

# **AEMQ87-953**

Intel® Q87 Express Chipset

## **ATX Motherboard**

### **User's Manual**

**Rev: 6.0**

Release date: October 1, 2019

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- \* Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.



## **Environmental Safety Instruction**

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.
- 0 to 40 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)
- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.
- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.
- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

## **Environmental Protection Announcement**

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



## **User's Notice**

Copyright of this manual belongs to the manufacturer. No part of this manual, including the products and software described in it may be reproduced, transmitted or translated into any language in any form or by any means without written permission of the manufacturer.

This manual contains all information required to use this mother-board series and we do assure this manual meets user's requirement but will change, correct any time without notice. Manufacturer provides this manual "as is" without warranty of any kind, and will not be liable for any indirect, special, incidental or consequential damages (including damages for loss of profit, loss of business, loss of use of data, interruption of business and the like).

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## **Manual Revision Information**

<b>Reversion</b>	<b>Revision History</b>	<b>Date</b>
6.0	Sixth Edition	October 1, 2019

## **Item Checklist**

- ✓ Motherboard
- ✓ Cable(s)
- ✓ I/O Back panel shield

## Chapter 1 Introduction of the Motherboard

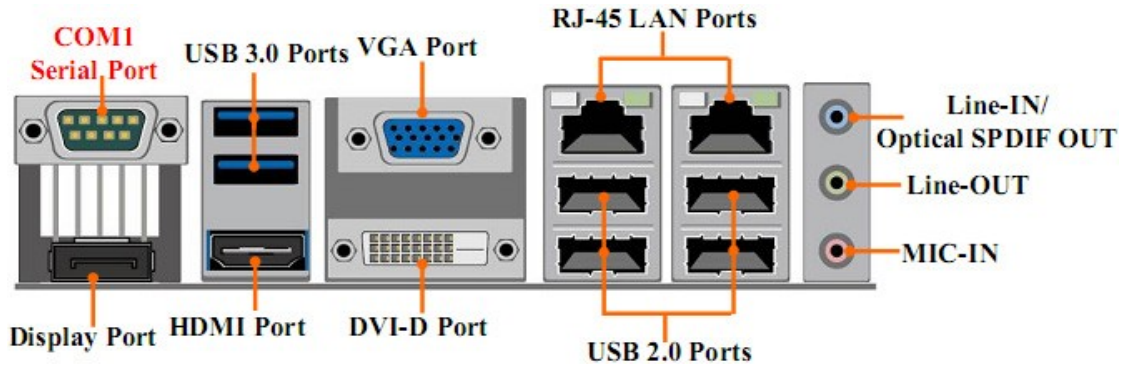
### 1-1 Specification

Spec	Description
<b>Design</b>	<ul style="list-style-type: none"> <li>● ATX form factor; PCB size: 30.5×24.5 cm</li> </ul>
<b>Chipset</b>	<ul style="list-style-type: none"> <li>● Intel® Q87 Express Chipset</li> </ul>
<b>CPU Socket</b>	<ul style="list-style-type: none"> <li>● Supports Intel® Core™ i7, Core™ i5, Core™ i3 series, Pentium® processor in LAG1150 Package (Max. 65W TDP)</li> </ul>
<b>Memory Slot</b>	<ul style="list-style-type: none"> <li>● DDRIII RAM module slot×4</li> <li>● Supporting four DDRIII 1600/1333/1066MHz RAM Module expandable to 32 GB (Maximum)</li> <li>● Support dual-channel function</li> </ul>
<b>Expansion Slots</b>	<ul style="list-style-type: none"> <li>● 1 pcs×PCI-Expressx16 slot (PE1)</li> <li>● 1 pcs×PCI-Expressx4 slot (PE2)</li> <li>● 1 pcs×PCI-Expressx1 slot (PE3)</li> <li>● 4 pcs×32-bit PCI slot</li> <li>● 1 pcs×Full-size Mini-PCIE slot (PE4)</li> <li>● 1 pcs×Full-size MSATA slot</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>● 6×SATAIII 6Gb/s ports support RAID 0, 1, 5, 10 function</li> </ul>
<b>Dual LAN Chips</b>	<ul style="list-style-type: none"> <li>● Integrated Intel® 82574L and i217-LM Gigabit Ethernet LAN chip that supports Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate</li> </ul>
<b>HD Audio Chip</b>	<ul style="list-style-type: none"> <li>● Realtek ALC662 6-channel Audio Codec integrated</li> <li>● Audio driver and utility included</li> </ul>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>● 64M Bit DIP Flash ROM</li> </ul>
<b>Multi I/O</b>	<p><b>Rear Panel I/O:</b></p> <ul style="list-style-type: none"> <li>● 1×RS 232/422/485 Serial port connector (COM1)</li> <li>● 1×Display port connector</li> <li>● 1×HDMI port connector</li> <li>● 1×DVI-D port connector</li> <li>● 1×VGA port connector</li> </ul>

