

# GENE-SKU6

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3.5" Subcompact Board

User's Manual 6<sup>th</sup> Ed

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## Packing List

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Before setting up your product, please make sure the following items have been shipped:

| Item  | Quantity |
|---|----------|
| ● GENE-SKU6 with heat spreader                        | 1        |
| ● Product DVD with User's Manual (in pdf) and drivers | 1        |

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

## About this Document

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This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the [AAEON.com](http://AAEON.com) for the latest version of this document.

## Safety Precautions

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Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please contact our service personnel:
  - i. Damaged power cord or plug
  - ii. Liquid intrusion to the device
  - iii. Exposure to moisture
  - iv. Device is not working as expected or in a manner as described in this manual
  - v. The device is dropped or damaged
  - vi. Any obvious signs of damage displayed on the device
18. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.**

### **Warning!**



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

### **Caution:**

*There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.*

### **Attention:**

*Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.*



## China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

| 部件名称   | 有毒有害物质或元素 |           |           |                 |               |                 |
|--|-----------|-----------|-----------|-----------------|---------------|-----------------|
|  | 铅<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 印刷电路板<br>及其电子组件  | ○         | ○         | ○         | ○               | ○             | ○               |
| 外部信号<br>连接器及线材   | ○         | ○         | ○         | ○               | ○             | ○               |
| <p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。</p> |           |           |           |                 |               |                 |

## China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

| Component   | Poisonous or Hazardous Substances or Elements |              |              |                              |                                |                                       |
|---|---|--------------|--------------|------------------------------|--------------------------------|---------------------------------------|
|   | Lead (Pb)                                     | Mercury (Hg) | Cadmium (Cd) | Hexavalent Chromium (Cr(VI)) | Polybrominated Biphenyls (PBB) | Polybrominated Diphenyl Ethers (PBDE) |
| PCB & Other Components  | ○   | ○            | ○            | ○                            | ○                              | ○                                     |
| Wires & Connectors for External Connections   | ○   | ○            | ○            | ○                            | ○                              | ○                                     |
| <p>O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.</p> <p>X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.</p> <p><b>Note:</b> The Environment Friendly Use Period as labeled on this product is applicable under normal usage only</p> |   |              |              |                              |                                |                                       |

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# Chapter 1

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Product Specifications

## 1.1 Specifications

---

### System

|                               |   |
|-------------------------------|---|
| ● Form Factor                 | 3.5"  |
| ● CPU                         | Intel® Core™ i3/i5/i7 processor SoC           |
| ● CPU Frequency               | Up to 2.4/3.0 GHz                             |
| ● Chipset                     | Intel® Core™ i3/i5/i7 processor SoC           |
| ● Memory Type                 | DDR4 1866/2133 SODIMM x 1                     |
| ● Max Memory Capacity         | 16 GB   |
| ● BIOS                        | UEFI  |
| ● Wake On LAN                 | Yes   |
| ● Watchdog Timer              | 255 levels                                    |
| ● Power Requirement           | +12 V or 9 ~ 36 V                             |
| ● Power Supply Type           | AT/ATX  |
| ● Power Consumption (Typical) | Intel® i7-6600U, DDR4 2133MHz 16G, 1.75A@+12V |
| ● Dimensions (L x W)          | 146 x 101.7 mm (5.75 x 4")                    |
| ● Operating Temperature       | 0 ~ 60°C (32 ~ 140°F)                         |
| ● Storage Temperature         | -40 ~ 81°C (-40 ~ 176°F)                      |
| ● Operation Humidity          | 10 ~ 90% relative humidity, non-condensing    |
| ● MTBF                        | 123,000                                       |
| ● Certification               | CE/FCC  |



## Display

- **VGA/LCD Controller** Intel® Core™ i3/i5/i7 processor SoC
- **Video Output** DVI, CRT/DP, LVDS  
(CRT is shared with DP, and default is DP)
- **Backlight Inverter Supply** Yes

## I/O

- **Ethernet** Intel I210, 10/100/1000Base , RJ-45 x 2
- **Audio** High definition audio interface
- **USB** USB 3.0 x 4  
USB 2.0 x 2
- **Serial Port** RS-232 x 1  
RS-232/422/485 x 3
- **HDD Interface** SATA 3.0 Gb/s x 1  
+5 SATA power connector x 1
- **SSD** mSATA (shared with half-size Mini-Card, select with BIOS)
- **Expansion Slot** 1. BIO x 1 (option)  
2. Mini Card x 2 and default is  
2.1. mSATA x 1 (half-size)  
2.2. miniCard x 1(Full-size)
- **DI/O** 8-bit
- **TPM** TPM2.0 x 1(option)
- **Touch** 1

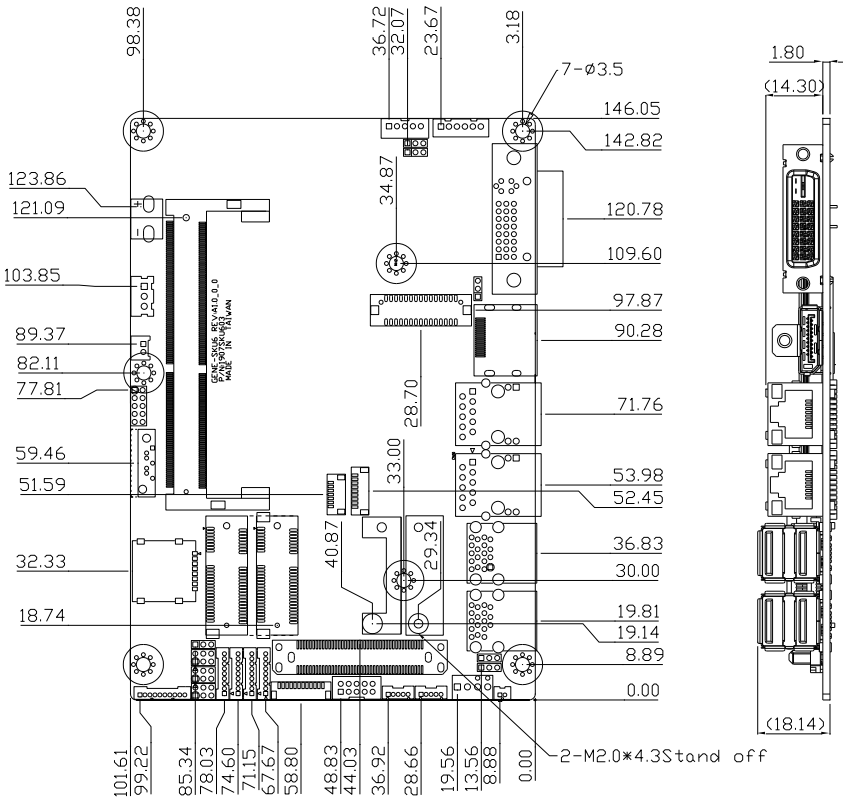
# Chapter 2

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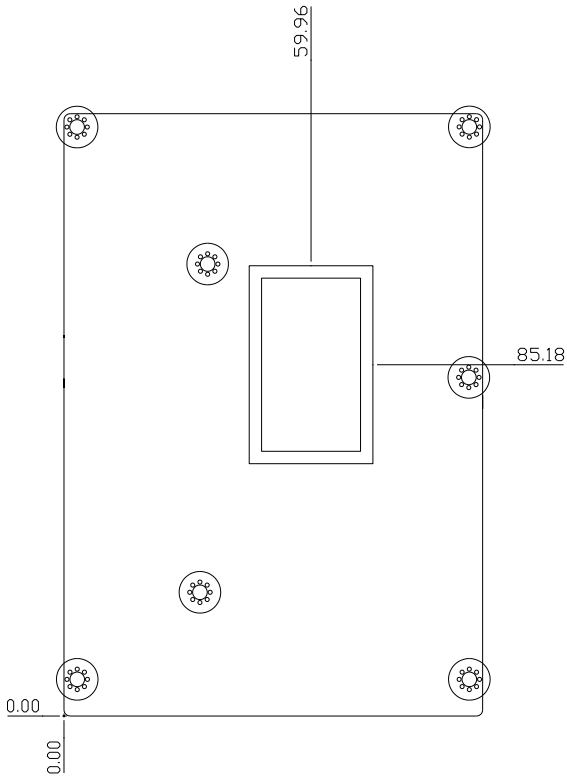
Hardware Information

## 2.1 Dimensions

### Component Side

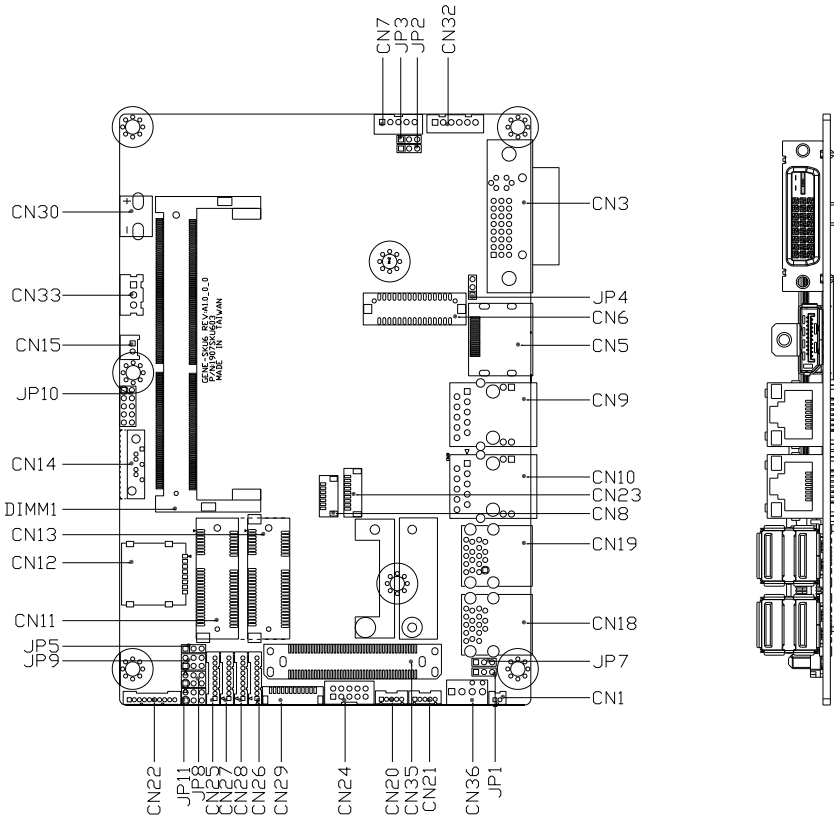


### Solder Side (with heat spreader)



### Solder Side

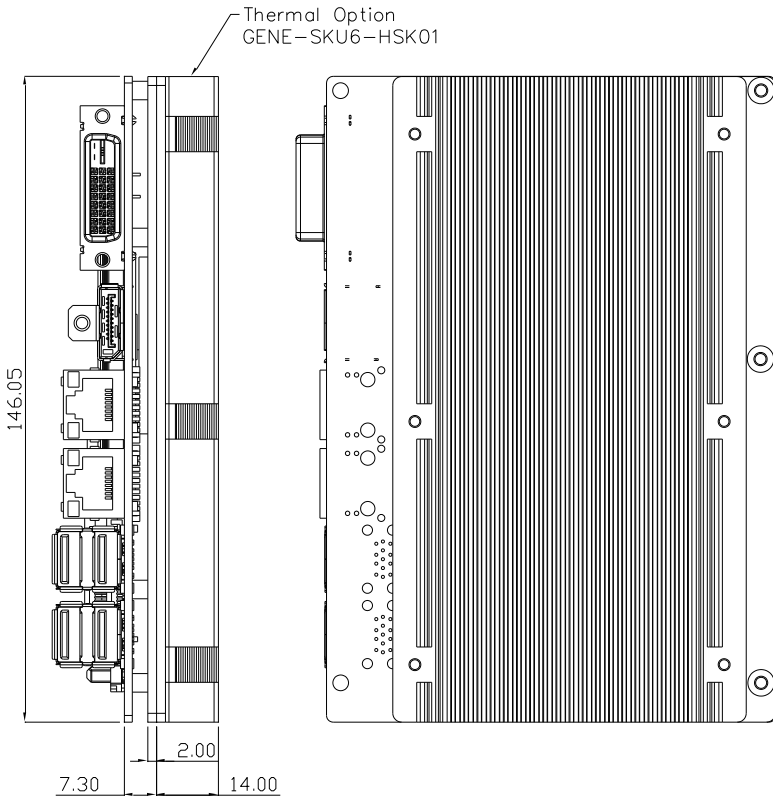
## 2.2 Jumpers and Connectors



## 2.3 Thermal Solution

### 2.3.1 GENE-SKU6-HSK01

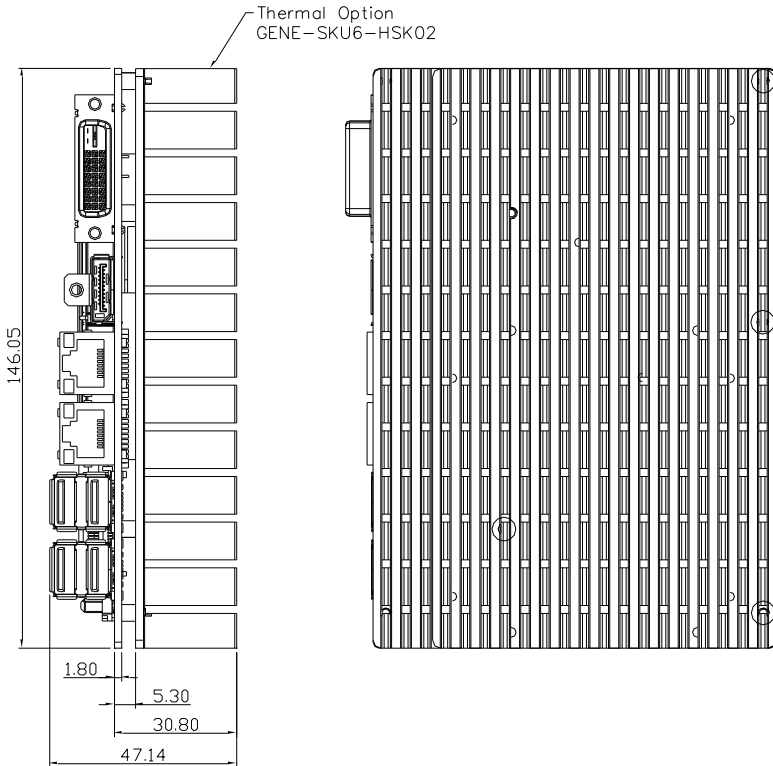
Heatsink used with a heat spreader



Recommend to be used with the system cooler and the system air flow > 7CFM

## 2.3.2 GENE-SKU6-HSK02

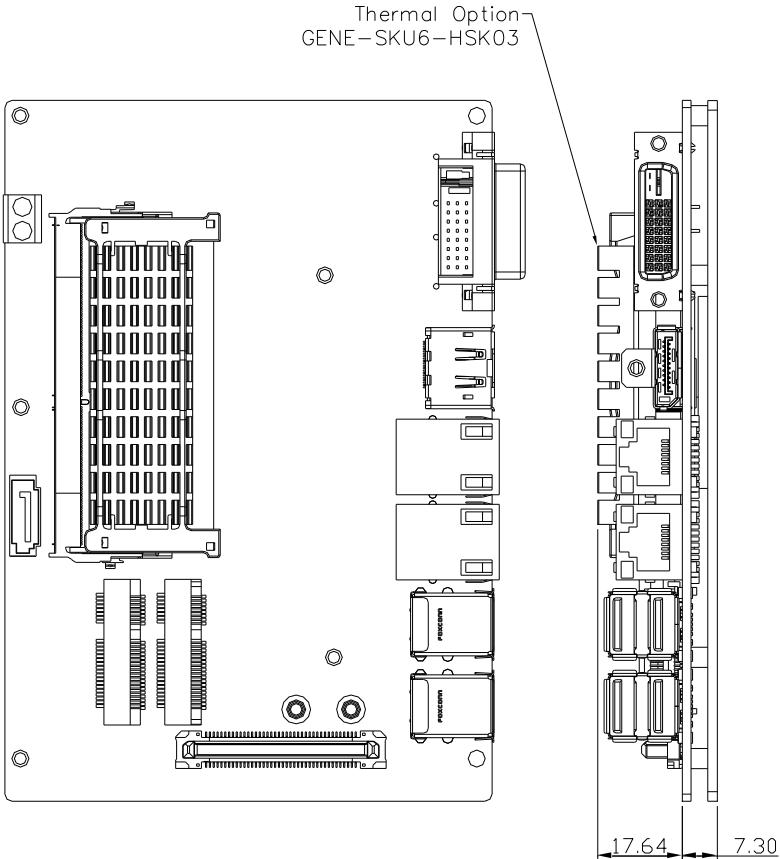
One shape heatsink – no need to use a heat spreader



Extended temperature SKUs are tested using the GENE-SKU6-HSK02 thermal solution and under UEFI mode.

