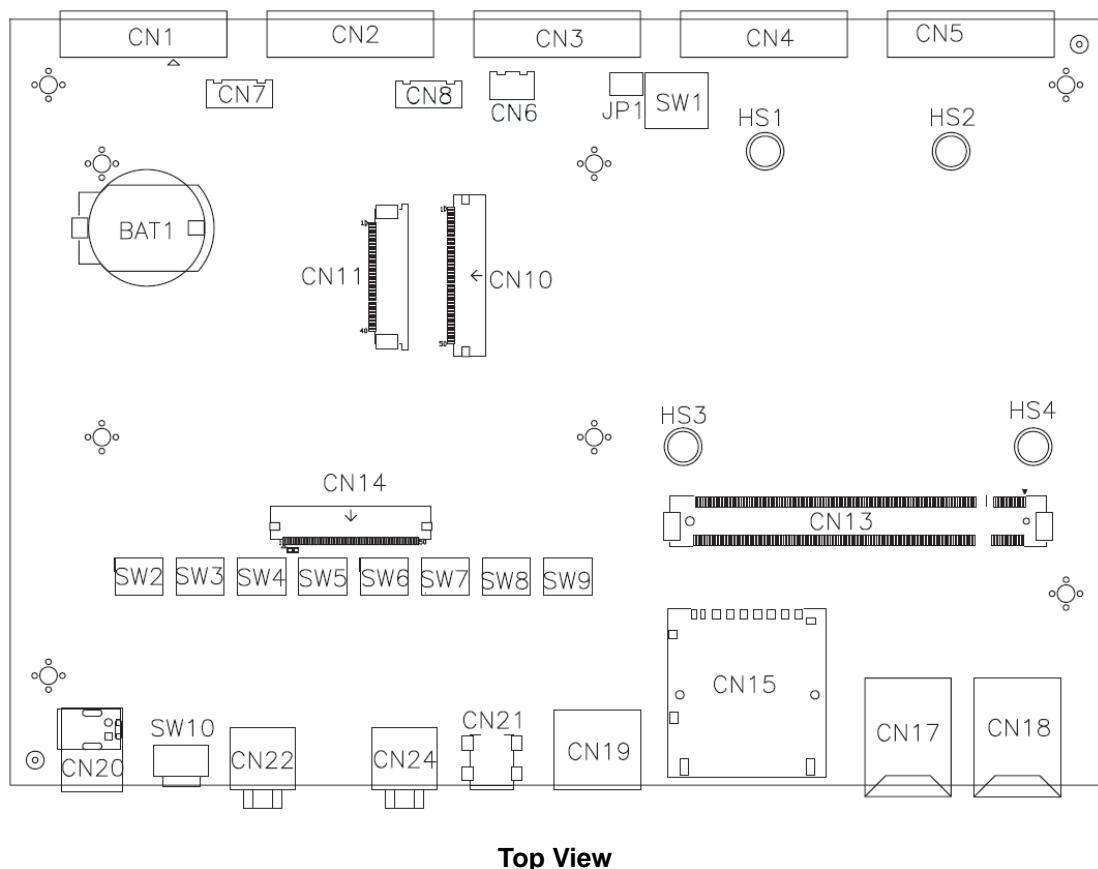


***Note:*** All specifications and images are subject to change without notice.

### 3.2 Q7B100 Dimensions and Fixing Holes



### 3.3 Q7B100 Board Layout



**Top View**

### 3.4 Q7B100 Jumper and Switch Settings

Properly configure jumper and switch on the Q7B100 to meet your application purpose. Below you can find a summary table and onboard default setting.



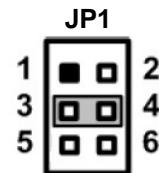
**Note:** Once the default setting needs to be changed, please do it under power-off condition.

| Jumper | Description   | Setting                        |
|--------|---|--------------------------------|
| JP1    | COM3 RS-422/485 Mode Setting<br>Default: RS-422                           | 3-4 Close                      |
| SW1    | Termination Resistor Switch<br>Default: Disable all termination resistors | SW1-1, SW1-2, SW1-3, SW1-4 OFF |

#### 3.4.1 COM3 RS-422/485 Mode Setting (JP1)

Use this jumper to set COM3 port to operate as RS-422 or RS-485 communication mode.