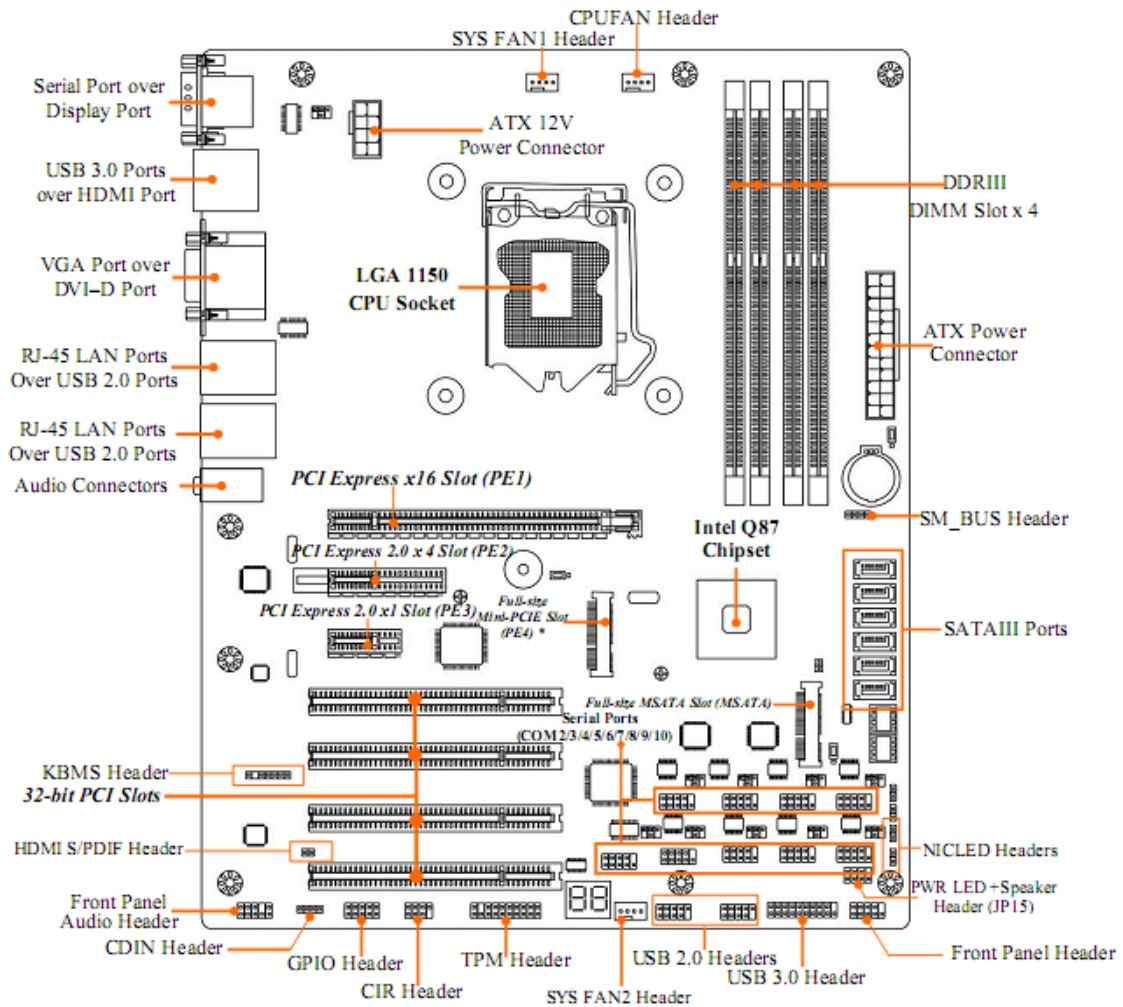
- 2×USB 3.0 port connector
  - 4×USB 2.0 port connector
  - 2×RJ-45 LAN connector
  - 3×Audio connector (Line-in, Line-out, MIC)
- Internal I/O Connectors & Headers:**
- 1×24-pin main power connector
  - 1×8-pin 12V Power connector
  - 1×Front panel audio header
  - 1×CDIN header
  - 1×HDMI-SPDIF header
  - 1×PS/2 KB & MS header
  - 1×GPIO header
  - 1×CIR header
  - 1×TPM 1.2 header
  - 1×USB 3.0 header (support two expansion USB 3.0 ports)
  - 2×USB 2.0 header (support four expansion USB 2.0 ports)
  - 1×Front panel header
  - 1×POWER LED1 & 1×Speaker header
  - 1×RS 232/422/485 serial port header (COM2)
  - 8×RS 232/422/485 serial port header (COM3/4/5/6/7/8/9/10)
  - 1×SM\_BUS header
  - 2×LANLED header
  - 3×Fan header