### 2.3.3 GENE-SKU6-HSK03

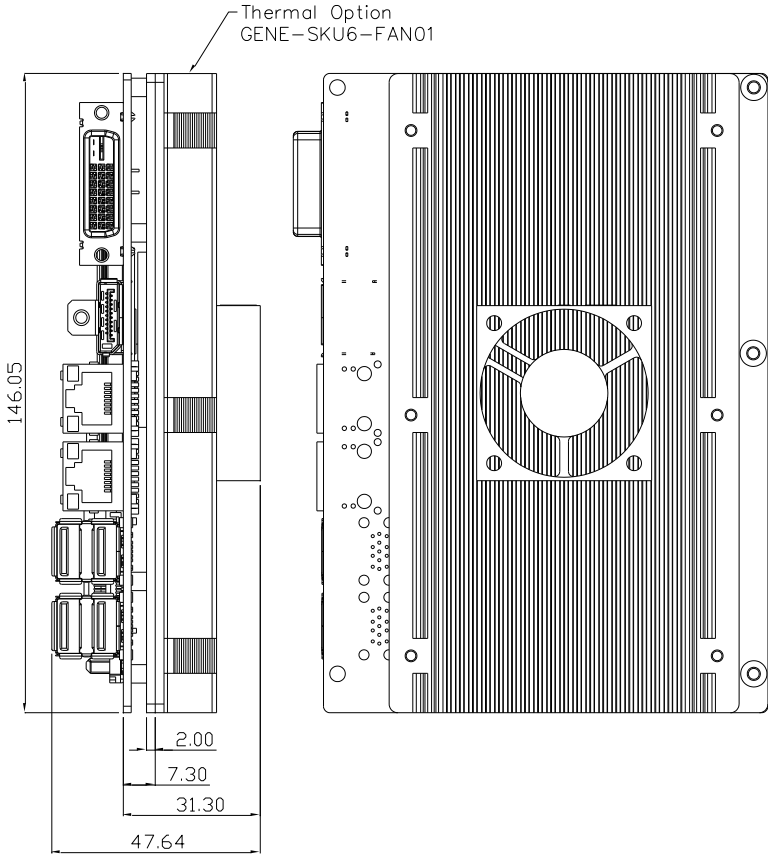
Heatsink for DRAM





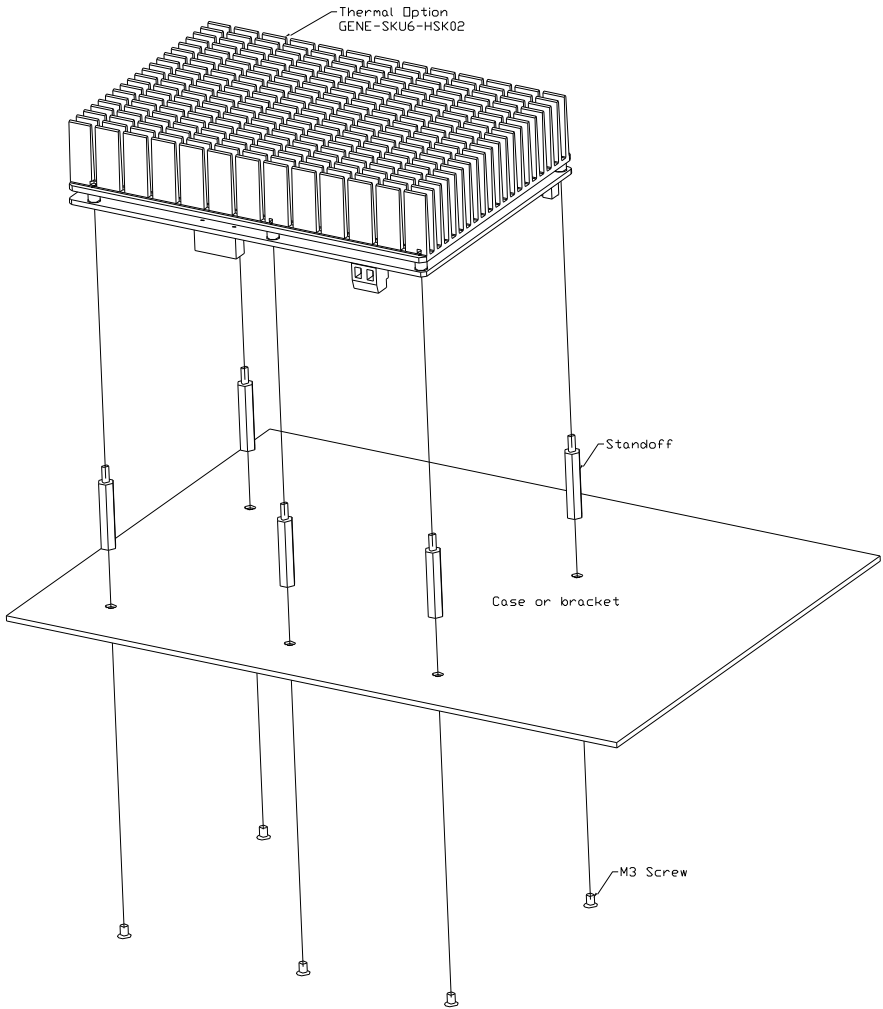
### 2.3.4 GENE-SKU6-FAN01

Cooler used with a heat spreader

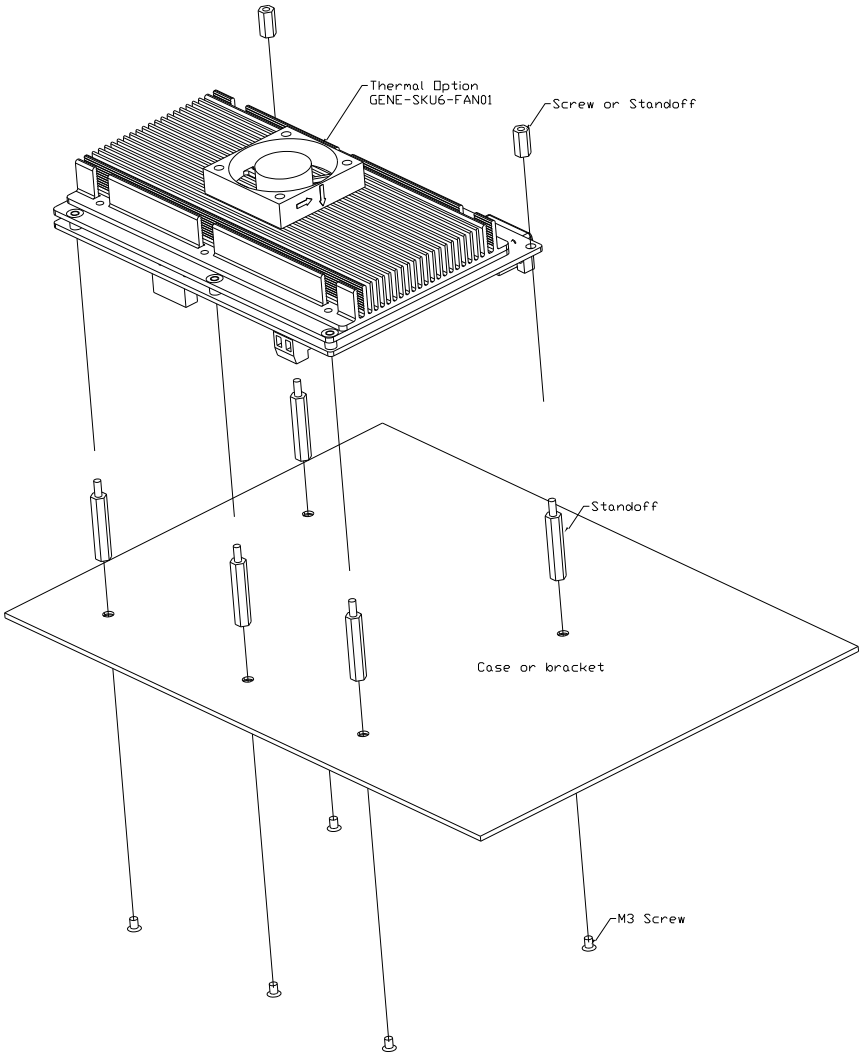


## 2.4 Assembly Options

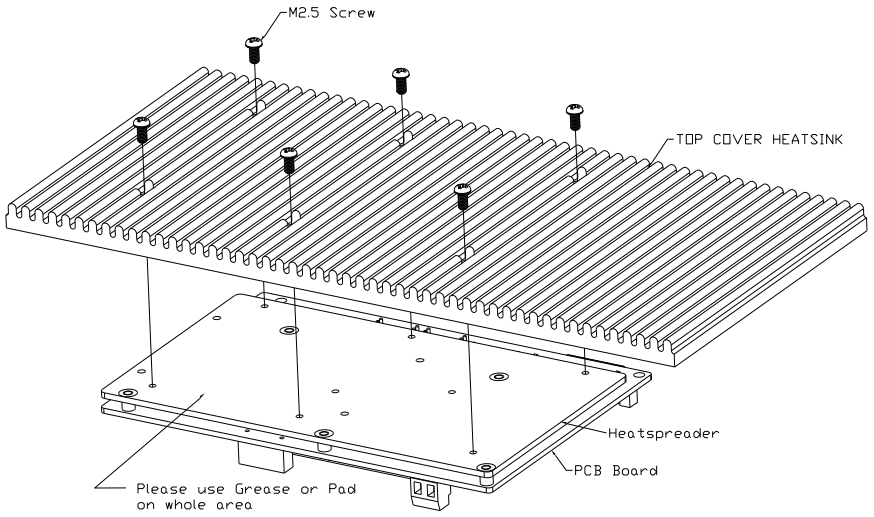
### Option 1



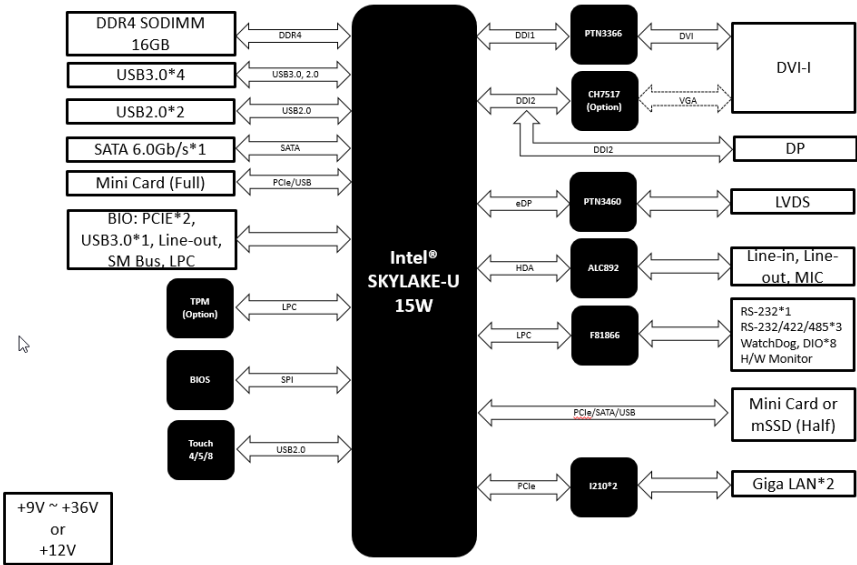
### Option 2



### Option 3



## 2.5 Block Diagram



## 2.6 List of Jumpers

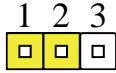
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Please refer to the table below for all of the board's jumpers that you can configure for your application

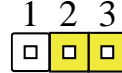
| Label | Function   |
|-------|--|
| JP1   | Clear CMOS Jumper                                    |
| JP2   | LVDS Port Backlight Inverter VCC Selection           |
| JP3   | LVDS Port Backlight Lightness Control Mode Selection |
| JP4   | LVDS Port Operating VDD Selection                    |
| JP5   | mSATA/Mini-Card Operating VCC Selection              |
| JP6   | Touch Screen 4/5/8-wire Mode Selection               |
| JP7   | Auto Power Button Enable/Disable Selection           |
| JP8   | COM3 Pin8 Function Selection                         |
| JP9   | COM2 Pin8 Function Selection                         |
| JP10  | Front Panel Connector                                |
| JP11  | COM4 Pin8 Function Selection                         |

## 2.6.1 Clear CMOS Jumper (JP1)

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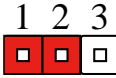
Normal (Default)



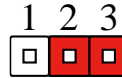
Clear CMOS

## 2.6.2 LVDS Port Backlight Inverter VCC Selection (JP2)

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+12V



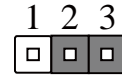
+5V (Default)

## 2.6.3 LVDS Port Backlight Lightness Control Mode Selection (JP3)

---



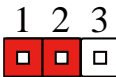
VR Mode (Default)



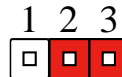
PWM Mode

## 2.6.4 LVDS Port Operating VDD Selection (JP4)

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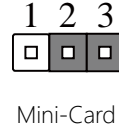
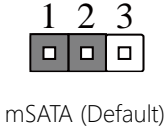


+5V

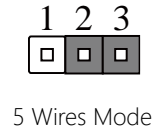
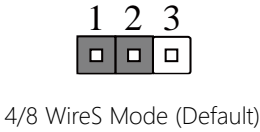


+3.3V (Default)

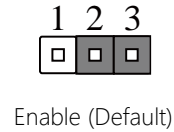
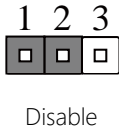
## 2.6.5 mSATA/ Mini-Card Operating VCC Selection (JP5)



## 2.6.6 Touch Screen 4,5,8 Wire Selection (JP6)

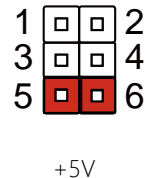
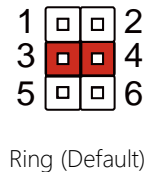
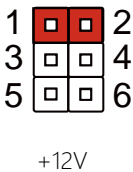


## 2.6.7 Auto Power Button Enable/Disable Selection (JP7)



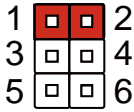
\* When disabled, use power button JP10(1-2) to power on the system.

## 2.6.8 COM3 Pin8 Function Selection (JP8)

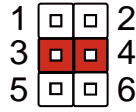




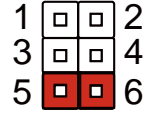
## 2.6.9 COM3 Pin8 Function Selection (JP9)



+12V

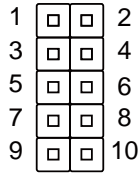


Ring (Default)



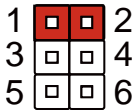
+5V

## 2.6.10 Front Panel Connector (JP10)

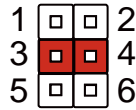


| Pin | Pin Name   | Pin | Pin Name   |
|-----|------------|-----|------------|
| 1   | PWR_BTN-   | 2   | PWR_BTN+   |
| 3   | HDD_LED-   | 4   | HDD_LED+   |
| 5   | SPEAKER-   | 6   | SPEAKER+   |
| 7   | PWR_LED-   | 8   | PWR_LED+   |
| 9   | H/W RESET- | 10  | H/W RESET+ |

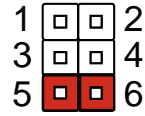
## 2.6.11 COM4 Pin8 Function Selection (JP11)



+12V



Ring (Default)



+5V

## 2.7 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

| Label | Function                                 |
|-------|--|
| CN1   | Battery                                  |
| CN3   | DVI-I (Digital and Analog)               |
| CN5   | DP Port                                  |
| CN6   | LVDS Port                                |
| CN7   | LVDS Port Inverter / Backlight Connector |
| CN8   | SPI Debug Port                           |
| CN9   | LAN (RJ-45) Port1                        |
| CN10  | LAN (RJ-45) Port2                        |
| CN11  | Mini-Card Slot (Full-Mini Card)          |
| CN12  | Micro SIM Card Socket                    |
| CN13  | Mini-Card Slot (Half-Mini Card)          |
| CN14  | SATA Port                                |
| CN15  | +5V Output for SATA HDD                  |
| CN18  | USB 3.0 Ports                            |
| CN19  | USB 3.0 Ports                            |
| CN20  | USB 2.0 Port                             |
| CN21  | USB 2.0 Port                             |
| CN22  | Audio I/O Port                           |
| CN23  | Touch Screen Connector                   |
| CN24  | Digital IO Port                          |
| CN25  | COM Port 1                               |
| CN26  | COM Port 4                               |
| CN27  | COM Port 2                               |

|      |                      |
|------|----------------------|
| CN28 | COM Port 3           |
| CN29 | LPC Port             |
| CN30 | External Power Input |
| CN32 | +5VSB Output w/SMBus |
| CN33 | External +5VSB Input |
| CN35 | BIO Connector        |
| CN36 | CPU FAN              |

### 2.7.1 Battery (CN1)

---

| Pin | Pin Name | Signal Type | Signal level |
|-----|----------|-------------|--------------|
| 1   | +3.3V    | PWR         | 3.3V         |
| 2   | GND      | GND         |              |

### 2.7.2 DVI-I (Digital and Analog) (CN3)

---

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | DVI_D2-     | OUT         |              |
| 2   | DVI_D2+     | OUT         |              |
| 3   | GND         | GND         |              |
| 4   | VGA_DDC_CLK | I/O         |              |
| 5   | VGA_DDC_DAT | I/O         |              |
| 6   | SCL         | I/O         |              |
| 7   | SDA         | I/O         |              |
| 8   | VGA_VSYNC   | OUT         |              |
| 9   | DVI_D1-     | OUT         |              |
| 10  | DVI_D1+     | OUT         |              |
| 11  | GND         | GND         |              |
| 12  | NC          |             |              |
| 13  | NC          |             |              |
| 14  | +5V         | PWR         | +5V          |
| 15  | GND         | GND         |              |
| 16  | HPD         | IN          |              |
| 17  | DVI_D0-     | OUT         |              |
| 18  | DVI_D0+     | OUT         |              |
| 19  | GND         | GND         |              |

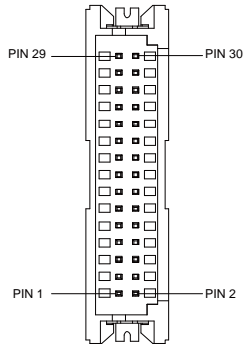
|    |           |     |
|----|-----------|-----|
| 20 | NC        |     |
| 21 | NC        |     |
| 22 | GND       | GND |
| 23 | DVI_CLK+  | OUT |
| 24 | DVI_CLK-  | OUT |
| C1 | VGA_RED   | OUT |
| C2 | VGA_GREEN | OUT |
| C3 | VGA_BLUE  | OUT |
| C4 | VGA_HSYNC | OUT |

### 2.7.3 DP Port (CN5)

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | DP_D0+   | DIFF        |              |
| 2   | GND      | GND         |              |
| 3   | DP_D0-   | DIFF        |              |
| 4   | DP_D1+   | DIFF        |              |
| 5   | GND      | GND         |              |
| 6   | DP_D1-   | DIFF        |              |
| 7   | DP_D2+   | DIFF        |              |
| 8   | GND      | GND         |              |
| 9   | DP_D2-   | DIFF        |              |
| 10  | DP_D3+   | DIFF        |              |
| 11  | GND      | GND         |              |
| 12  | DP_D3-   | DIFF        |              |
| 13  | GND      | GND         |              |
| 14  | GND      | GND         |              |
| 15  | DP_AUX+  | DIFF        |              |

|    |             |      |     |
|----|-------------|------|-----|
| 16 | GND         | GND  |     |
| 17 | DP_AUX-     | DIFF |     |
| 18 | HPLG_DETECT | IN   |     |
| 19 | GND         | GND  |     |
| 20 | +5V         | I/O  | +5V |

## 2.7.4 LVDS Port (CN6)

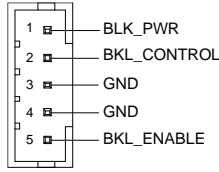


\*LVDS LCD\_PWR can be set to +3.3V or +5V by JP4

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | BKL_ENABLE  | OUT         |              |
| 2   | BKL_CONTROL | OUT         |              |
| 3   | LCD_PWR     | PWR         | +3.3V/+5V    |
| 4   | GND         | GND         |              |
| 5   | LVDS_A_CLK- | DIFF        |              |
| 6   | LVDS_A_CLK+ | DIFF        |              |
| 7   | LCD_PWR     | PWR         | +3.3V/+5V    |
| 8   | GND         | GND         |              |
| 9   | LVDS_DA0-   | DIFF        |              |
| 10  | LVDS_DA0+   | DIFF        |              |

|    |             |      |           |
|----|-------------|------|-----------|
| 11 | LVDS_DA1-   | DIFF |           |
| 12 | LVDS_DA1+   | DIFF |           |
| 13 | LVDS_DA2-   | DIFF |           |
| 14 | LVDS_DA2+   | DIFF |           |
| 15 | LVDS_DA3-   | DIFF |           |
| 16 | LVDS_DA3+   | DIFF |           |
| 17 | DDC_DATA    | I/O  | +3.3V     |
| 18 | DDC_CLK     | I/O  | +3.3V     |
| 19 | LVDS_DB0-   | DIFF |           |
| 20 | LVDS_DB0+   | DIFF |           |
| 21 | LVDS_DB1-   | DIFF |           |
| 22 | LVDS_DB1+   | DIFF |           |
| 23 | LVDS_DB2-   | DIFF |           |
| 24 | LVDS_DB2+   | DIFF |           |
| 25 | LVDS_DB3-   | DIFF |           |
| 26 | LVDS_DB3+   | DIFF |           |
| 27 | LCD_PWR     | PWR  | +3.3V/+5V |
| 28 | GND         | GND  |           |
| 29 | LVDS_B_CLK- | DIFF |           |
| 30 | LVDS_B_CLK+ | DIFF |           |