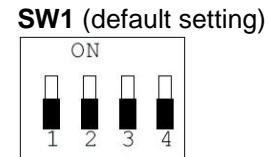
| Function              | Setting        |
|-----------------------|----------------|
| RS-422 mode (Default) | 3-4 close      |
| RS-485 mode           | 3-4, 5-6 close |



#### 3.4.2 Termination Resistor Switch (SW1)

This is a termination resistor selection switch, see table below.

| Function                                      | Setting   |
|---|-----------|
| Enable RS-422 termination resistor            | SW1-1 ON  |
| Disable RS-422 termination resistor (Default) | SW1-1 OFF |
| Enable RS-485 termination resistor            | SW1-2 ON  |
| Disable RS-485 termination resistor (Default) | SW1-2 OFF |
| Enable CAN0 termination resistor              | SW1-3 ON  |
| Disable CAN0 termination resistor (Default)   | SW1-3 OFF |
| Enable CAN1 termination resistor              | SW1-4 ON  |
| Disable CAN1 termination resistor (Default)   | SW1-4 OFF |



### 3.5 Q7B100 Connectors and Push Buttons

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors and push buttons on the hardware.

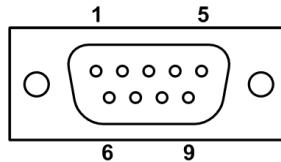
| Connector | Description   |
|-----------|---|
| CN1       | COM2 Connector  |
| CN2       | COM1 Connector  |
| CN3       | COM3 Connector  |
| CN4       | CAN1 Interface Connector                                  |
| CN5       | CAN0 Interface Connector                                  |
| CN6       | COM4 Connector  |
| CN7~CN8   | Digital I/O Ports   |
| CN10      | 50-pin ZIF Connector for Axiomtek Proprietary IO from SoM |
| CN11      | 40-pin ZIF Connector for TTL LCD from SoM                 |
| CN13      | MXM Connector   |
| CN14      | 50-pin ZIF for TTL LCD+T/S from baseboard                 |
| CN15      | SDHC Card 1 Socket  |
| CN17      | Ethernet Port 0 Connector                                 |
| CN18      | Ethernet Port 1 Connector                                 |
| CN19      | USB Port 1 Host Connector                                 |
| CN20      | DC Jack Power Connector                                   |
| CN21      | Mini USB OTG Port 0 Host/Device Connector                 |
| CN22      | Audio Headphone Jack                                      |
| CN24      | Audio MIC-in Jack   |
| SW2~SW9   | User Buttons for Keypad                                   |
| SW10      | Reset Button  |

### 3.5.1 COM1~COM3 Connectors (CN1~CN3)

These are standard 9-pin D-Sub connectors for interfacing to serial ports.

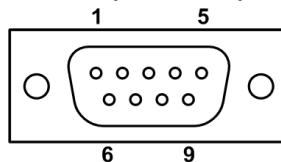
| Pin | Signal   |
|-----|----------|
| 1   | N.C.     |
| 2   | COM2_RX  |
| 3   | COM2_TX  |
| 4   | N.C.     |
| 5   | GND      |
| 6   | N.C.     |
| 7   | COM2_RTS |
| 8   | COM2_CTS |
| 9   | N.C.     |

CN1 (for COM2)



| Pin | Signal   |
|-----|----------|
| 1   | N.C.     |
| 2   | COM1_RX  |
| 3   | COM1_TX  |
| 4   | N.C.     |
| 5   | GND      |
| 6   | N.C.     |
| 7   | COM1_RTS |
| 8   | COM1_CTS |
| 9   | N.C.     |

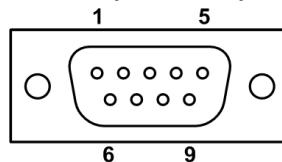
CN2 (for COM1)



The pin assignments of RS-422/RS-485 are listed in table below. If you need COM3 port to support RS-422 or RS-485, please refer to section 3.4.1.