## 1-2 Layout Diagram

### Rear IO Diagram



### Motherboard Internal Diagram



**\*Notice:**

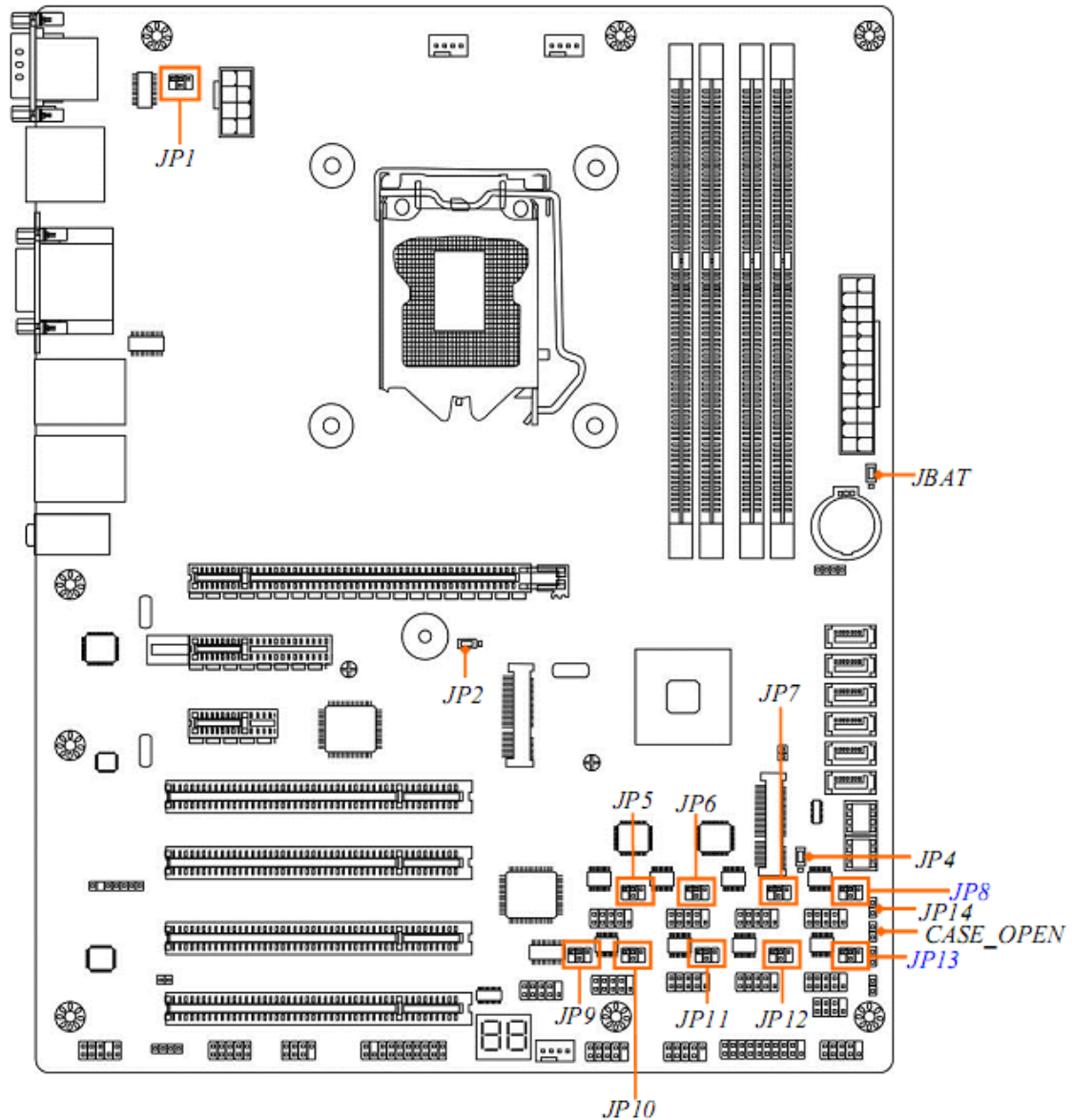
1. PE4 slot functions as full-size Mini-PCIE slot and shares function with



PE3, i.e. only one can function at a time.

- MSATA slot shares function with SATA6 port; user can only choose one to use at one time.

### Motherboard Jumper Position



### Jumper

Jumper	Name	Description
JP1	COM1 Port Pin9 Function Select	4-pin Block
JP9	COM2 Header Pin9 Function Select	4-pin Block
JP5	COM3 Header Pin9 Function Select	4-pin Block
JP6	COM5 Header Pin9 Function Select	4-pin Block

## Chapter 1 Introduction of the Motherboard

Jumper	Name	Description
JP7	COM7 Header Pin9 Function Select	4-pin Block
JP8	COM9 Header Pin9 Function Select	4-pin Block
JP10	COM4 Header Pin9 Function Select	4-pin Block
JP11	COM6 Header Pin9 Function Select	4-pin Block
JP12	COM8 Header Pin9 Function Select	6-pin Block
JP13	COM10 Header Pin9 Function Select	6-pin Block
JP14	ME_Features Select	2-pin Block
JBAT	CMOS RAM Clear Function Setting	3-pin Block
JP2	Mini PCI-E Slot (PE4)VCC3.3V/3.3VSB Select	3-pin Block
JP4	MSATA Slot (MSATA)VCC3.3V/3.3VSB Select	3-pin Block
Case_OPEN	Case Open Message Display Function Select	2-pin Block

### Connectors

Connector	Name
ATXPWR	ATX Power Connector
ATX12V	ATX 12V Power Connector
COM1	RS232/422/485 Serial Port Connector
DP	Display Port
USB1	USB 3.0 Connector × 2
HDMI	High-Definition Multimedia Interface
CRT	Video Graphic Attach Connector
DVI1	DVI-D Port Connector
UL1(Top)/UL2(Top)	RJ-45 LAN Connector × 2
UL1(Middle & Bottom)/ UL2(Middle & Bottom)	USB 2.0 Port Connector × 4
AUDIO	Line Out /Line In /MIC Audio Connector
SATA1/2/3/4/5/6	SATAIII Connector × 6