## 2.7.5 LVDS Port Inverter / Backlight Connector (CN7)



| Pin | Pin Name    | Signal Type | Signal level |
|-----|-------------|-------------|--------------|
| 1   | BKL_PWR     | PWR         | +5V / +12V   |
| 2   | BKL_CONTROL | OUT         |              |
| 3   | GND         | GND         |              |
| 4   | GND         | GND         |              |
| 5   | BKL_ENABLE  | OUT         | +5V          |

\* LVDS BKL\_PWR can be set to +5V or +12V by JP2

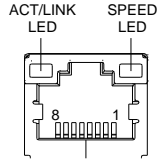
\* LVDS BKL\_CONTROL can be set by JP3

## 2.7.6 SPI Debug Port (CN8)

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | SPI_MISO | OUT         |              |
| 2   | GND      | GND         |              |
| 3   | SPI_CLK  | IN          |              |
| 4   | +3.3VSB  | PWR         | +3.3V        |
| 5   | SPI_MOSI | IN          |              |
| 6   | SPI_CS   | IN          |              |
| 7   | NC       |             |              |

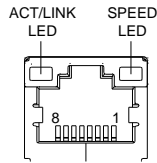


## 2.7.7 LAN (RJ-45) Port1 (CN9)



| Pin | Pin Name | Signal Type | Signal level |
|-----|----------|-------------|--------------|
| 1   | MDI0+    | DIFF        |              |
| 2   | MDI0-    | DIFF        |              |
| 3   | MDI1+    | DIFF        |              |
| 4   | MDI2+    | DIFF        |              |
| 5   | MDI2-    | DIFF        |              |
| 6   | MDI1-    | DIFF        |              |
| 7   | MDI3+    | DIFF        |              |
| 8   | MDI3-    | DIFF        |              |

## 2.7.8 LAN (RJ-45) Port2 (CN10)



| Pin | Pin Name | Signal Type | Signal level |
|-----|----------|-------------|--------------|
| 1   | MDI0+    | DIFF        |              |
| 2   | MDI0-    | DIFF        |              |
| 3   | MDI1+    | DIFF        |              |
| 4   | MDI2+    | DIFF        |              |
| 5   | MDI2-    | DIFF        |              |
| 6   | MDI1-    | DIFF        |              |

|   |       |      |
|---|-------|------|
| 7 | MDI3+ | DIFF |
| 8 | MDI3- | DIFF |

### 2.7.9 Mini-Card Slot (Full-Mini Card) (CN11)

| Pin | Pin Name      | Signal Type | Signal level |
|-----|---------------|-------------|--------------|
| 1   | PCIE_WAKE#    | IN          |              |
| 2   | +3.3VSB       | PWR         | +3.3V        |
| 3   | NC            |             |              |
| 4   | GND           | GND         |              |
| 5   | NC            |             |              |
| 6   | +1.5V         | PWR         | +1.5V        |
| 7   | PCIE_CLK_REQ# | IN          |              |
| 8   | UIM_PWR       | PWR         |              |
| 9   | GND           | GND         |              |
| 10  | UIM_DATA      | I/O         |              |
| 11  | PCIE_REF_CLK- | DIFF        |              |
| 12  | UIM_CLK       | IN          |              |
| 13  | PCIE_REF_CLK+ | DIFF        |              |
| 14  | UIM_RST       | IN          |              |
| 15  | GND           | GND         |              |
| 16  | UIM_VPP       | PWR         |              |
| 17  | NC            |             |              |
| 18  | GND           | GND         |              |
| 19  | NC            |             |              |
| 20  | W_DISABLE#    | OUT         | +3.3V        |
| 21  | GND           | GND         |              |

|    |           |      |       |
|----|-----------|------|-------|
| 22 | PCIE_RST# | OUT  | +3.3V |
| 23 | PCIE_RX-  | DIFF |       |
| 24 | +3.3VSB   | PWR  | +3.3V |
| 25 | PCIE_RX+  | DIFF |       |
| 26 | GND       | GND  |       |
| 27 | GND       | GND  |       |
| 28 | +1.5V     | PWR  | +1.5V |
| 29 | GND       | GND  |       |
| 30 | SMB_CLK   | I/O  | +3.3V |
| 31 | PCIE_TX-  | DIFF |       |
| 32 | SMB_DATA  | I/O  | +3.3V |
| 33 | PCIE_TX+  | DIFF |       |
| 34 | GND       | GND  |       |
| 35 | GND       | GND  |       |
| 36 | USB_D-    | DIFF |       |
| 37 | GND       | GND  |       |
| 38 | USB_D+    | DIFF |       |
| 39 | +3.3VSB   | PWR  | +3.3V |
| 40 | GND       | GND  |       |
| 41 | +3.3VSB   | PWR  | +3.3V |
| 42 | NC        |      |       |
| 43 | GND       | GND  |       |
| 44 | NC        |      |       |
| 45 | NC        |      |       |
| 46 | NC        |      |       |
| 47 | NC        |      |       |
| 48 | +1.5V     | PWR  | +1.5V |

|    |         |     |       |
|----|---------|-----|-------|
| 49 | NC      |     |       |
| 50 | GND     | GND |       |
| 51 | NC      |     |       |
| 52 | +3.3VSB | PWR | +3.3V |

### 2.7.10 Micro SIM Card Socket (CN12)

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | UIM_PWR  | PWR         |              |
| 2   | UIM_RST  | IN          |              |
| 3   | UIM_CLK  | IN          |              |
| 4   | NC       |             |              |
| 5   | GND      | GND         |              |
| 6   | UIM_VPP  | PWR         |              |
| 7   | UIM_DATA | I/O         |              |
| 8   | NC       |             |              |

### 2.7.11 Mini-Card Slot (Half-Mini Card) (CN13)

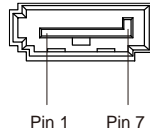
| Pin | Pin Name      | Signal Type | Signal Level |
|-----|---------------|-------------|--------------|
| 1   | PCIE_WAKE#    | IN          |              |
| 2   | +3.3VSB       | PWR         | +3.3V        |
| 3   | NC            |             |              |
| 4   | GND           | GND         |              |
| 5   | NC            |             |              |
| 6   | +1.5V         | PWR         | +1.5V        |
| 7   | PCIE_CLK_REQ# | IN          |              |

|    |                    |      |       |
|----|--------------------|------|-------|
| 8  | NC                 |      |       |
| 9  | GND                | GND  |       |
| 10 | NC                 |      |       |
| 11 | PCIE_REF_CLK-      | DIFF |       |
| 12 | NC                 |      |       |
| 13 | PCIE_REF_CLK+      | DIFF |       |
| 14 | NC                 |      |       |
| 15 | GND                | GND  |       |
| 16 | NC                 |      |       |
| 17 | NC                 |      |       |
| 18 | GND                | GND  |       |
| 19 | NC                 |      |       |
| 20 | W_DISABLE#         | OUT  | +3.3V |
| 21 | GND                | GND  |       |
| 22 | PCIE_RST#          | OUT  | +3.3V |
| 23 | PCIE_RX-/mSATA_RX+ | DIFF |       |
| 24 | +3.3VSB            | PWR  | +3.3V |
| 25 | PCIE_RX+/mSATA_RX- | DIFF |       |
| 26 | GND                | GND  |       |
| 27 | GND                | GND  |       |
| 28 | +1.5V              | PWR  | +1.5V |
| 29 | GND                | GND  |       |
| 30 | SMB_CLK            | I/O  | +3.3V |
| 31 | PCIE_TX-/mSATA_TX- | DIFF |       |
| 32 | SMB_DATA           | I/O  | +3.3V |
| 33 | PCIE_TX+/mSATA_TX+ | DIFF |       |
| 34 | GND                | GND  |       |

|    |         |      |       |
|----|---------|------|-------|
| 35 | GND     | GND  |       |
| 36 | USB_D-  | DIFF |       |
| 37 | GND     | GND  |       |
| 38 | USB_D+  | DIFF |       |
| 39 | +3.3VSB | PWR  | +3.3V |
| 40 | GND     | GND  |       |
| 41 | +3.3VSB | PWR  | +3.3V |
| 42 | NC      |      |       |
| 43 | GND     | GND  |       |
| 44 | NC      |      |       |
| 45 | NC      |      |       |
| 46 | NC      |      |       |
| 47 | NC      |      |       |
| 48 | +1.5V   | PWR  | +1.5V |
| 49 | NC      |      |       |
| 50 | GND     | GND  |       |
| 51 | NC      |      |       |
| 52 | +3.3VSB | PWR  | +3.3V |

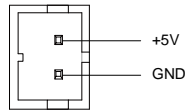
\* CN13 can be selected for Mini-Card or mSATA by changing BIOS

### 2.7.12 SATA Port 1 (CN14)



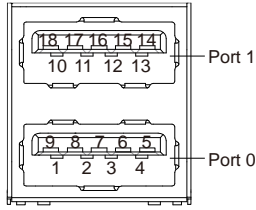
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | GND      | GND         |              |
| 2   | SATA_TX+ | DIFF        |              |
| 3   | SATA_TX- | DIFF        |              |
| 4   | GND      | GND         |              |
| 5   | SATA_RX- | DIFF        |              |
| 6   | SATA_RX+ | DIFF        |              |
| 7   | GND      | GND         |              |

### 2.7.13 +5V Output for SATA HDD (CN15)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | +5V      | PWR         | +5V          |
| 2   | GND      | GND         |              |

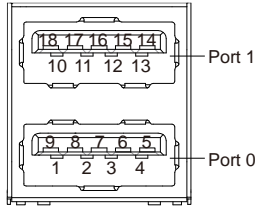
## 2.7.14 USB 3.0 Ports (CN18)



| Pin | Pin Name  | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1   | +5VSB     | PWR         | +5V          |
| 2   | USB_D-    | DIFF        |              |
| 3   | USB_D+    | DIFF        |              |
| 4   | GND       | GND         |              |
| 5   | USB_SSRX- | DIFF        |              |
| 6   | USB_SSRX+ | DIFF        |              |
| 7   | GND       | GND         |              |
| 8   | USB_SSTX- | DIFF        |              |
| 9   | USB_SSTX+ | DIFF        |              |
| 10  | +5VSB     | PWR         | +5V          |
| 11  | USB_D-    | DIFF        |              |
| 12  | USB_D+    | DIFF        |              |
| 13  | GND       | GND         |              |
| 14  | USB_SSRX- | DIFF        |              |
| 15  | USB_SSRX+ | DIFF        |              |
| 16  | GND       | GND         |              |
| 17  | USB_SSTX- | DIFF        |              |
| 18  | USB_SSTX+ | DIFF        |              |

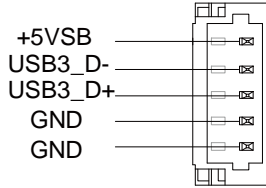


## 2.7.15 USB 3.0 Ports (CN19)



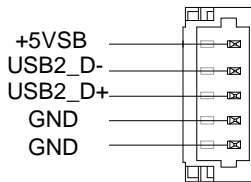
| Pin | Pin Name  | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1   | +5VSB     | PWR         | +5V          |
| 2   | USB_D-    | DIFF        |              |
| 3   | USB_D+    | DIFF        |              |
| 4   | GND       | GND         |              |
| 5   | USB_SSRX- | DIFF        |              |
| 6   | USB_SSRX+ | DIFF        |              |
| 7   | GND       | GND         |              |
| 8   | USB_SSTX- | DIFF        |              |
| 9   | USB_SSTX+ | DIFF        |              |
| 10  | +5VSB     | PWR         | +5V          |
| 11  | USB_D-    | DIFF        |              |
| 12  | USB_D+    | DIFF        |              |
| 13  | GND       | GND         |              |
| 14  | USB_SSRX- | DIFF        |              |
| 15  | USB_SSRX+ | DIFF        |              |
| 16  | GND       | GND         |              |
| 17  | USB_SSTX- | DIFF        |              |
| 18  | USB_SSTX+ | DIFF        |              |

### 2.7.16 USB 2.0 Port (CN20)



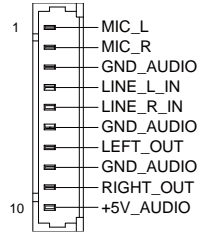
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | +5VSB    | PWR         | +5V          |
| 2   | USB_D-   | DIFF        |              |
| 3   | USB_D+   | DIFF        |              |
| 4   | GND      | GND         |              |
| 5   | GND      | GND         |              |

### 2.7.17 USB 2.0 Port (CN21)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | +5VSB    | PWR         | +5V          |
| 2   | USB_D-   | DIFF        |              |
| 3   | USB_D+   | DIFF        |              |
| 4   | GND      | GND         |              |
| 5   | GND      | GND         |              |

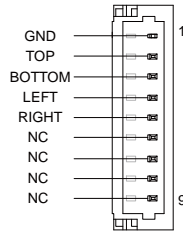
## 2.7.18 Audio I/O Port (CN22)



| Pin | Pin Name  | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1   | MIC_L     | IN          |              |
| 2   | MIC_R     | IN          |              |
| 3   | GND_AUDIO | GND         |              |
| 4   | LINE_L_IN | IN          |              |
| 5   | LINE_R_IN | IN          |              |
| 6   | GND_AUDIO | GND         |              |
| 7   | LEFT_OUT  | OUT         |              |
| 8   | GND_AUDIO | GND         |              |
| 9   | RIGHT_OUT | OUT         |              |
| 10  | +5V_AUDIO | PWR         | +5V          |

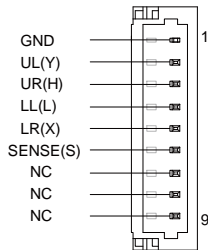
## 2.7.19 Touchscreen Connector (CN23)

\* Touch mode can be set by JP6



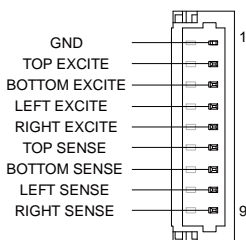
### 4-Wire

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | GND      | GND         |              |
| 2   | TOP      | IN          |              |
| 3   | BOTTOM   | IN          |              |
| 4   | LEFT     | IN          |              |
| 5   | RIGHT    | IN          |              |
| 6   | NC       |             |              |
| 7   | NC       |             |              |
| 8   | NC       |             |              |
| 9   | NC       |             |              |



## 5-Wire

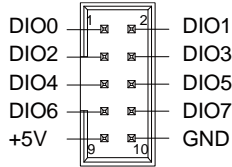
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | GND      | GND         |              |
| 2   | UL(Y)    | IN          |              |
| 3   | UR(H)    | IN          |              |
| 4   | LL(L)    | IN          |              |
| 5   | LR(X)    | IN          |              |
| 6   | SENSE(S) | IN          |              |
| 7   | NC       |             |              |
| 8   | NC       |             |              |
| 9   | NC       |             |              |



## 8-Wire

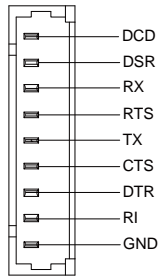
| Pin | Pin Name      | Signal Type | Signal Level |
|-----|---------------|-------------|--------------|
| 1   | GND           | GND         |              |
| 2   | TOP EXCITE    | IN          |              |
| 3   | BOTTOM EXCITE | IN          |              |
| 4   | LEFT EXCITE   | IN          |              |
| 5   | RIGHT EXCITE  | IN          |              |
| 6   | TOP SENSE     | IN          |              |
| 7   | BOTTOM SENSE  | IN          |              |
| 8   | LEFT SENSE    | IN          |              |

## 2.7.20 Digital I/O Port (CN24)



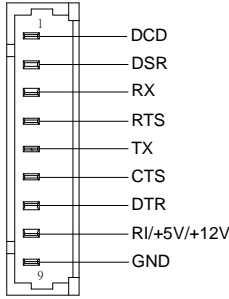
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | DIO0     | I/O         | +5V          |
| 2   | DIO1     | I/O         | +5V          |
| 3   | DIO2     | I/O         | +5V          |
| 4   | DIO3     | I/O         | +5V          |
| 5   | DIO4     | I/O         | +5V          |
| 6   | DIO5     | I/O         | +5V          |
| 7   | DIO6     | I/O         | +5V          |
| 8   | DIO7     | I/O         | +5V          |
| 9   | +5V      | PWR         | +5V          |
| 10  | GND      | GND         |              |

## 2.7.21COM Port 1 (CN25)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | DCD      | IN          |              |
| 2   | DSR      | IN          |              |
| 3   | RX       | IN          |              |
| 4   | RTS      | OUT         | ±9V          |
| 5   | TX       | OUT         | ±9V          |
| 6   | CTS      | IN          |              |
| 7   | DTR      | OUT         | ±9V          |
| 8   | RI       | IN          |              |
| 9   | GND      | GND         |              |

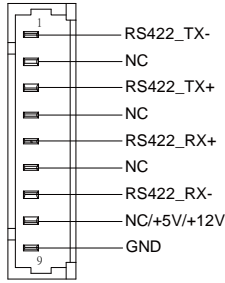
## 2.7.22 COM Port 4 (CN26)



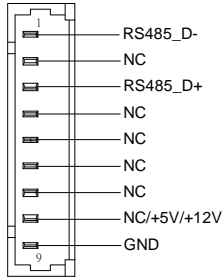
### RS-232

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | DCD         | IN          |              |
| 2   | DSR         | IN          |              |
| 3   | RX          | IN          |              |
| 4   | RTS         | OUT         | ±5V          |
| 5   | TX          | OUT         | ±5V          |
| 6   | CTS         | IN          |              |
| 7   | DTR         | OUT         | ±5V          |
| 8   | RI/+5V/+12V | IN/ PWR     | +5V/+12V     |
| 9   | GND         | GND         |              |





| RS-422 |             |             |              |
|--------|-------------|-------------|--------------|
| Pin    | Pin Name    | Signal Type | Signal Level |
| 1      | RS422_TX-   | OUT         | ±5V          |
| 2      | NC          |             |              |
| 3      | RS422_TX+   | OUT         | ±5V          |
| 4      | NC          |             |              |
| 5      | RS422_RX+   | IN          |              |
| 6      | NC          |             |              |
| 7      | RS422_RX-   | IN          |              |
| 8      | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9      | GND         | GND         |              |



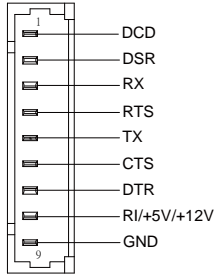
## RS-485

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | RS485_D-    | I/O         | ±5V          |
| 2   | NC          |             |              |
| 3   | RS485_D+    | I/O         | ±5V          |
| 4   | NC          |             |              |
| 5   | NC          |             |              |
| 6   | NC          |             |              |
| 7   | NC          |             |              |
| 8   | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9   | GND         | GND         |              |

\* COM4 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

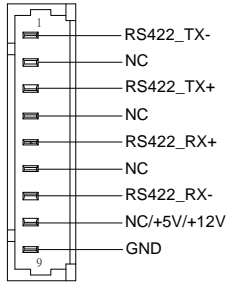
\* Pin 8 function can be set by JP11.