| Pin | RS-422 | RS-485 |
|-----|--------|--------|
| 1   | N.C.   | N.C.   |
| 2   | RX+    | N.C.   |
| 3   | TX+    | DATA+  |
| 4   | N.C.   | N.C.   |
| 5   | GND    | GND    |
| 6   | N.C.   | N.C.   |
| 7   | TX-    | DATA-  |
| 8   | RX-    | N.C.   |
| 9   | N.C.   | N.C.   |

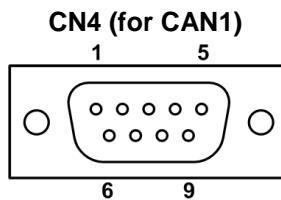
CN3 (for COM3)



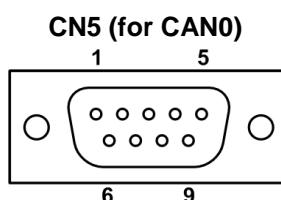
### 3.5.2 CAN Interface Connectors (CN4 and CN5)

These are standard 9-pin D-Sub connectors for interfacing to CAN network.

| Pin | Signal |
|-----|--------|
| 1   | N.C.   |
| 2   | CAN1_L |
| 3   | GND    |
| 4   | N.C.   |
| 5   | N.C.   |
| 6   | N.C.   |
| 7   | CAN1_H |
| 8   | N.C.   |
| 9   | N.C.   |



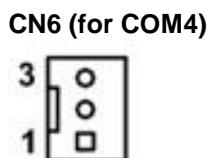
| Pin | Signal |
|-----|--------|
| 1   | N.C.   |
| 2   | CAN0_L |
| 3   | GND    |
| 4   | N.C.   |
| 5   | N.C.   |
| 6   | N.C.   |
| 7   | CAN0_H |
| 8   | N.C.   |
| 9   | N.C.   |



### 3.5.3 COM4 Connector (CN6)

This is a 3-pin wafer connector for 3.3V TTL TX/RX UART Port, see table below.

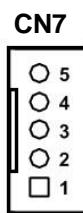
| Pin | Signal  |
|-----|---------|
| 1   | COM4_RX |
| 2   | COM4_TX |
| 3   | GND     |



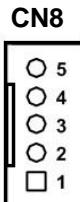
### 3.5.4 Digital I/O Ports (CN7 and CN8)

The board is equipped with two 4-channel digital I/O connectors that meet requirements for a system customary automation control. You may use software programming to control these digital signals.

| Pin | CN7 Signal |
|-----|------------|
| 1   | GPIO1_30   |
| 2   | GPIO1_29   |
| 3   | GPIO1_28   |
| 4   | GPIO0_27   |
| 5   | GND        |



| Pin | CN8 Signal |
|-----|------------|
| 1   | GPIO0_26   |
| 2   | GPIO0_24   |
| 3   | GPIO0_17   |
| 4   | GPIO0_16   |
| 5   | GND        |



### 3.5.5 ZIF Connectors (CN10, CN11 and CN14)

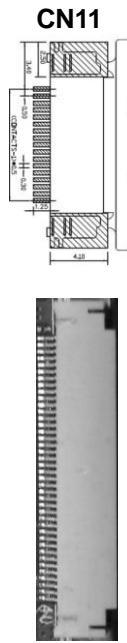
This board has a 50-pin ZIF connector (CN10) for interfacing Axiomtek Proprietary IO from SoM.

| Pin | Signal      | Pin | Signal      |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | COM4_RX     |
| 3   | COM4_TX     | 4   | GND         |
| 5   | COM1_TX     | 6   | COM1_RTS    |
| 7   | COM1_RX     | 8   | COM1_CTS    |
| 9   | GND         | 10  | COM2_TX     |
| 11  | COM2_RTS    | 12  | COM2_RX     |
| 13  | COM2_CTS    | 14  | GND         |
| 15  | N.C.        | 16  | COM3_RX     |
| 17  | GPIO2_26    | 18  | COM3_TX     |
| 19  | GND         | 20  | CAN1_RX     |
| 21  | CAN1_RX     | 22  | GND         |
| 23  | LDADC4      | 24  | GND         |
| 25  | LDADC2      | 26  | GND         |
| 27  | LDADC5      | 28  | GND         |
| 29  | LDADC3      | 30  | GND         |
| 31  | LDADC6      | 32  | GND         |
| 33  | LRADC1      | 34  | GND         |
| 35  | TP1         | 36  | GND         |
| 37  | CAN_PWDN    | 38  | USB0_PWR_EN |
| 39  | USB1_PWR_EN | 40  | GPIO0_16    |
| 41  | GPIO0_17    | 42  | GPIO0_24    |
| 43  | GPIO0_26    | 44  | GPIO0_27    |
| 45  | GPIO1_28    | 46  | GPIO1_29    |
| 47  | GPIO1_30    | 48  | GPIO2_14    |
| 49  | GPIO3_27    | 50  | GND         |