## 2.7.23 COM Port 2 (CN27)



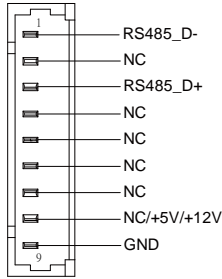
RS-232

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | DCD         | IN          |              |
| 2   | DSR         | IN          |              |
| 3   | RX          | IN          |              |
| 4   | RTS         | OUT         | ±5V          |
| 5   | TX          | OUT         | ±5V          |
| 6   | CTS         | IN          |              |
| 7   | DTR         | OUT         | ±5V          |
| 8   | RI/+5V/+12V | IN/ PWR     | +5V/+12V     |
| 9   | GND         | GND         |              |



## RS-422

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | RS422_TX-   | OUT         | ±5V          |
| 2   | NC          |             |              |
| 3   | RS422_TX+   | OUT         | ±5V          |
| 4   | NC          |             |              |
| 5   | RS422_RX+   | IN          |              |
| 6   | NC          |             |              |
| 7   | RS422_RX-   | IN          |              |
| 8   | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9   | GND         | GND         |              |



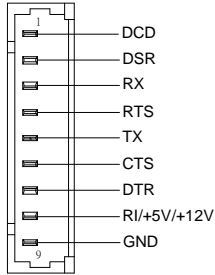
## RS-485

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | RS485_D-    | I/O         | ±5V          |
| 2   | NC          |             |              |
| 3   | RS485_D+    | I/O         | ±5V          |
| 4   | NC          |             |              |
| 5   | NC          |             |              |
| 6   | NC          |             |              |
| 7   | NC          |             |              |
| 8   | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9   | GND         | GND         |              |

\* COM2 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

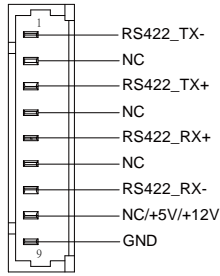
\* Pin 8 function can be set by JP9.

## 2.7.24 COM Port 3 (CN28)



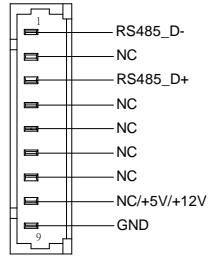
RS-232

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | DCD         | IN          |              |
| 2   | DSR         | IN          |              |
| 3   | RX          | IN          |              |
| 4   | RTS         | OUT         | ±5V          |
| 5   | TX          | OUT         | ±5V          |
| 6   | CTS         | IN          |              |
| 7   | DTR         | OUT         | ±5V          |
| 8   | RI/+5V/+12V | IN/ PWR     | +5V/+12V     |
| 9   | GND         | GND         |              |



## RS-422

| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | RS422_TX-   | OUT         | ±5V          |
| 2   | NC          |             |              |
| 3   | RS422_TX+   | OUT         | ±5V          |
| 4   | NC          |             |              |
| 5   | RS422_RX+   | IN          |              |
| 6   | NC          |             |              |
| 7   | RS422_RX-   | IN          |              |
| 8   | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9   | GND         | GND         |              |



## RS-485

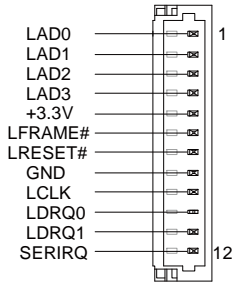
| Pin | Pin Name    | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1   | RS485_D-    | I/O         | ±5V          |
| 2   | NC          |             |              |
| 3   | RS485_D+    | I/O         | ±5V          |
| 4   | NC          |             |              |
| 5   | NC          |             |              |
| 6   | NC          |             |              |
| 7   | NC          |             |              |
| 8   | NC/+5V/+12V | PWR         | +5V/+12V     |
| 9   | GND         | GND         |              |

\* COM3 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

\* Pin 8 function can be set by JP8.

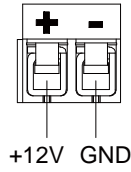


## 2.7.25 LPC Port (CN29)



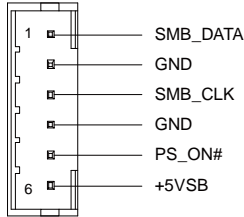
| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | LAD0     | I/O         | +3.3V        |
| 2   | LAD1     | I/O         | +3.3V        |
| 3   | LAD2     | I/O         | +3.3V        |
| 4   | LAD3     | I/O         | +3.3V        |
| 5   | +3.3V    | PWR         | +3.3V        |
| 6   | LFRAME#  | IN          |              |
| 7   | LRESET#  | OUT         | +3.3V        |
| 8   | GND      | GND         |              |
| 9   | LCLK     | OUT         |              |
| 10  | LDRQ0    | IN          |              |
| 11  | LDRQ1    | IN          |              |
| 12  | SERIRQ   | I/O         | +3.3V        |

## 2.7.26 External Power Input (CN30)



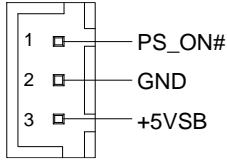
| Pin | Pin Name | Signal Type | Signal Level      |
|-----|----------|-------------|-------------------|
| 1   | +12V     | PWR         | +9~+36V (or +12V) |
| 2   | GND      | GND         |                   |

## 2.7.27 +5VSB Output w/SMBus (CN32)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | SMB_DATA | I/O         | +3.3V        |
| 2   | GND      | GND         |              |
| 3   | SMB_CLK  | I/O         | +3.3V        |
| 4   | GND      | GND         |              |
| 5   | PS_ON#   | OUT         | +3.3V        |
| 6   | +5VSB    | PWR         | +5V          |

## 2.7.28 External +5VSB Input (CN33)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1   | PS_ON#   | OUT         | +3.3V        |
| 2   | GND      | GND         |              |
| 3   | +5VSB    | PWR         | +5V          |

## 2.7.29 BIO Connector (CN35)

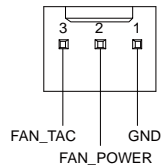
| Pin | Pin Name  | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1   | +12V_Dual | PWR         | +12V         |
| 2   | GND       | GND         |              |
| 3   | GND       | GND         |              |
| 4   | PCIE1_TX- | I/O         |              |
| 5   | PCIE1_RX- | I/O         |              |
| 6   | PCIE1_TX+ | I/O         |              |
| 7   | PCIE1_RX+ | I/O         |              |
| 8   | GND       | GND         |              |
| 9   | GND       | GND         |              |
| 10  | PCIE2_TX- | I/O         |              |
| 11  | PCIE2_RX- | I/O         |              |
| 12  | PCIE2_TX+ | I/O         |              |
| 13  | PCIE2_RX+ | I/O         |              |
| 14  | GND       | GND         |              |

|    |           |     |     |
|----|-----------|-----|-----|
| 15 | GND       | GND |     |
| 16 | PS_ON#    | OUT |     |
| 17 | NC        |     |     |
| 18 | NC        |     |     |
| 19 | +5V_Dual  | PWR | +5V |
| 20 | +5V_Dual  | PWR | +5V |
| 21 | +5V_Dual  | PWR | +5V |
| 22 | +5V_Dual  | PWR | +5V |
| 23 | PCIE_CLK+ | OUT |     |
| 24 | PLT_RST#  | OUT |     |
| 25 | PCIE_CLK- | OUT |     |
| 26 | GND       | GND |     |
| 27 | GND       | GND |     |
| 28 | NC        |     |     |
| 29 | NC        |     |     |
| 30 | NC        |     |     |
| 31 | NC        |     |     |
| 32 | GND       | GND |     |
| 33 | GND       | GND |     |
| 34 | NC        |     |     |
| 35 | NC        |     |     |
| 36 | NC        |     |     |
| 37 | NC        |     |     |
| 38 | GND       | GND |     |
| 39 | GND       | GND |     |
| 40 | NC        |     |     |
| 41 | NC        |     |     |

|    |             |     |     |
|----|-------------|-----|-----|
| 42 | GND         | GND |     |
| 43 | NC          |     |     |
| 44 | USB 3.0_TX- | I/O |     |
| 45 | GND         | GND |     |
| 46 | USB 3.0_TX+ | I/O |     |
| 47 | USB 2.0_D-  | I/O |     |
| 48 | GND         | GND |     |
| 49 | USB 2.0_D+  | I/O |     |
| 50 | USB 3.0_RX- | I/O |     |
| 51 | GND         | GND |     |
| 52 | USB 3.0_RX+ | I/O |     |
| 53 | SMB_CLK     | I/O |     |
| 54 | GND         | GND |     |
| 55 | SMB_DATA    | I/O |     |
| 56 | PCIE_WAKE#  | IN  |     |
| 57 | GND         | GND |     |
| 58 | USB 2.0_OC# | IN  |     |
| 59 | +5V         | PWR | +5V |
| 60 | USB 2.0_OC# | IN  |     |
| 61 | +5V         | PWR | +5V |
| 62 | +5V         | PWR | +5V |
| 63 | +5V         | PWR | +5V |
| 64 | +5V         | PWR | +5V |
| 65 | LPC_AD0     | I/O |     |
| 66 | LPC_FRAME#  | I/O |     |
| 67 | LPC_AD1     | I/O |     |
| 68 | SERIRQ#     | I/O |     |

|    |             |     |
|----|-------------|-----|
| 69 | LPC_AD2     | I/O |
| 70 | NC          |     |
| 71 | LPC_AD3     | I/O |
| 72 | GPIO        | I/O |
| 73 | GND         | GND |
| 74 | Audio_GND   | GND |
| 75 | LPC_CLK     | OUT |
| 76 | Audio_OUT_L | OUT |
| 77 | PME#        | IN  |
| 78 | Audio_OUT_R | OUT |
| 79 | GND         | GND |
| 80 | GND         | GND |

### 2.7.30 CPU Fan (CN36)



| Pin | Pin Name  | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1   | GND       | GND         |              |
| 2   | FAN_POWER | PWR         | +12V         |
| 3   | FAN_TAC   | IN          |              |

# Chapter 3

---

AMI BIOS Setup

## 3.1 System Test and Initialization

---

The board uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.



## 3.2 AMI BIOS Setup

---

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

**Main** – Date and time can be set here. Press <Tab> to switch between date elements

**Advanced** – Enable/ Disable boot option for legacy network devices

**Chipset** – For hosting bridge parameters

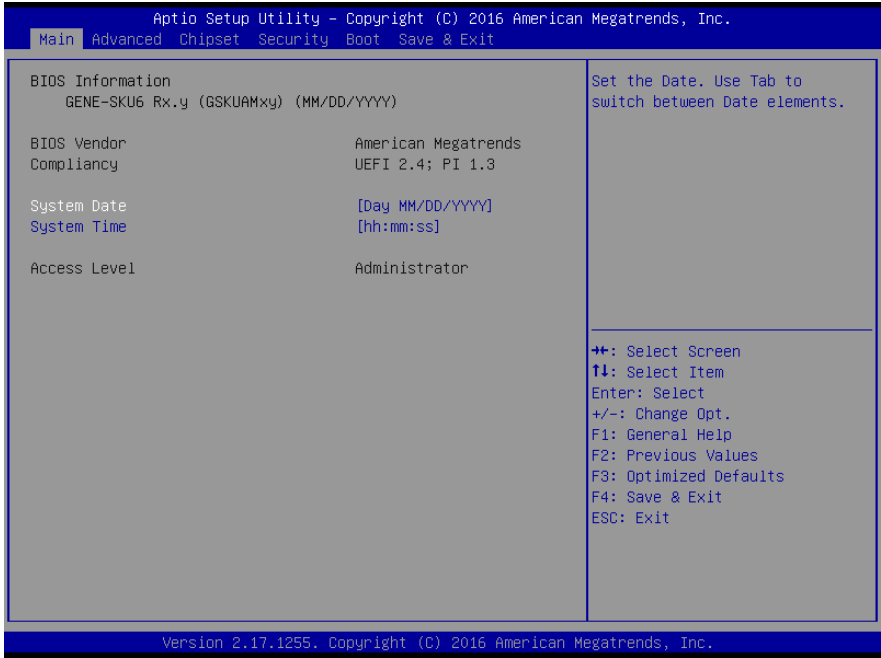
**Boot** – Enable/ Disable quiet Boot Option

**Security** – The setup administrator password can be set here

**Save & Exit** – Save your changes and exit the program

### 3.3 Setup submenu: Main

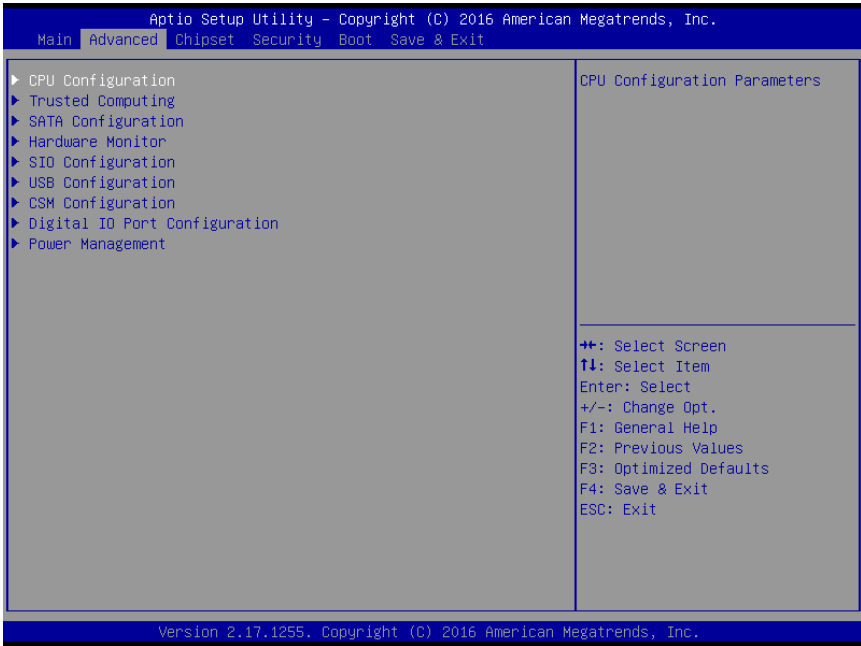
Press 'Delete' Key to enter Setup



Options summary: (default setting)

|   |                |  |
|---|----------------|--|
| System Date   | Day MM:DD:YYYY |  |
| Change the month, year and century. The 'Day' is changed automatically. |                |  |
| System Time   | HH : MM : SS   |  |
| Change the clock of the system.   |                |  |

### 3.4 Setup submenu: Advanced

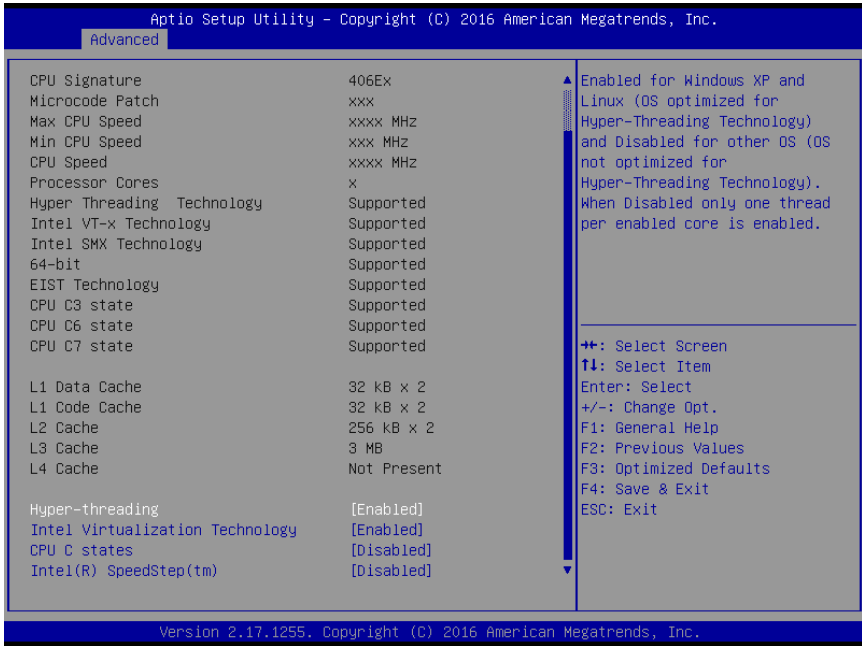


Options summary: **(default setting)**

|                                   |  |  |
|-----------------------------------|--|--|
| CPU Configuration                 |  |  |
| CPU Configuration Parameters      |  |  |
| Trusted Computing                 |  |  |
| Trusted Computing Settings        |  |  |
| SATA Configuration                |  |  |
| SATA Device Options Settings      |  |  |
| Hardware Monitor                  |  |  |
| Monitor hardware status           |  |  |
| SIO Configuration                 |  |  |
| Super IO Configuration Parameters |  |  |

|   |  |  |
|---|--|--|
| USB Configuration                                 |  |  |
| USB Configuration Parameters                      |  |  |
| CSM Configuration                                 |  |  |
| CSM Enable/Disable, Option ROM execution setting. |  |  |
| Digital IO Port Configuration                     |  |  |
| DIO configuration                                 |  |  |
| Power Management                                  |  |  |
| System ACPI/Power Mode/Wake Event Configuration   |  |  |

### 3.4.1 Advanced: CPU Management

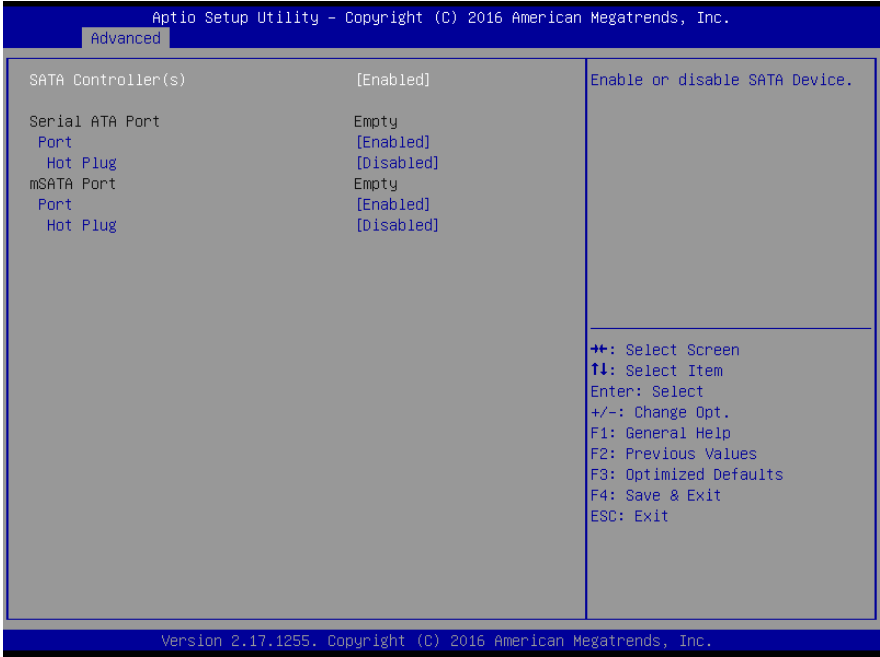


Options summary: (default setting)

|   |          |  |
|---|----------|--|
| Hyper-threading   | Enabled  |  |
|   | Disabled |  |
| Enable/Disable Intel Hyper-threading(HT) feature.   |          |  |
| Intel Virtualization Technology   | Enabled  |  |
|   | Disabled |  |
| When enabled, a VMM can utilize the additional hardware capabilities provide by Vanderpool Technology |          |  |
| CPU C State Report  | Enabled  |  |
|   | Disabled |  |
| Enable/Disable CPU C state report to OS   |          |  |

|   |          |  |
|---|----------|--|
| Intel(R) SpeedStep(tm)  | Enabled  |  |
|   | Disabled |  |
| Enable/Disable Intel SpeedStep feature.   |          |  |
| Turbo Mode  | Enabled  |  |
|   | Disabled |  |
| En/Disable Turbo mode. This feature is only available when Intel SpeedStep enabled. |          |  |