This board also has a 40-pin ZIF connector (CN11) for interfacing TTL LCD from SoM.

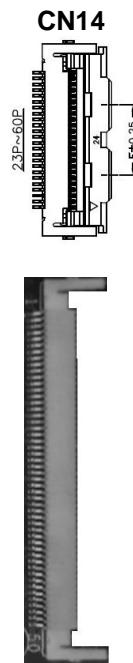
| Pin | Signal      | Pin | Signal    |
|-----|-------------|-----|-----------|
| 1   | N.C.        | 2   | N.C.      |
| 3   | GND         | 4   | GND       |
| 5   | N.C.        | 6   | N.C.      |
| 7   | LCD_ENABLE  | 8   | LCD_VSYNC |
| 9   | LCD_HSYNC   | 10  | LCD_DISP  |
| 11  | LCD_CLOCKIN | 12  | GND       |
| 13  | LCD_D07     | 14  | LCD_D06   |
| 15  | LCD_D05     | 16  | LCD_D04   |
| 17  | LCD_D03     | 18  | LCD_D02   |
| 19  | LCD_D01     | 20  | LCD_D00   |
| 21  | LCD_D15     | 22  | LCD_D14   |
| 23  | LCD_D13     | 24  | LCD_D12   |
| 25  | LCD_D11     | 26  | LCD_D10   |
| 27  | LCD_D09     | 28  | LCD_D08   |
| 29  | LCD_D23     | 30  | LCD_D22   |
| 31  | LCD_D21     | 32  | LCD_D20   |
| 33  | LCD_D19     | 34  | LCD_D18   |
| 35  | LCD_D17     | 36  | LCD_D16   |
| 37  | N.C.        | 38  | N.C.      |
| 39  | GND         | 40  | GND       |



**Note:** Gently connect Q7M100 SoM to these CN10 and CN11..

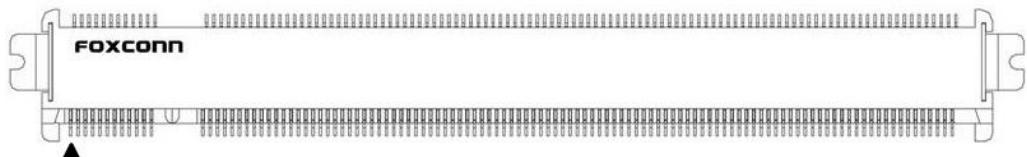
This board also has a 50-pin ZIF connector (CN14) for interfacing TTL LCD and touchscreen from baseboard.

| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 1          | GND           | 2          | GND           |
| 3          | REG_3V3       | 4          | REG_3V3       |
| 5          | LCD_D16       | 6          | LCD_D17       |
| 7          | LCD_D18       | 8          | LCD_D19       |
| 9          | LCD_D20       | 10         | LCD_D21       |
| 11         | LCD_D22       | 12         | LCD_D23       |
| 13         | LCD_D08       | 14         | LCD_D09       |
| 15         | LCD_D10       | 16         | LCD_D11       |
| 17         | LCD_D12       | 18         | LCD_D13       |
| 19         | LCD_D14       | 20         | LCD_D15       |
| 21         | LCD_D00       | 22         | LCD_D01       |
| 23         | LCD_D02       | 24         | LCD_D03       |
| 25         | LCD_D04       | 26         | LCD_D05       |
| 27         | LCD_D06       | 28         | LCD_D07       |
| 29         | GND           | 30         | LCD_CLOCKIN   |
| 31         | LCD_DISP      | 32         | LCD_HSYNC     |
| 33         | LCD_VSYNC     | 34         | LCD_ENABLE    |
| 35         | N.C.          | 36         | N.C.          |
| 37         | GND           | 38         | GND           |
| 39         | TOUCH_X0      | 40         | TOUCH_Y1      |
| 41         | TOUCH_X1      | 42         | TOUCH_Y0      |
| 43         | N.C.          | 44         | N.C.          |
| 45         | N.C.          | 46         | LEDB-         |
| 47         | LEDB+         | 48         | GND           |
| 49         | GND           | 50         | GND           |