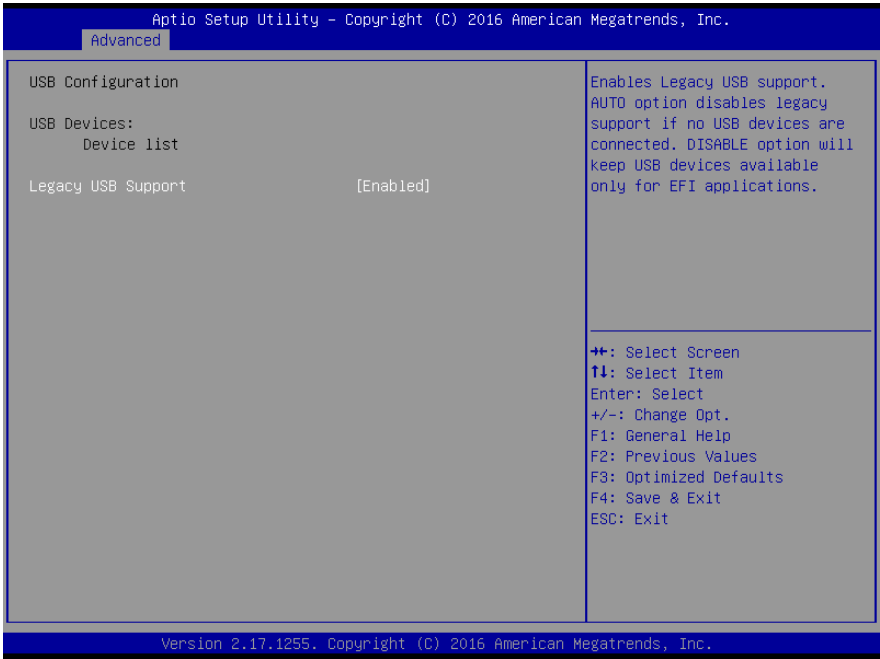
### 3.4.2 Advanced: SATA Configuration



Options summary: (default setting)

|   |                 |  |
|---|-----------------|--|
| SATA Speed Support                          | <b>Enabled</b>  |  |
|   | Disabled        |  |
| Enable or disable SATA Device               |                 |  |
| Serial ATA Port/mSATA Port                  | <b>Enabled</b>  |  |
|   | Disabled        |  |
| Enabled/Disabled Serial ATA Port/mSATA Port |                 |  |
| Serial ATA Port/mSATA Port<br>Hot Plug      | <b>Enabled</b>  |  |
|   | <b>Disabled</b> |  |
| Designated specified port as Hot Pluggable. |                 |  |

### 3.4.3 Advanced: USB Configuration

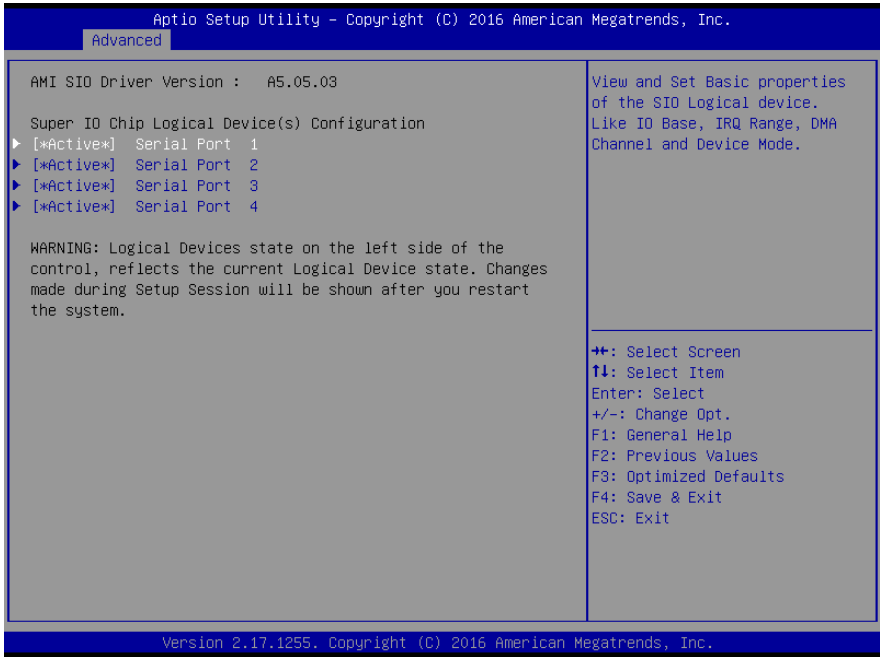


Options summary: (default setting)

|  |          |  |
|--|----------|--|
| Legacy USB Support   | Enabled  |  |
|  | Disabled |  |
|  | Auto     |  |
| <p>Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI application</p> |          |  |



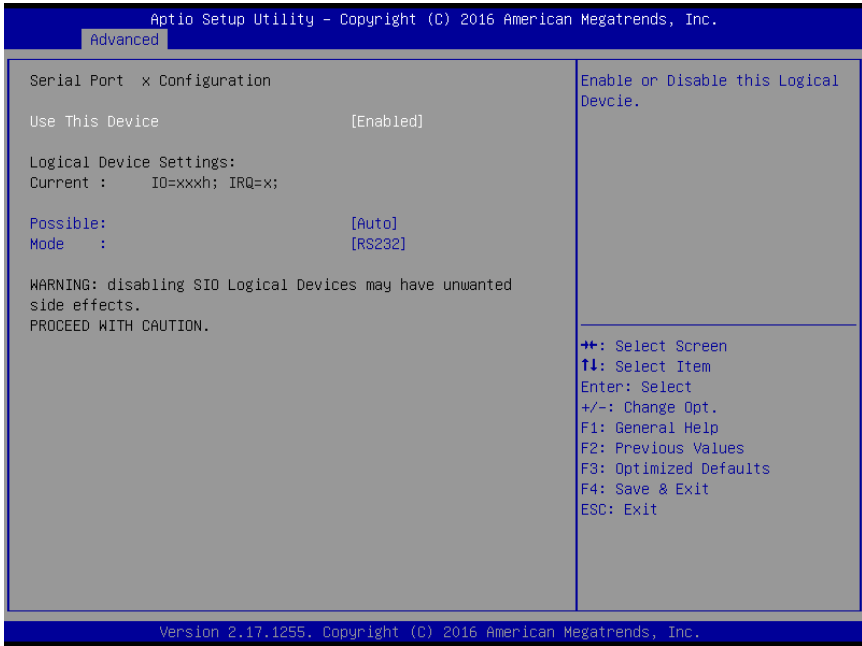
### 3.4.4 Advanced: SIO Configuration



Options summary: (default setting)

|                                       |  |  |
|---------------------------------------|--|--|
| Serial Port 1/2/3/4                   |  |  |
| Configuration                         |  |  |
| Set Parameters of Serial Port 1/2/3/4 |  |  |

### 3.4.4.1 SIO Configuration: Serial Port 1-4 Configuration

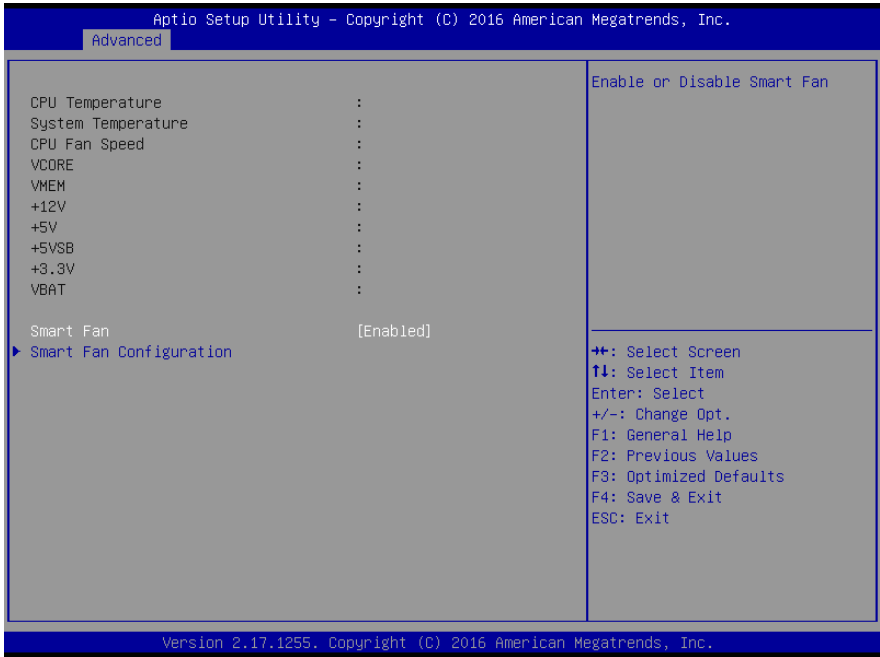


Options summary: (default setting)

|                                   |                        |  |
|-----------------------------------|------------------------|--|
| Use This Device                   | Disabled               |  |
|                                   | Enabled                |  |
| En/Disable specified serial port. |                        |  |
| Change Settings<br>(COM1)         | Use Automatic Settings |  |
|                                   | IO=3F8h; IRQ=4;        |  |
|                                   | IO=2F8h; IRQ=3;        |  |
| Change Settings<br>(COM2)         | Use Automatic Settings |  |
|                                   | IO=2F8h; IRQ=3;        |  |
|                                   | IO=3F8h; IRQ=4;        |  |
| Change Settings                   | Use Automatic Settings |  |

|  |                               |  |
|--|-------------------------------|--|
| (COM3)   | IO=3E8h; IRQ=11;              |  |
|  | IO=2E8h; IRQ=11;              |  |
| Change Settings  | <b>Use Automatic Settings</b> |  |
| (COM4)   | IO=2E8h; IRQ=11;              |  |
|  | IO=3E8h; IRQ=11;              |  |
| Select a resource setting for Super IO device.   |                               |  |
| Mode   | <b>RS232</b>                  |  |
|  | RS422                         |  |
|  | RS485                         |  |
| Configure COM operated as RS232, RS422 or RS485. Only COM3 and COM4 support this function. |                               |  |

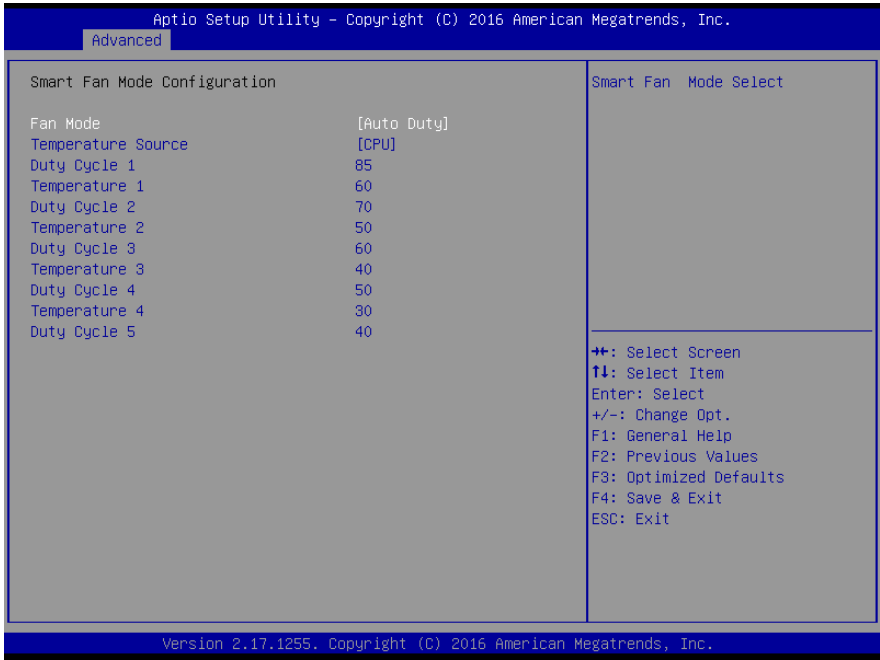
### 3.4.5 Advanced: Hardware Monitor



Options summary: (default setting)

|                                 |          |  |
|---------------------------------|----------|--|
| Smart Fan                       | Disabled |  |
|                                 | Enabled  |  |
| En/Disable specified Smart Fan. |          |  |

### 3.4.5.1 Hardware Monitor: Smart Fan Configuration



Options summary: (default setting)

|   |             |  |
|---|-------------|--|
| Fan Mode  | Manual Duty |  |
|   | Auto Duty   |  |
| Smart Fan Mode Select   |             |  |
| Manual Duty Mode  | 60          |  |
| Manual mode fan control, user can write expected duty cycle (PWM fan type) 1 – 100                        |             |  |
| Temperature Source  | CPU         |  |
| Select the monitored temperature source for this fan. Only supports CPU(external) support for this board. |             |  |
| Duty Cycle 1  | 85          |  |
| Duty Cycle 2  | 70          |  |

|  |    |  |
|--|----|--|
| Duty Cycle 3   | 60 |  |
| Duty Cycle 4   | 50 |  |
| Duty Cycle 5   | 40 |  |
| Fan speed control for each temperature region. User can write expected duty cycle (PWM fan type) 1 – 100 |    |  |
| Temperature 1  | 60 |  |
| Temperature 2  | 50 |  |
| Temperature 3  | 40 |  |
| Temperature 4  | 30 |  |
| Definition of temperature region. User can write expected temperature boundary 1 – 100                   |    |  |

Note: Optional support for PWM mode is available on request.

### 3.4.6 Advanced: CSM Configuration



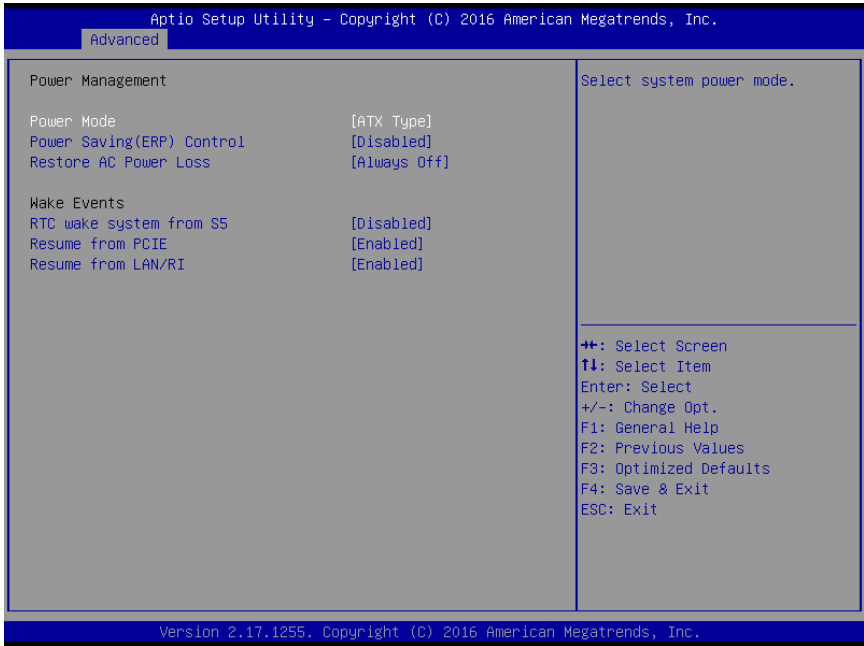
Options summary: (default setting)

|   |                 |  |
|---|-----------------|--|
| CSM Support   | Enabled         |  |
|   | Disabled        |  |
| Enable/Disable for CSM Support                        |                 |  |
| Boot option filter                                    | UEFI and Legacy |  |
|   | Legacy only     |  |
|   | UEFI only       |  |
| This option controls Legacy/UEFI boot option priority |                 |  |
| Network/PXE   | Do not launch   |  |
|   | UEFI            |  |
|   | Legacy          |  |

|   |               |  |
|---|---------------|--|
| Controls the execution of UEFI and Legacy PXE OpROM     |               |  |
| Storage   | Do not launch |  |
|   | UEFI          |  |
|   | <b>Legacy</b> |  |
| Controls the execution of UEFI and Legacy Storage OpROM |               |  |
| Video   | Do not launch |  |
|   | UEFI          |  |
|   | <b>Legacy</b> |  |
| Controls the execution of UEFI and Legacy Video OpROM   |               |  |



### 3.4.7 Advanced: Power Management

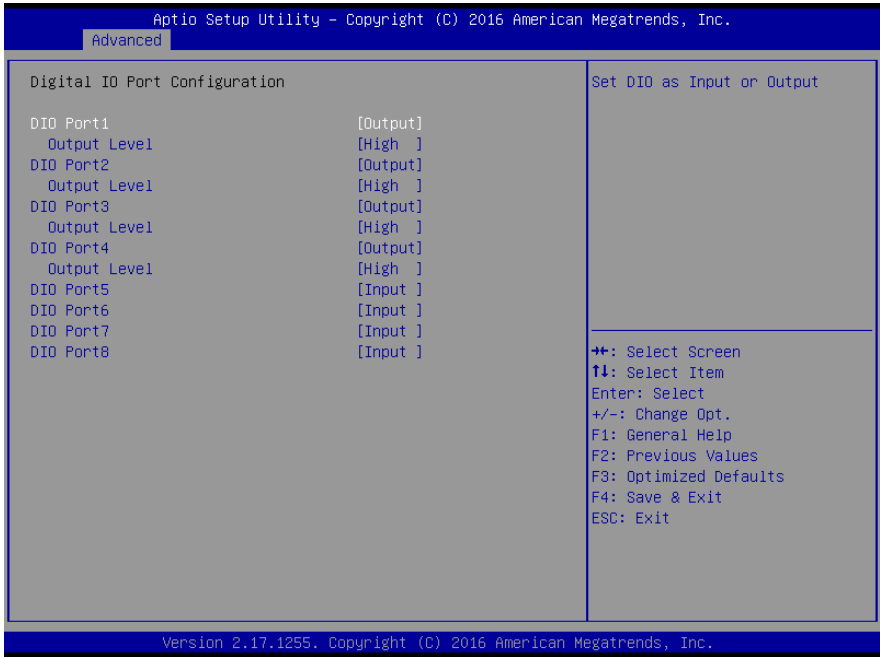


Options summary: (default setting)

|  |            |  |
|--|------------|--|
| Power Mode   | ATX Type   |  |
|  | AT Type    |  |
| Select system power mode   |            |  |
| Power Saving (ERP) Control   | Enabled    |  |
|  | Disabled   |  |
| Enabled or disabled ERP feature for power saving in S5 state.        |            |  |
| Restore AC Power Loss  | Power Off  |  |
|  | Power on   |  |
|  | Late State |  |
| Select AC power state when power is re-applied after a power failure |            |  |

|   |                 |  |
|---|-----------------|--|
| RTC wake system from S5   | <b>Disabled</b> |  |
|   | Fixed Time      |  |
|   | Dynamic Time    |  |
| Enable system to wake from S5 using RTC alarm.  |                 |  |
| Wake up day   | 0-31            |  |
| Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up |                 |  |
| Wake up hour  | 0-23            |  |
|   |                 |  |
| Wake up minute  | 0-59            |  |
|   |                 |  |
| Wake up second  | 0-59            |  |
|   |                 |  |
| Wake up minute increase   | 1-5             |  |
|   |                 |  |
| Resume from PCIE  | <b>Enabled</b>  |  |
|   | Disabled        |  |
| Enabled or disabled resume from PCIE WAKE#.   |                 |  |
| Resume from LAN/RI  | <b>Enabled</b>  |  |
|   | Disabled        |  |
| Enabled or disabled resume from LAN/RI  |                 |  |

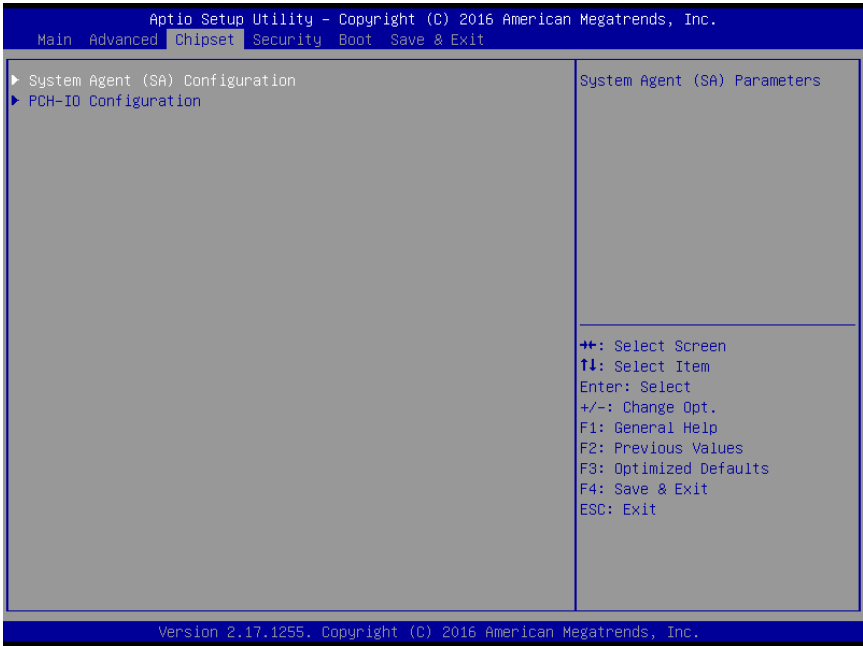
### 3.4.8 Advanced: Digital IO Port Configuration



Options summary: (default setting)

|  |               |  |
|--|---------------|--|
| DIO Port1/2/3/4                        | Input         |  |
|  | <b>Output</b> |  |
| Set DIO Port1/2/3/4 as Input or Output |               |  |
| DIO Port5/6/7/8                        | <b>Input</b>  |  |
|  | Output        |  |
| Set GPIO3/GPIO4 as Input or Output     |               |  |
| Output Level                           | Hi            |  |
|  | <b>Low</b>    |  |
| Set GPIO Level when used as Output     |               |  |

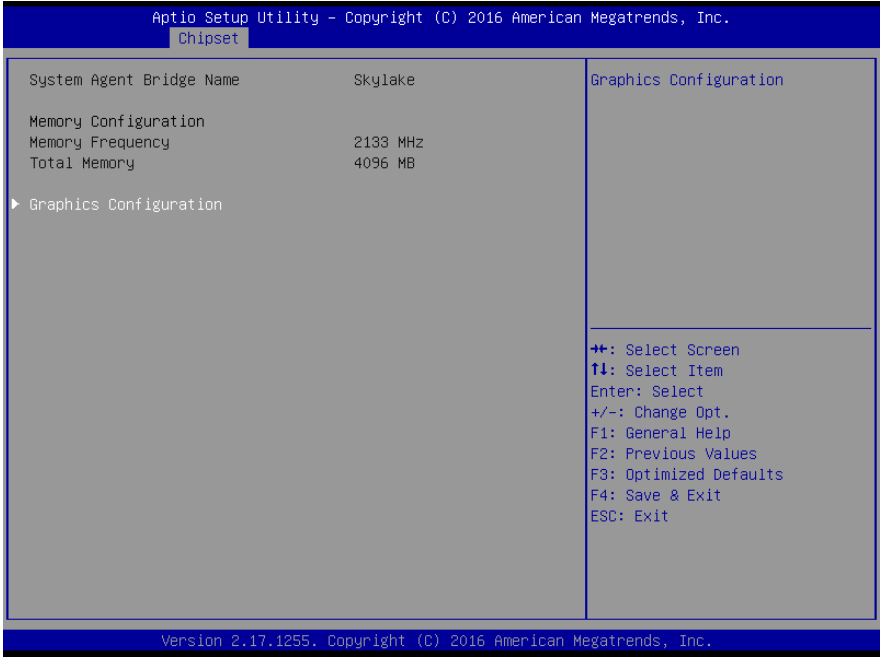
### 3.5 Setup submenu: Chipset



Options summary: **(default setting)**

|                                 |  |  |
|---------------------------------|--|--|
| System Agent (SA) Configuration |  |  |
| System Agent (SA) Parameters.   |  |  |
| PCH-IO Configuration            |  |  |
| PCH Parameters                  |  |  |

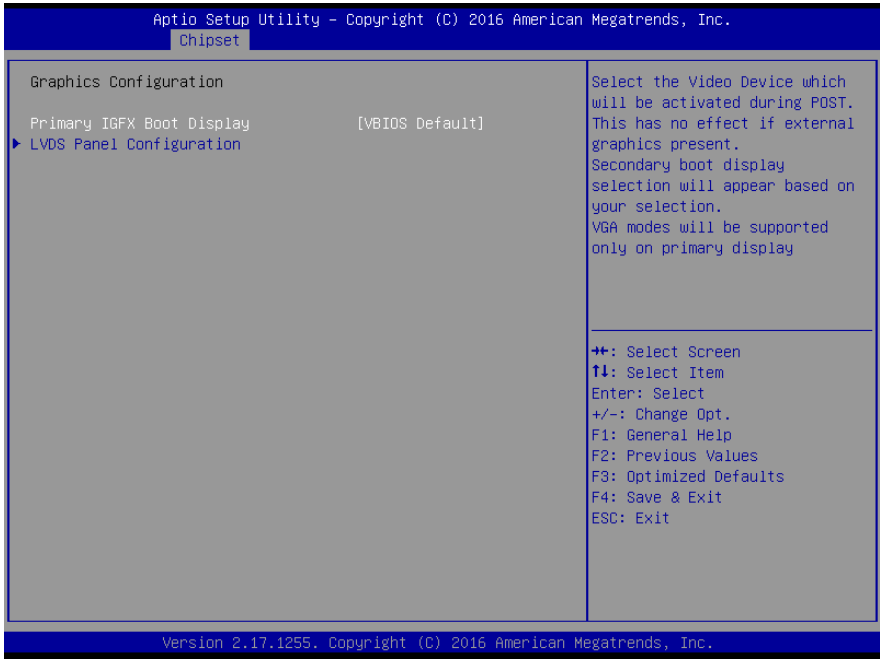
### 3.5.1 Chipset: System Agent (SA) Configuration



Options summary: (default setting)

|                        |  |  |
|------------------------|--|--|
| Graphics Configuration |  |  |
| Graphics Configuration |  |  |

### 3.5.1.1 System Agent (SA) Configuration: Graphics Configuration

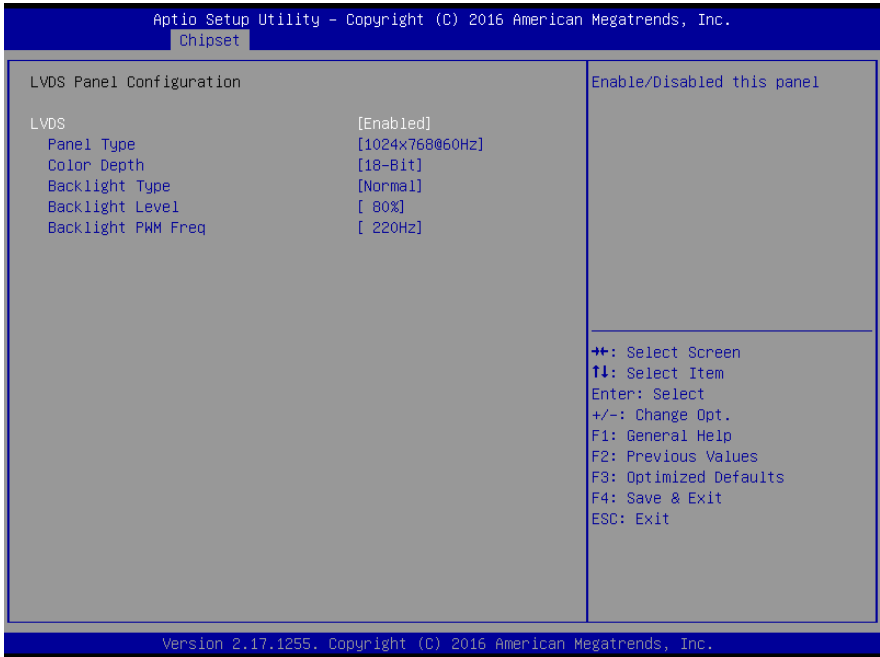


Options summary: (default setting)

|                                    |                      |  |
|------------------------------------|----------------------|--|
| Primary IGFX Boot Display          | <b>VBIOS Default</b> |  |
|                                    | DVI                  |  |
|                                    | CRT/DP               |  |
|                                    | LVDS                 |  |
| Select Primary boot display device |                      |  |
| Secondary Boot Display             | <b>Disabled</b>      |  |
|                                    | DVI                  |  |
|                                    | CRT/DP               |  |
|                                    | LVDS                 |  |
| Select Primary boot display device |                      |  |

|                               |  |  |
|-------------------------------|--|--|
| LVDS Panel Configuration      |  |  |
| Config LVDS panel parameters. |  |  |

### 3.5.1.2 Graphics Configuration: LVDS Panel Configuration



Options summary: (default setting)

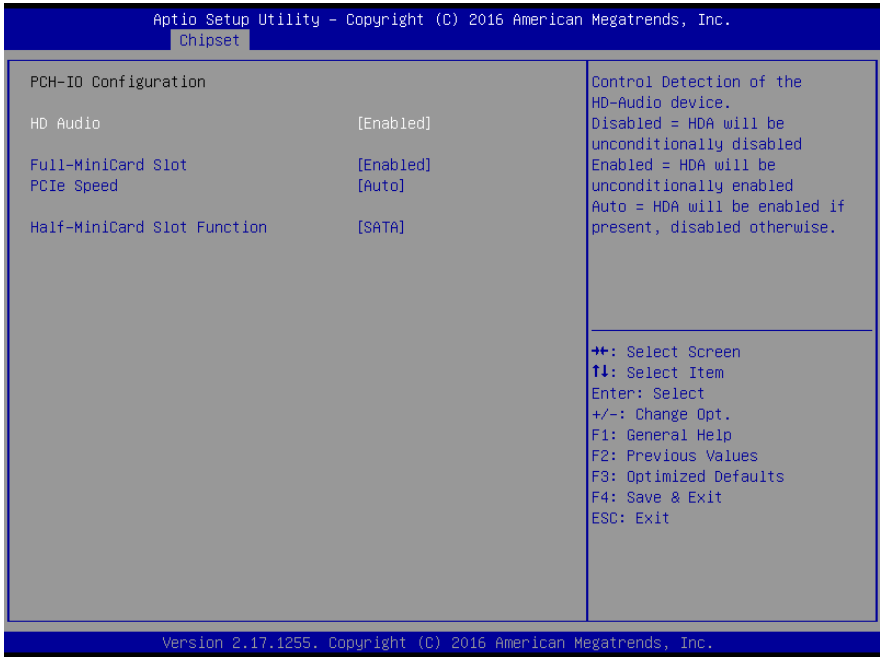
|                                  |               |  |
|----------------------------------|---------------|--|
| LVDS                             | Disabled      |  |
|                                  | Enabled       |  |
| Enable or Disable LVDS interface |               |  |
| Panel Type                       | 640x480@60Hz  |  |
|                                  | 800x480@60Hz  |  |
|                                  | 800x600@60Hz  |  |
|                                  | 1024x600@60Hz |  |

|   |                      |  |
|---|----------------------|--|
|   | <b>1024x768@60Hz</b> |  |
|   | 1280x768@60Hz        |  |
|   | 1280x800@60Hz        |  |
|   | 1280x1024@60Hz       |  |
|   | 1366x768@60Hz        |  |
|   | 1440x900@60Hz        |  |
|   | 1600x1200@60Hz       |  |
|   | 1920x1080@60Hz       |  |
|   | 1920x1200@60Hz       |  |
| Select panel resolution.                                    |                      |  |
| Color Depth   | <b>18-Bit</b>        |  |
|   | 24-Bit               |  |
|   | 36-Bit               |  |
|   | 48-Bit               |  |
| Select color depth of the panel                             |                      |  |
| Backlight Type  | Inverted             |  |
|   | <b>Normal</b>        |  |
| Select Backlight control type.                              |                      |  |
| Inverted: Brightest for low PWM duty cycle and low voltage. |                      |  |
| Normal: Brightest for high PWM duty cycle and high voltage. |                      |  |
| Backlight Level   | 100%                 |  |
|   | 90%                  |  |
|   | <b>80%</b>           |  |
|   | 70%                  |  |
|   | 60%                  |  |
|   | 50%                  |  |
|   | 40%                  |  |



|   |              |  |
|---|--------------|--|
|   | 30%          |  |
|   | 20%          |  |
|   | 10%          |  |
|   | 0%           |  |
| Select Backlight Level                            |              |  |
| Backlight PWM Freq                                | 100Hz        |  |
|   | 200Hz        |  |
|   | <b>220Hz</b> |  |
|   | 500Hz        |  |
|   | 1KHz         |  |
|   | 2.2KHz       |  |
|   | 6.5KHz       |  |
| Select PWM frequency of backlight control signal. |              |  |

### 3.5.2 Chipset: PCH-IO Configuration

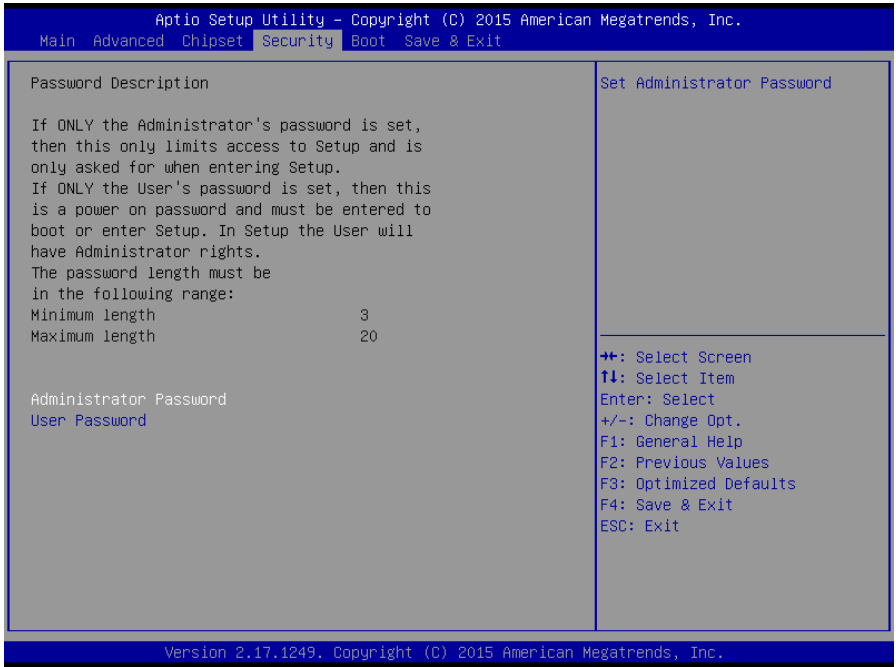


Options summary: (default setting)

|  |                |  |
|--|----------------|--|
| HD Audio   | Disabled       |  |
|  | <b>Enabled</b> |  |
| Enable or disabled Azalia device for audio function. |                |  |
| Full-MiniCard Slot                                   | Disabled       |  |
|  | <b>Enabled</b> |  |
| Control the full-size minicard slot                  |                |  |
| PCIe Speed   | <b>Auto</b>    |  |
|  | Gen1           |  |
|  | Gen2           |  |
|  | Gen3           |  |

|  |                |  |
|--|----------------|--|
| PCIe Gen Speed for full-size minicard.               |                |  |
| Half-MiniCard Slot                                   | mSATA          |  |
| Function   | <b>PCIe</b>    |  |
| Select function enabled for Half-MiniCard(CN13) Slot |                |  |
| Half-MiniCard Slot                                   | Disabled       |  |
|  | <b>Enabled</b> |  |
| Control the full-size minicard slot                  |                |  |
| PCIe Speed   | <b>Auto</b>    |  |
|  | Gen1           |  |
|  | Gen2           |  |
|  | Gen3           |  |
| PCIe Gen Speed for half-size minicard.               |                |  |

## 3.6 Setup submenu: Security



Options summary: (default setting)

|                         |         |  |
|-------------------------|---------|--|
| Administrator Password/ | Not set |  |
| User Password           |         |  |

### Change User/Administrator Password

If an Administrator Password is set, it will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

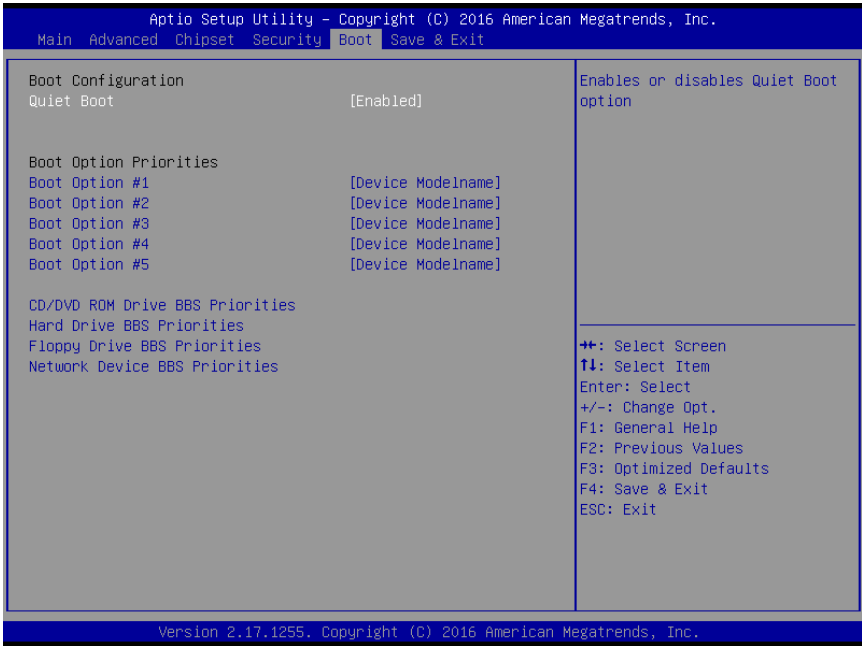
Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press

Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

### **Removing the Password**

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

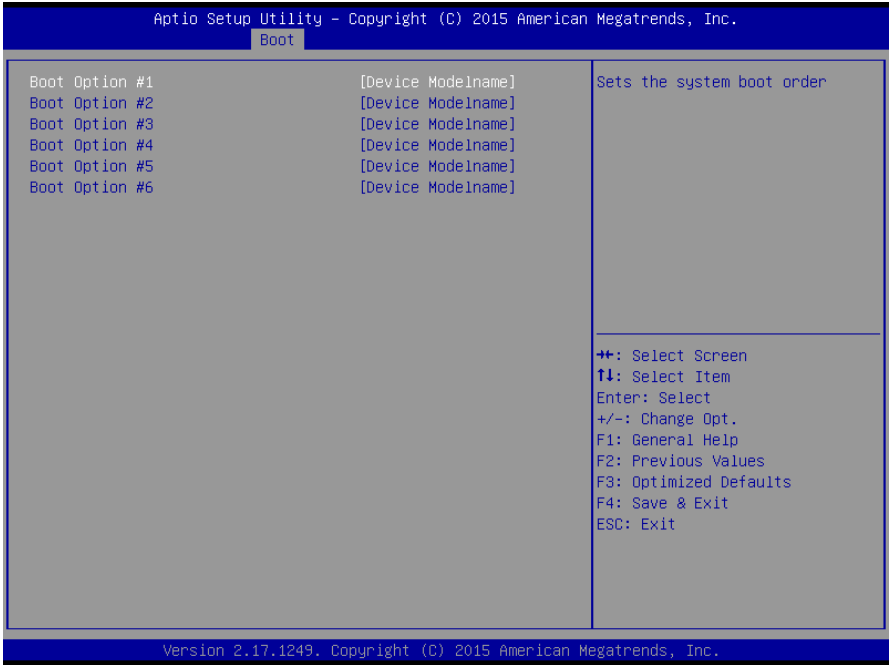
### 3.7 Setup submenu: Boot



Options summary: (default setting)

|  |          |  |
|--|----------|--|
| Quiet Boot                                   | Disabled |  |
|  | Enabled  |  |
| En/Disable showing boot logo.                |          |  |
| Boot Option #X/<br>XXXX Drive BBS Priorities |          |  |
| The order of boot priorities.                |          |  |

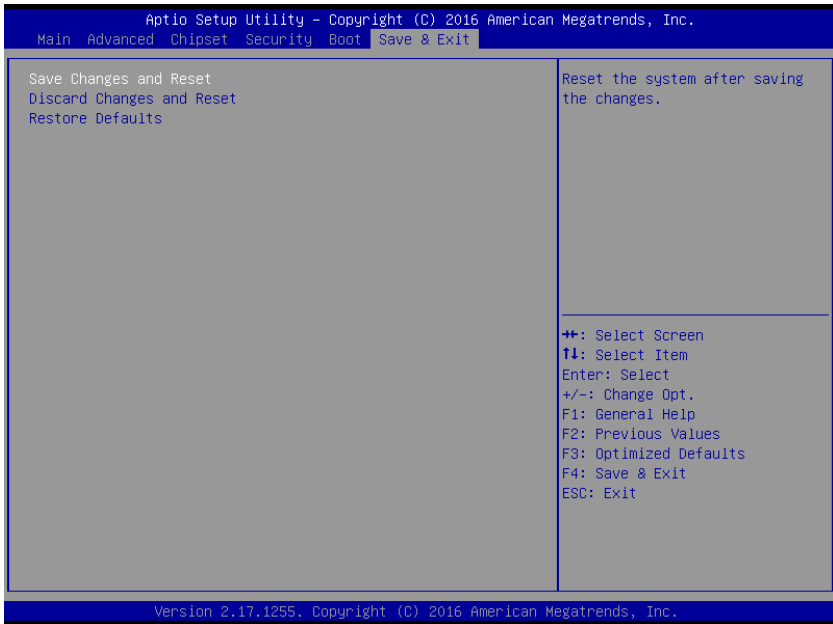
### 3.7.1 Boot: BBS Priorities



Options summary: **(default setting)**

|                            |             |  |
|----------------------------|-------------|--|
| Boot Option #x             | Disabled    |  |
|                            | Device name |  |
| Sets the system boot order |             |  |

### 3.8 Setup submenu: Save & Exit



#### Options summary: (default setting)

|  |  |  |
|--|--|--|
| Save Changes and Reset                                 |  |  |
| Reset the system after saving the changes              |  |  |
| Discard Changes and Exit                               |  |  |
| Reset system setup without saving any changes          |  |  |
| Restore Defaults                                       |  |  |
| Restore/Load Default values for all the setup options. |  |  |



# Chapter 4

---

Drivers Installation

## 4.1 Product CD/DVD

---

The GENE-SKU6 comes with a product DVD that contains all the drivers and utilities you need to setup your product. Insert the DVD and follow the steps in the autorun program to install the drivers.

In case the program does not start, follow the sequence below to install the drivers.

### Step 1 – Install Chipset Drivers

1. Open the **Step1 - Chipset** folder followed by **SetupChipset.exe**
2. Follow the instructions
3. Drivers will be installed automatically

### Step 2 – Install Graphics Drivers

1. Open the **Step2 - VGA** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

### Step 3 – Install LAN Drivers

1. Click on the **Step3 - LAN** folder and select your OS
2. Open the **.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

### Step 4 – Install Audio Drivers

1. Open the **Step4 - Audio** folder and select your OS
2. Open the **.exe** file in the folder

3. Follow the instructions
4. Drivers will be installed automatically

#### **Step 5 – Install USB 3.0 Driver (Windows 7 only)**

1. Open the **Step5 - USB3.0** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

#### **Step 6 – Install TPM 2.0 Driver (Windows 7 only)**

1. Open the **Step6 TPM 2.0** folder followed by the **.msu** file
2. Follow the instructions
3. Drivers will be installed automatically

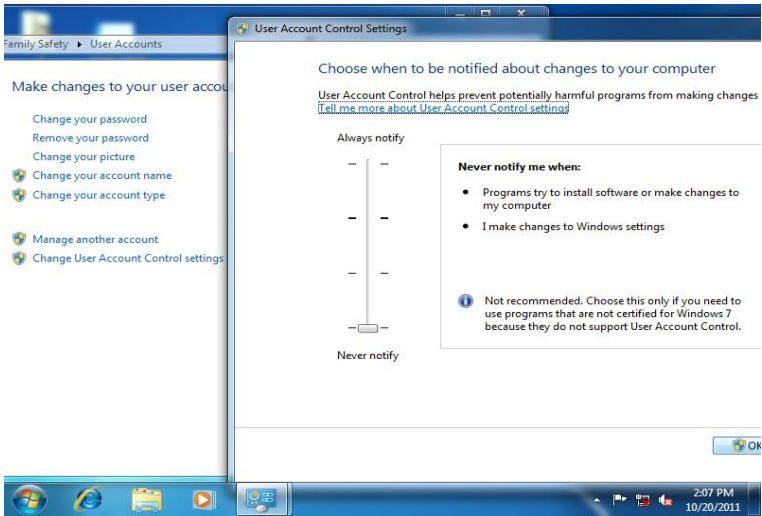
#### **Step 7 – Install Touch Driver**

1. Open the **Step7 - PenMount Touch 6000** folder followed by **Setup.exe**
2. Follow the instructions
3. Drivers will be installed automatically

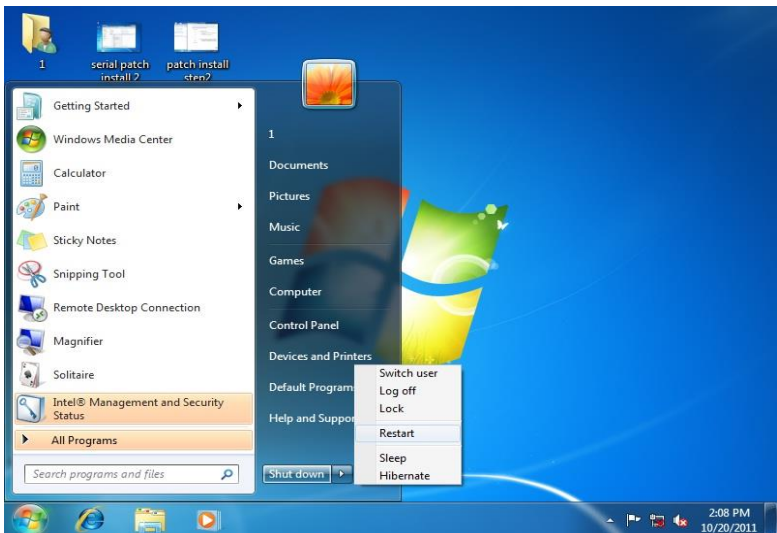
## Step 8 – Install Serial Port Drivers

For Windows 7:

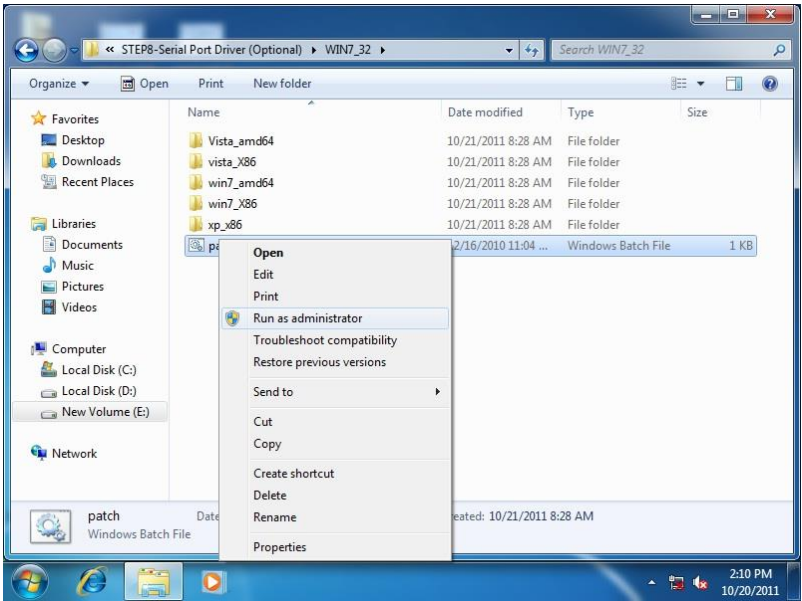
1. Change User Account Control settings to **Never notify**



2. Reboot and log in as administrator



3. Run patch.bat as administrator



For Windows 8/10:

1. Click on the **Step8 - Serial Port Driver (Optional)** folder and select your OS
2. Open the **setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

## 4.2 Note on EHCI

---

With the EHCI controller no longer available on the 6th Gen Intel® Core™ platforms, it is recommended to install Windows 7 through a SATA bus, eg SATA DVD-ROM, or patch the xHCI driver onto an installation media for Windows 7. More information can be found in the links below.

[Windows 7 USB 3.0 Creator Utility](#)

[Read me](#)

For input devices, please use an add-on standard EHCI controller expansion card, such as PCIe to USB 2.0 conversion card.

# Appendix A

---

## Watchdog Timer Programming

## A.1 Watchdog Timer Registers

| Table 1 : Watch dog relative IO address |               |   |
|---|---------------|---|
|   | Default Value | Note  |
| I/O Base Address                        | 0xA10         | I/O Base address for Watchdog operation.<br>This address is assigned by SIO LDN7, register 0x60-0x61. |

| Table 2 : Watchdog relative register table |        |        |       |  |
|--|--------|--------|-------|--|
| Register                                   | Offset | BitNum | Value | Note   |
| Watchdog WDRST# Enable                     | 0x00   | 7      | 1     | Enable/Disable time out output via WDRST#<br>0: Disable<br>1: Enable   |
| Pulse Width                                | 0x05   | 0:1    | 01    | Width of Pulse signal<br>00: 1ms (do not use)<br>01: 25ms<br>10: 125ms<br>11: 5s<br><b>Pulse width is must longer then 16ms.</b> |
| Signal Polarity                            | 0x05   | 2      | 0     | 0: low active<br>1: high active<br><b>Must set this bit to 0</b>   |
| Counting Unit                              | 0x05   | 3      | 0     | Select time unit.<br>0: second<br>1: minute  |
| Output Signal Type                         | 0x05   | 4      | 1     | 0: Level<br>1: Pulse<br><b>Must set this bit to 1</b>  |
| Watchdog Timer Enable                      | 0x05   | 5      | 1     | 0: Disable<br>1: Enable  |
| Timeout Status                             | 0x05   | 6      | 1     | 1: timeout occurred. Write a 1 to clear timeout status   |
| Timer Counter                              | 0x06   |        |       | Time of watchdog timer (0~255)   |



## A.2 Watchdog Sample Program

```
*****
// WDT I/O operation relative definition (Please reference to Table 1)
#define WDTAddr    0x510 // WDT I/O base address
Void  WDTWriteByte(byte Register, byte Value);
byte  WDTReadByte(byte Register);
Void  WDTSetReg(byte Register, byte Bit, byte Val);
// Watch Dog relative definition (Please reference to Table 2)
#define DevReg     0x00 // Device configuration register
    #define WDTRstBit 0x80 // Watchdog WDTRST# (Bit7)
    #define WDTRstVal 0x80 // Enabled WDTRST#
#define TimerReg  0x05 // Timer register
    #define PSWidthBit 0x00 // WDTRST# Pulse width (Bit0:1)
    #define PSWidthVal 0x01 // 25ms for WDTRST# pulse
    #define PolarityBit 0x02 // WDTRST# Signal polarity (Bit2)
    #define PolarityVal 0x00 // Low active for WDTRST#
    #define UnitBit    0x03 // Unit for timer (Bit3)
    #define ModeBit    0x04 // WDTRST# mode (Bit4)
    #define ModeVal    0x01 // 0:level 1: pulse
    #define EnableBit  0x05 // WDT timer enable (Bit5)
    #define EnableVal  0x01 // 1: enable
    #define StatusBit  0x06 // WDT timer status (Bit6)
#define CounterReg 0x06 // Timer counter register
*****

*****
VOID  Main(){
    // Procedure : AaeonWDTConfig
    // (byte)Timer : Counter of WDT timer.(0x00~0xFF)
    // (boolean)Unit : Select time unit(0: second, 1: minute).
    AaeonWDTConfig(Counter, Unit);

    // Procedure : AaeonWDTEnable
    // This procedure will enable the WDT counting.
    AaeonWDTEnable();
}
*****

*****
// Procedure : AaeonWDTEnable
```

```

VOID AaeonWDTEnable (){
    WDTEnableDisable(1);
}

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (byte Counter, BOOLEAN Unit){
    // Disable WDT counting
    WDTEnableDisable(0);
    // Clear Watchdog Timeout Status
    WDTClearTimeoutStatus();
    // WDT relative parameter setting
    WDTParameterSetting(Timer, Unit);
}

VOID WDTEnableDisable(byte Value){
    If (Value == 1)
        WDTSetBit(TimerReg, EnableBit, 1);
    else
        WDTSetBit(TimerReg, EnableBit, 0);
}

VOID WDTParameterSetting(byte Counter, BOOLEAN Unit){
    // Watchdog Timer counter setting
    WDTWriteByte(CounterReg, Counter);
    // WDT counting unit setting
    WDTSetBit(TimerReg, UnitBit, Unit);
    // WDT output mode set to pulse
    WDTSetBit(TimerReg, ModeBit, ModeVal);
    // WDT output mode set to active low
    WDTSetBit(TimerReg, PolarityBit, PolarityVal);
    // WDT output pulse width is 25ms
    WDTSetBit(TimerReg, PSWidthBit, PSWidthVal);
    // Watchdog WDTRST# Enable
    WDTSetBit(DevReg, WDTRstBit, WDTRstVal);
}

VOID WDTClearTimeoutStatus(){
    WDTSetBit(TimerReg, StatusBit, 1);
}

*****
*****

```

```
VOID  WDTWriteByte(byte Register, byte Value){
    IOWriteByte(WDTAddr+Register, Value);
}

byte  WDTReadByte(byte Register){
    return IOReadByte(WDTAddr+Register);
}

VOID  WDTSetBit(byte Register, byte Bit, byte Val){
    byte TmpValue;

    TmpValue = WDTReadByte(Register);
    TmpValue &= ~(1 << Bit);
    TmpValue |= Val << Bit;
    WDTWriteByte(Register, TmpValue);
}
```

```
*****
```

# Appendix B

---

I/O Information

## B.1 I/O Address Map






























\* There are no PS/2 ports on the GENE-SKU6, hence the exclamation marks.

| Address                                | Device   |
|--|--|
| [0000000000000000 - 00000000000000CF7] | PCI Express Root Complex   |
| [00000000000000020 - 0000000000000021] | Programmable interrupt controller  |
| [00000000000000024 - 0000000000000025] | Programmable interrupt controller  |
| [00000000000000028 - 0000000000000029] | Programmable interrupt controller  |
| [0000000000000002C - 000000000000002D] | Programmable interrupt controller  |
| [0000000000000002E - 000000000000002F] | Motherboard resources  |
| [00000000000000030 - 0000000000000031] | Programmable interrupt controller  |
| [00000000000000034 - 0000000000000035] | Programmable interrupt controller  |
| [00000000000000038 - 0000000000000039] | Programmable interrupt controller  |
| [0000000000000003C - 000000000000003D] | Programmable interrupt controller  |
| [00000000000000040 - 0000000000000043] | System timer   |
| [0000000000000004E - 000000000000004F] | Motherboard resources  |
| [00000000000000050 - 0000000000000053] | System timer   |
| [00000000000000060 - 0000000000000060] | Standard PS/2 Keyboard   |
| [00000000000000061 - 0000000000000061] | Motherboard resources  |
| [00000000000000063 - 0000000000000063] | Motherboard resources  |
| [00000000000000064 - 0000000000000064] | Standard PS/2 Keyboard   |
| [00000000000000065 - 0000000000000065] | Motherboard resources  |
| [00000000000000067 - 0000000000000067] | Motherboard resources  |
| [00000000000000070 - 0000000000000070] | Motherboard resources  |
| [00000000000000070 - 0000000000000077] | System CMOS/real time clock  |
| [00000000000000080 - 0000000000000080] | Motherboard resources  |
| [00000000000000092 - 0000000000000092] | Motherboard resources  |
| [00000000000000A0 - 00000000000000A1]  | Programmable interrupt controller  |
| [00000000000000A4 - 00000000000000A5]  | Programmable interrupt controller  |
| [00000000000000A8 - 00000000000000A9]  | Programmable interrupt controller  |
| [00000000000000AC - 00000000000000AD]  | Programmable interrupt controller  |
| [00000000000000B0 - 00000000000000B1]  | Programmable interrupt controller  |
| [00000000000000B2 - 00000000000000B3]  | Motherboard resources  |
| [00000000000000B4 - 00000000000000B5]  | Programmable interrupt controller  |
| [00000000000000B8 - 00000000000000B9]  | Programmable interrupt controller  |
| [00000000000000BC - 00000000000000BD]  | Programmable interrupt controller  |
| [00000000000002E8 - 00000000000002EF]  | Communications Port (COM4)   |
| [00000000000002F8 - 00000000000002FF]  | Communications Port (COM2)   |
| [00000000000003B0 - 00000000000003BB]  | Intel(R) HD Graphics 520   |
| [00000000000003C0 - 00000000000003DF]  | Intel(R) HD Graphics 520   |
| [00000000000003E8 - 00000000000003EF]  | Communications Port (COM3)   |
| [00000000000003F8 - 00000000000003FF]  | Communications Port (COM1)   |
| [00000000000004D0 - 00000000000004D1]  | Programmable interrupt controller  |
| [0000000000000680 - 000000000000069F]  | Motherboard resources  |
| [0000000000000A00 - 0000000000000A0F]  | Motherboard resources  |
| [0000000000000A10 - 0000000000000A1F]  | Motherboard resources  |
| [0000000000000A20 - 0000000000000A2F]  | Motherboard resources  |
| [0000000000000D00 - 0000000000000FFF]  | PCI Express Root Complex   |
| [000000000000164E - 000000000000164F]  | Motherboard resources  |
| [0000000000001800 - 00000000000018FE]  | Motherboard resources  |
| [0000000000001854 - 0000000000001857]  | Motherboard resources  |
| [000000000000D000 - 000000000000DFFF]  | Intel(R) 100 Series Chipset Family PCI Express Root Port #4 - 9D13             |
| [000000000000E000 - 000000000000EFFF]  | Intel(R) 100 Series Chipset Family PCI Express Root Port #3 - 9D12             |
| [000000000000E000 - 000000000000EFFF]  | Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115 |
| [000000000000F000 - 000000000000F03F]  | Intel(R) HD Graphics 520   |
| [000000000000F040 - 000000000000F05F]  | Intel(R) 100 Series Chipset Family SMBUS - 9D23                                |
| [000000000000F060 - 000000000000F07F]  | Standard SATA AHCI Controller  |
| [000000000000F080 - 000000000000F083]  | Standard SATA AHCI Controller  |
| [000000000000F090 - 000000000000F097]  | Standard SATA AHCI Controller  |
| [000000000000FF00 - 000000000000FFFE]  | Motherboard resources  |
| [000000000000FFFF - 000000000000FFFF]  | Motherboard resources  |
| [000000000000FFFF - 000000000000FFFF]  | Motherboard resources  |
| [000000000000FFFF - 000000000000FFFF]  | Motherboard resources  |