### 3.5.6 MXM Connector (CN13)

This SMT type 0.50mm [.020"] pitch, 230-pin MXM connector is available in 2 different heights (5.5mm and 7.8mm) for maximum flexibility.



| Pin | Signal        | Pin | Signal        |
|-----|---------------|-----|---------------|
| 1   | GND           | 2   | GND           |
| 3   | ETH1_RXN      | 4   | ETH1_TXN      |
| 5   | ETH1_RXP      | 6   | ETH1_TXP      |
| 7   | ETH0_100MLED2 | 8   | ETH1_100MLED2 |
| 9   | ETH0_RXN      | 10  | ETH0_TXN      |
| 11  | ETH0_RXP      | 12  | ETH0_TXP      |
| 13  | ETH0_LINKLED1 | 14  | ETH1_LINKLED1 |
| 15  | ETH0_CT       | 16  | ETH1_CT       |
| 17  | N.C.          | 18  | 3V3_ENABLE    |
| 19  | N.C.          | 20  | N.C.          |
| 21  | N.C.          | 22  | N.C.          |
| 23  | GND           | 24  | GND           |
| 25  | GND           | 26  | N.C.          |
| 27  | N.C.          | 28  | SW_RESET      |
| 29  | N.C.          | 30  | N.C.          |
| 31  | N.C.          | 32  | N.C.          |
| 33  | N.C.          | 34  | GND           |
| 35  | N.C.          | 36  | N.C.          |
| 37  | N.C.          | 38  | N.C.          |
| 39  | GND           | 40  | GND           |
| 41  | N.C.          | 42  | SDIO1_CLK     |
| 43  | SDIO1_CD      | 44  | N.C.          |
| 45  | SDIO1_CMD     | 46  | SDIO1_WP      |
| 47  | SDIO1_PWR     | 48  | SDIO1_D1      |
| 49  | SDIO1_D0      | 50  | SDIO1_D3      |
| 51  | SDIO1_D2      | 52  | SDIO1_D5      |
| 53  | SDIO1_D4      | 54  | SDIO1_D7      |
| 55  | SDIO1_D6      | 56  | N.C.          |
| 57  | GND           | 58  | GND           |
| 59  | I2S_LRCLK     | 60  | N.C.          |
| 61  | SYS_MCLK      | 62  | N.C.          |
| 63  | I2S_SCLK      | 64  | N.C.          |
| 65  | I2S_DOUT      | 66  | I2C1_CLK      |
| 67  | I2S_DIN       | 68  | I2C1_DAT      |
| 69  | N.C.          | 70  | N.C.          |
| 71  | N.C.          | 72  | N.C.          |
| 73  | GND           | 74  | GND           |
| 75  | N.C.          | 76  | N.C.          |
| 77  | N.C.          | 78  | N.C.          |
| 79  | N.C.          | 80  | N.C.          |