## B.2 Memory Address Map

| Memory                                  |  |
|---|--|
| [0000000000A0000 - 0000000000BFFFF]     | Intel(R) HD Graphics 520   |
| [0000000000A0000 - 0000000000BFFFF]     | PCI Express Root Complex   |
| [0000000090000000 - 00000000DFFFFFF]    | PCI Express Root Complex   |
| [00000000C0000000 - 00000000CFFFFFF]    | Intel(R) HD Graphics 520   |
| [00000000DE000000 - 00000000DEFFFFFF]   | Intel(R) HD Graphics 520   |
| [00000000DF000000 - 00000000DF01FFFF]   | Intel(R) I210 Gigabit Network Connection #2                        |
| [00000000DF000000 - 00000000DF0FFFFF]   | Intel(R) 100 Series Chipset Family PCI Express Root Port #4 - 9D13 |
| [00000000DF020000 - 00000000DF023FFF]   | Intel(R) I210 Gigabit Network Connection #2                        |
| [00000000DF100000 - 00000000DF11FFFF]   | Intel(R) I210 Gigabit Network Connection                           |
| [00000000DF100000 - 00000000DF1FFFFF]   | Intel(R) 100 Series Chipset Family PCI Express Root Port #3 - 9D12 |
| [00000000DF120000 - 00000000DF123FFF]   | Intel(R) I210 Gigabit Network Connection                           |
| [00000000DF200000 - 00000000DF20FFFF]   | High Definition Audio Controller                                   |
| [00000000DF210000 - 00000000DF21FFFF]   | Intel(R) USB 3.0 Host Controller Adaptation Driver                 |
| [00000000DF220000 - 00000000DF223FFF]   | High Definition Audio Controller                                   |
| [00000000DF224000 - 00000000DF227FFF]   | Intel(R) 100 Series Chipset Family PMC - 9D21                      |
| [00000000DF228000 - 00000000DF229FFF]   | Standard SATA AHCI Controller                                      |
| [00000000DF22A000 - 00000000DF22A0FF]   | Intel(R) 100 Series Chipset Family SMBUS - 9D23                    |
| [00000000DF22B000 - 00000000DF22B7FF]   | Standard SATA AHCI Controller                                      |
| [00000000DF22C000 - 00000000DF22C0FF]   | Standard SATA AHCI Controller                                      |
| [00000000DF22E000 - 00000000DF22EFFF]   | Intel(R) 100 Series Chipset Family Thermal subsystem - 9D31        |
| [00000000DFFE0000 - 00000000DFFFFFFF]   | Motherboard resources  |
| [00000000E0000000 - 00000000EFFFFFFF]   | Motherboard resources  |
| [00000000FD000000 - 00000000FDABFFFF]   | Motherboard resources  |
| [00000000FD000000 - 00000000FE7FFFFF]   | PCI Express Root Complex   |
| [00000000FDAC0000 - 00000000FDACFFFF]   | Motherboard resources  |
| [00000000FDAD0000 - 00000000FDADFFFF]   | Motherboard resources  |
| [00000000FDAE0000 - 00000000FDAEFFFF]   | Motherboard resources  |
| [00000000FDAF0000 - 00000000FDAFFFFF]   | Motherboard resources  |
| [00000000FDB00000 - 00000000FDBFFFFF]   | Motherboard resources  |
| [00000000FE000000 - 00000000FE01FFFF]   | Motherboard resources  |
| [00000000FE028000 - 00000000FE028FFF]   | Motherboard resources  |
| [00000000FE029000 - 00000000FE029FFF]   | Motherboard resources  |
| [00000000FE036000 - 00000000FE03BFFF]   | Motherboard resources  |
| [00000000FE03D000 - 00000000FE03FFFF]   | Motherboard resources  |
| [00000000FE40F000 - 00000000FE40FFFF]   | Intel(R) Management Engine Interface                               |
| [00000000FE410000 - 00000000FE7FFFFF]   | Motherboard resources  |
| [00000000FED00000 - 00000000FED003FF]   | High precision event timer   |
| [00000000FED10000 - 00000000FED17FFF]   | Motherboard resources  |
| [00000000FED18000 - 00000000FED18FFF]   | Motherboard resources  |
| [00000000FED19000 - 00000000FED19FFF]   | Motherboard resources  |
| [00000000FED20000 - 00000000FED3FFFF]   | Motherboard resources  |
| [00000000FED40000 - 00000000FED44FFF]   | Trusted Platform Module 2.0  |
| [00000000FED45000 - 00000000FED8FFFF]   | Motherboard resources  |
| [00000000FED90000 - 00000000FED93FFF]   | Motherboard resources  |
| [00000000FEE00000 - 00000000FEEFFFFFFF] | Motherboard resources  |
| [00000000FF000000 - 00000000FFFFFFF]    | Intel(R) 82802 Firmware Hub Device                                 |
| [00000000FF000000 - 00000000FFFFFFF]    | Motherboard resources  |

## B.3 IRQ Mapping Chart

|   |   |                                |  |
|---|---|--------------------------------|--|
| ▲ |    | <b>Interrupt request (IRQ)</b> |  |
|   |    | (ISA) 0x00000000 (00)          | System timer   |
|   |    | (ISA) 0x00000003 (03)          | Communications Port (COM2)   |
|   |    | (ISA) 0x00000004 (04)          | Communications Port (COM1)   |
|   |    | (ISA) 0x00000008 (08)          | System CMOS/real time clock  |
|   |    | (ISA) 0x0000000B (11)          | Communications Port (COM3)   |
|   |    | (ISA) 0x0000000B (11)          | Communications Port (COM4)   |
|   |    | (ISA) 0x0000000E (14)          | Motherboard resources  |
|   |    | (PCI) 0x0000000B (11)          | Intel(R) 100 Series Chipset Family SMBUS - 9D23                    |
|   |    | (PCI) 0x00000010 (16)          | High Definition Audio Controller                                   |
|   |    | (PCI) 0x00000010 (16)          | Standard SATA AHCI Controller                                      |
|   |    | (PCI) 0xFFFFFDED (-19)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDEE (-18)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDEF (-17)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDF0 (-16)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDF1 (-15)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDF2 (-14)         | Intel(R) I210 Gigabit Network Connection #2                        |
|   |    | (PCI) 0xFFFFFDF3 (-13)         | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF4 (-12)         | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF5 (-11)         | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF6 (-10)         | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF7 (-9)          | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF8 (-8)          | Intel(R) I210 Gigabit Network Connection                           |
|   |    | (PCI) 0xFFFFFDF9 (-7)          | Intel(R) Management Engine Interface                               |
|   |    | (PCI) 0xFFFFFDF A (-6)         | Intel(R) USB 3.0 Host Controller Adaptation Driver                 |
|   |   | (PCI) 0xFFFFFDF B (-5)         | Intel(R) HD Graphics 520   |
|   |  | (PCI) 0xFFFFFDF C (-4)         | Intel(R) 100 Series Chipset Family PCI Express Root Port #4 - 9D13 |
|   |  | (PCI) 0xFFFFFDF D (-3)         | Intel(R) 100 Series Chipset Family PCI Express Root Port #3 - 9D12 |
|   |  | (PCI) 0xFFFFFDF E (-2)         | Intel(R) 100 Series Chipset Family PCI Express Root Port #1 - 9D10 |

# Appendix C

---

Electrical Specifications for I/O Ports



## C.1 Electrical Specifications for I/O Ports

| I/O   | Reference | Signal Name      | Rate Output                |
|---|-----------|------------------|----------------------------|
| DVI Port                                    | CN3       | +5V              | +5V/1A (reserved)          |
| DP port                                     | CN5       | +3.3V            | +3.3V/1A                   |
| LVDS Port                                   | CN6       | +3.3V/+5V        | +3.3V/2A or<br>+5V/2A      |
| LVDS Port Inverter /<br>Backlight Connector | CN7       | +5V/+12V         | +5V/1.5A or<br>+12V/1.5A   |
| Mini-Card Slot<br>(Full-Mini Card)          | CN11      | +3.3VSB<br>+1.5V | +3.3V/1.1A<br>+1.5V/0.375A |
| Mini-Card Slot<br>(Half-Mini Card)          | CN13      | +3.3VSB<br>+1.5V | +3.3V/1.1A<br>+1.5V/0.375A |
| +5V Output for<br>SATA HDD                  | CN15      | +5V              | +5V/1A                     |
| USB 3.0 Ports                               | CN18      | +5VSB            | +5V/1A (per<br>channel)    |
| USB 3.0 Ports                               | CN19      | +5VSB            | +5V/1A (per<br>channel)    |
| USB 2.0 Ports                               | CN20      | +5VSB            | +5V/0.5A (per<br>channel)  |
| USB 2.0 Ports                               | CN21      | +5VSB            | +5V/0.5A (per<br>channel)  |

|                 |      |          |                          |
|-----------------|------|----------|--------------------------|
| Audio I/O Port  | CN22 | +5V      | +5V/1A                   |
| Digital IO Port | CN24 | +5V      | +5V/1A                   |
| COM Port 4      | CN26 | +5V/+12V | +5V/0.5A or<br>+12V/0.5A |
| COM Port 2      | CN27 | +5V/+12V | +5V/0.5A or<br>+12V/0.5A |
| COM Port 3      | CN28 | +5V/+12V | +5V/0.5A or<br>+12V/0.5A |
| LPC Port        | CN29 | +3.3V    | +3.3V/0.5A               |
| CPU FAN         | CN36 | +12V     | +12V/0.5A                |

# Appendix D

---

Digital I/O Ports

## D.1 Electrical Specifications for Digital I/O Ports

Table 1 : Digital Input/Output Pin Electrical Specification

| Pin  | Type | Input Threshold Voltage |      | Output Voltage |      | Note |
|------|------|-------------------------|------|----------------|------|------|
|      |      | Low                     | High | Low            | High |      |
| DIO0 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO1 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO2 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO3 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO4 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO5 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO6 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |
| DIO7 | I/O  | 0.8                     | 2.0  | 0              | 5    |      |

Note: All DIO pins are 5V tolerant in input mode.

## D.2 DI/O Programming

---

GENE-SKU6 utilizes FINTEK F81866D chipset as its Digital I/O controller. Below are the procedures to complete its configuration and the AAEON initial DI/O program is also attached, based on which you can develop customized program to fit your application.

There are three steps to complete the configuration setup:

- (1) Enter the MB PnP Mode
- (2) Modify the data of configuration registers
- (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

### D.3 Digital I/O Register

| Table 2 : SuperIO relative register table |               |  |
|---|---------------|--|
|   | Default Value | Note   |
| Index                                     | 0x2E          | SIO MB PnP Mode Index Register<br>0x2E or 0x4E |
| Data                                      | 0x2F)         | SIO MB PnP Mode Data Register<br>0x2F or 0x4F  |

| Table 3 : Digital Input/Output relative register table |      |          |     |                    |
|--|------|----------|-----|--------------------|
|  | LDN  | Register | Bit | Note               |
| DIO0 Direction   | 0x06 | 0xA0     | 0   | 0:input, 1: output |
| DIO1 Direction   | 0x06 | 0xA0     | 1   |                    |
| DIO2 Direction   | 0x06 | 0xA0     | 2   |                    |
| DIO3 Direction   | 0x06 | 0xA0     | 3   |                    |
| DIO4 Direction   | 0x06 | 0xA0     | 4   |                    |
| DIO5 Direction   | 0x06 | 0xA0     | 5   |                    |
| DIO6 Direction   | 0x06 | 0xA0     | 6   |                    |
| DIO7 Direction   | 0x06 | 0xA0     | 7   |                    |
| DIO0 Output Level                                      | 0x06 | 0xA1     | 0   | 0:low, 1: high     |
| DIO1 Output Level                                      | 0x06 | 0xA1     | 1   |                    |
| DIO2 Output Level                                      | 0x06 | 0xA1     | 2   |                    |
| DIO3 Output Level                                      | 0x06 | 0xA1     | 3   |                    |
| DIO4 Output Level                                      | 0x06 | 0xA1     | 4   |                    |
| DIO5 Output Level                                      | 0x06 | 0xA1     | 5   |                    |
| DIO6 Output Level                                      | 0x06 | 0xA1     | 6   |                    |
| DIO7 Output Level                                      | 0x06 | 0xA1     | 7   |                    |
| DIO0 Status  | 0x06 | 0xA2     | 0   | 0:low, 1: high     |
| DIO1 Status  | 0x06 | 0xA2     | 1   |                    |
| DIO2 Status  | 0x06 | 0xA2     | 2   |                    |
| DIO3 Status  | 0x06 | 0xA2     | 3   |                    |
| DIO4 Status  | 0x06 | 0xA2     | 4   |                    |
| DIO5 Status  | 0x06 | 0xA2     | 5   |                    |
| DIO6 Status  | 0x06 | 0xA2     | 6   |                    |
| DIO7 Status  | 0x06 | 0xA2     | 7   |                    |

## D.4 Digital I/O Sample Program

```
*****
// SuperIO relative definition (Please reference to Table 2)
#define SIOIndex 0x2E
#define SIOData 0x2F
#define DIOLDN 0x06
IOWriteByte(byte IOPort, byte Value);
IOReadByte(byte IOPort);
// DIO relative definition (Please reference to Table 3)
#define DirReg 0xA0 // 0:input, 1: output
    #define InputPin 0x00
    #define OutputPin 0x01
#define OutputReg 0xA1 // 0:low, 1: high
#define StatusReg 0xA2 // 0:low, 1: high
    #define PinLow 0x00
    #define PinHigh 0x01
#define Pin0Bit 0x00
#define Pin1Bit 0x01
#define Pin2Bit 0x02
#define Pin3Bit 0x03
#define Pin4Bit 0x04
#define Pin5Bit 0x05
#define Pin6Bit 0x06
#define Pin7Bit 0x07
*****
*****
VOID Main(){
    Boolean PinStatus ;

    // Procedure : AaeonReadPinStatus
    // Input :
    // Example, Read Digital I/O Pin 3 status
    // Output :
    // InputStatus :
    // 0: Digital I/O Pin level is low
    // 1: Digital I/O Pin level is High
    PinStatus = AaeonReadPinStatus(Pin3Bit);

    // Procedure : AaeonSetOutputLevel
```

```

// Input :
// Example, Set Digital I/O Pin 2 to high level
AaeonSetOutputLevel(Pin2Bit, PinHigh);
}
*****

*****

Boolean AaeonReadPinStatus(byte PinBit){
    Boolean PinStatus ;
    PinStatus = SIOBitRead(DIOLDN, StatusReg, PinBit);
    Return PinStatus ;
}

VOID AaeonSetOutputLevel(byte PinBit, byte Value){
    ConfigDioMode(PinBit, OutputPin);
    SIOBitSet(DIOLDN, OutputReg, PinBit, Value);
}
*****

*****VOID
SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
}

```



```

        IOWriteByte(SIOData, TmpValue);
        SIOExitMBPnPMode();
    }

VOID  SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}
*****

*****

Boolean  SIOBitRead(byte LDN, byte Register, byte BitNum){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= (1 << BitNum);
    SIOExitMBPnPMode();
    If(TmpValue == 0)
        Return 0;
    Return 1;
}

VOID  ConfigDioMode(byte PinBit, byte Mode){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(DIOLDN);
    IOWriteByte(SIOIndex, DirReg);
    TmpValue = IOReadByte(SIOData);
    TmpValue |= (Mode << PinBit);
    IOWriteByte(SIOData, DirReg);
    SIOExitMBPnPMode();
}
*****

```

# Appendix E

---

Mating Connectors and Cables

## E.1 Mating Connectors and Cables

| Connector Label | Function                | Mating Connector |                 | Available Cable      | Cable P/N  |
|-----------------|-------------------------|------------------|-----------------|----------------------|------------|
|                 |                         | Vendor           | Model no        |                      |            |
| CN1             | External RTC Connector  | Molex            | 51021-0200      | Battery Cable        | 175011901C |
| CN6             | LVDS Connector          | HIROSE           | DF13-30DS-1.25C | N/A                  | N/A        |
| CN7             | LVDS Inverter Connector | JST              | PHR-5           | N/A                  | N/A        |
| CN14            | SATA Connector          | Molex            | 88750-5318      | SATA Cable           | 1709070500 |
| CN15            | +5Vout Connector        | JST              | PHR-2           | 2 Pins For HDD Power | 1702150155 |
| CN20            | USB Port Connector      | Molex            | 51021-0500      | USB Wafer Cable      | 1700050207 |
| CN21            | USB Port Connector      | Molex            | 51021-0500      | USB Wafer Cable      | 1700050207 |
| CN22            | Audio Connector         | Molex            | 51021-1000      | Audio Cable          | 1709100254 |
| CN23            | Touch Screen Connector  | JST              | SHR-9V-S-B      | N/A                  | N/A        |
| CN24            | Digital I/O Connector   | Neltron          | 2026B-10        | N/A                  | N/A        |
| CN25            | COM Port 1 Connector    | Molex            | 51021-0900      | Serial Port Cable    | 1701090150 |
| CN26            | COM Port 4 Connector    | Molex            | 51021-0900      | Serial Port Cable    | 1701090150 |
| CN27            | COM Port 2 Connector    | Molex            | 51021-0900      | Serial Port Cable    | 1701090150 |
| CN28            | COM Port 3 Connector    | Molex            | 51021-0900      | Serial Port Cable    | 1701090150 |

|      |  |                   |            |             |            |
|------|--|-------------------|------------|-------------|------------|
| CN30 | +9~36V Vin Connector                   | N/A               | N/A        | Power Cable | 1702002010 |
| CN32 | External +5VSB Power output and PS_ON# | Catch Electronics | 2418HJ-06  | N/A         | N/A        |
| CN33 | External +5VSB Power Input and PS_ON#  | JST               | PHR-3      | ATX Cable   | 170220020B |
| CN36 | CPU Fan Connector                      | Molex             | 22-01-2035 | N/A         | N/A        |