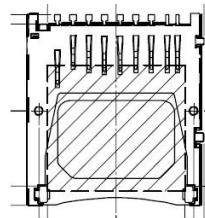
| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 81         | N.C.          | 82         | N.C.          |
| 83         | N.C.          | 84         | N.C.          |
| 85         | USB1_OC       | 86         | USB0_OC       |
| 87         | N.C.          | 88         | USB1_DM       |
| 89         | N.C.          | 90         | USB1_DP       |
| 91         | N.C.          | 92         | USB0_ID       |
| 93         | N.C.          | 94         | USB0_DM       |
| 95         | N.C.          | 96         | USB0_DP       |
| 97         | GND           | 98         | GND           |
| 99         | N.C.          | 100        | N.C.          |
| 101        | N.C.          | 102        | N.C.          |
| 103        | N.C.          | 104        | N.C.          |
| 105        | N.C.          | 106        | N.C.          |
| 107        | N.C.          | 108        | N.C.          |
| 109        | N.C.          | 110        | N.C.          |
| 111        | N.C.          | 112        | N.C.          |
| 113        | N.C.          | 114        | N.C.          |
| 115        | N.C.          | 116        | N.C.          |
| 117        | GND           | 118        | GND           |
| 119        | N.C.          | 120        | N.C.          |
| 121        | N.C.          | 122        | N.C.          |
| 123        | BACKLIGHT_PWM | 124        | N.C.          |
| 125        | I2C0_DAT      | 126        | N.C.          |
| 127        | I2C0_CLK      | 128        | N.C.          |
| 129        | CAN0_TX       | 130        | CAN0_RX       |
| 131        | N.C.          | 132        | N.C.          |
| 133        | N.C.          | 134        | N.C.          |
| 135        | GND           | 136        | GND           |
| 137        | N.C.          | 138        | N.C.          |
| 139        | N.C.          | 140        | N.C.          |
| 141        | GND           | 142        | GND           |
| 143        | N.C.          | 144        | N.C.          |
| 145        | N.C.          | 146        | N.C.          |
| 147        | GND           | 148        | GND           |
| 149        | N.C.          | 150        | N.C.          |
| 151        | N.C.          | 152        | N.C.          |
| 153        | N.C.          | 154        | N.C.          |
| 155        | N.C.          | 156        | N.C.          |
| 157        | N.C.          | 158        | N.C.          |
| 159        | GND           | 160        | GND           |
| 161        | N.C.          | 162        | N.C.          |
| 163        | N.C.          | 164        | N.C.          |
| 165        | GND           | 166        | GND           |
| 167        | N.C.          | 168        | N.C.          |
| 169        | N.C.          | 170        | N.C.          |
| 171        | N.C.          | 172        | N.C.          |
| 173        | N.C.          | 174        | N.C.          |
| 175        | N.C.          | 176        | N.C.          |
| 177        | N.C.          | 178        | N.C.          |

| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 179        | N.C.          | 180        | N.C.          |
| 181        | N.C.          | 182        | N.C.          |
| 183        | GND           | 184        | GND           |
| 185        | N.C.          | 186        | N.C.          |
| 187        | N.C.          | 188        | N.C.          |
| 189        | N.C.          | 190        | N.C.          |
| 191        | N.C.          | 192        | N.C.          |
| 193        | VCC_RTC       | 194        | N.C.          |
| 195        | N.C.          | 196        | N.C.          |
| 197        | GND           | 198        | GND           |
| 199        | SPI_MOSI      | 200        | SPI_CS0#      |
| 201        | SPI_MISO      | 202        | SPI_CS1#      |
| 203        | SPI_SCK       | 204        | N.C.          |
| 205        | N.C.          | 206        | N.C.          |
| 207        | N.C.          | 208        | N.C.          |
| 209        | N.C.          | 210        | N.C.          |
| 211        | WALL_5V_IN    | 212        | WALL_5V_IN    |
| 213        | WALL_5V_IN    | 214        | WALL_5V_IN    |
| 215        | WALL_5V_IN    | 216        | WALL_5V_IN    |
| 217        | WALL_5V_IN    | 218        | WALL_5V_IN    |
| 219        | WALL_5V_IN    | 220        | WALL_5V_IN    |
| 221        | WALL_5V_IN    | 222        | WALL_5V_IN    |
| 223        | WALL_5V_IN    | 224        | WALL_5V_IN    |
| 225        | WALL_5V_IN    | 226        | WALL_5V_IN    |
| 227        | WALL_5V_IN    | 228        | WALL_5V_IN    |
| 229        | WALL_5V_IN    | 230        | WALL_5V_IN    |

### 3.5.7 SDHC Card 1 Socket (CN15)

This board has a SDHC Card 1 socket.

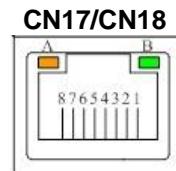
| Pin | Signal      |
|-----|-------------|
| 1   | SDIO1_D3    |
| 2   | SDIO1_CMD   |
| 3   | GND         |
| 4   | VDDIO_SD1   |
| 5   | SDIO1_CLK   |
| 6   | GND         |
| 7   | SDIO1_D0    |
| 8   | SDIO1_D1    |
| 9   | SDIO1_D2    |
| 10  | SDIO1_WP    |
| 11  | SDIO1_CD    |
| 12  | GND         |
| 13  | GND (SHELL) |
| 14  | GND (SHELL) |



### 3.5.8 Ethernet Port Connectors (CN17 and CN18)

This board has two RJ-45 connectors for Ethernet connection; CN17 for Ethernet port 0 and CN18 for Ethernet port 1. Just plug in one end of the Ethernet cable and connect the other end to a 100/10 Base-T hub.

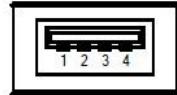
| Pin | Signal                           |
|-----|----------------------------------|
| 1   | TX+ (Data transmission positive) |
| 2   | TX- (Data transmission negative) |
| 3   | RX+ (Data reception positive)    |
| 4   | RJ45 termination                 |
| 5   | RJ45 termination                 |
| 6   | RX- (Data reception negative )   |
| 7   | RJ45 termination                 |
| 8   | RJ45 termination                 |
| A   | Active LED (Yellow)              |
| B   | 100 LAN LED (Green)              |



### 3.5.9 USB Port 1 Host Connector (CN19)

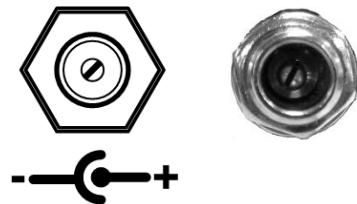
The board comes with one Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector which is for adapting to USB peripherals such as keyboard, mouse, etc.

| Pin | Signal                |
|-----|-----------------------|
| 1   | USB1_VBUS (+5V level) |
| 2   | USB1_DM               |
| 3   | USB1_DP               |
| 4   | GND                   |



### 3.5.10 DC Jack Power Connector (CN20)

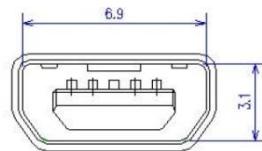
This is a DC power jack with lock. Firmly insert at least 25W adapter into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting this power jack.



### 3.5.11 Mini USB OTG Port 0 Host/Device Connector (CN21)

USB On-The-Go, often abbreviated USB OTG, is a specification that allows USB devices such as digital audio players or mobile phones to act as a host, allowing other USB devices like a USB flash drive, mouse, or keyboard to be attached to them. Unlike conventional USB systems, USB OTG systems can drop the hosting role and act as normal USB devices when attached to another host.

| Pin | Signal                |
|-----|-----------------------|
| 1   | USB0_VBUS (+5V level) |
| 2   | USB0_DM               |
| 3   | USB0_DP               |
| 4   | USB0_ID               |
| 5   | GND                   |



### 3.5.12 Audio Headphone Jack (CN22)

The board comes with one audio headphone jack.

| Pin Color | Signal    |
|-----------|-----------|
| Green     | Headphone |



### 3.5.13 Audio MIC-in Jack (CN24)

The board comes with one audio MIC-in jack.

| Pin Color | Signal |
|-----------|--------|
| Pink      | MIC IN |



### **3.5.14 User Buttons for Keypad (SW2~SW9)**

The board comes with eight push buttons for keypad, see table below.

| <b>Push Button</b> | <b>Description</b> |
|--------------------|--------------------|
| SW2                | KEY1               |
| SW3                | RIGHT              |
| SW4                | KEY2               |
| SW5                | LEFT               |
| SW6                | UP                 |
| SW7                | KEY3               |
| SW8                | DOWN               |
| SW9                | SELECT             |

**SW2/SW3/SW4/SW5/SW6/SW7/SW8/SW9**



### **3.5.15 Reset Button (SW10)**

This is the reset button for rebooting your system.

| <b>Push Button</b> | <b>Description</b> |
|--------------------|--------------------|
| SW10               | Reboot system      |