### Headers

Header	Name	Description
FP_AUDIO	Front Panel Audio Header	9-pin Block
CD_IN	CD Audio-In Header	4-pin Block

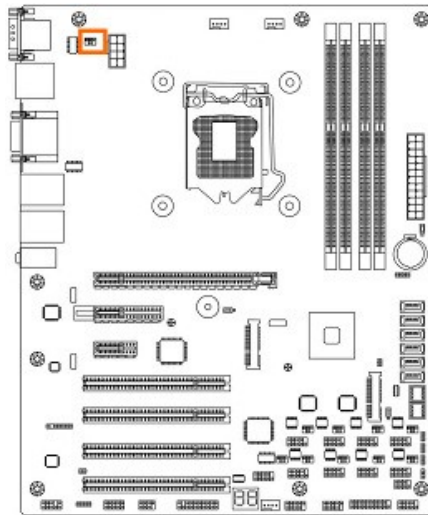
## Chapter 1 Introduction of the Motherboard

Header	Name	Description
HDMI_SPDIF	HDMI_SPDIF Out Header	2-pin Block
KBMS	PS/2 Keyboard & Mouse Header	6-pin Block
GPIO_CON	GPIO Header	10-pin Block
CIR_CON	CIR Header	7-pin Block
TPM	TPM Header	19-pin Block
USB2	USB 3.0 Header	19-pin Block
USB3/USB4	USB 2.0 Header	9-pin Block
JW_FP (Front Panel Header)	PWR LED / HD LED / Power Button / Reset	9-pin Block
JP15	Power LED+ Speaker Header	7-pin Block
COM2	RS232/422/485 Serial Port Header	9-pin Block
COM 3/4/5/6/7/8/9/10	RS232 Serial Port Header	9-pin Block
SM_BUS	SMBUS Header	4-pin Block
NIC_LED1/ NIC_LED2	LANLED Activity Header	2-pin Block
SYSFAN1/SYS FAN2/CPUFAN	FAN Header	4-pin Block

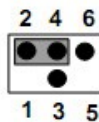
## Chapter 2 Hardware Installation

### 2-1 Jumper Setting

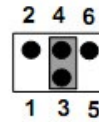
#### JP1 (4-pin): COM1 Port Pin9 Function Select



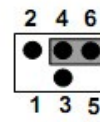
JP1→COM1 Port



2-4 Closed:  
RI=RS232

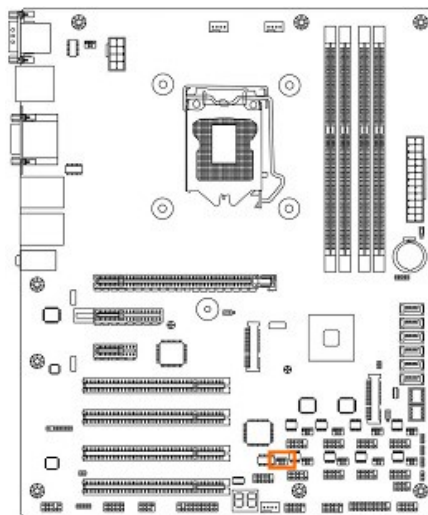


3-4 Closed:  
RI= 5V;

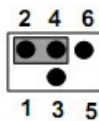


4-6 Closed:  
RI= 12V;

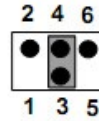
#### JP9 (4-pin): COM2 Header Pin9 Function Select



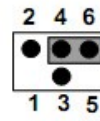
JP9→COM2 Header



2-4 Closed:  
RI=RS232

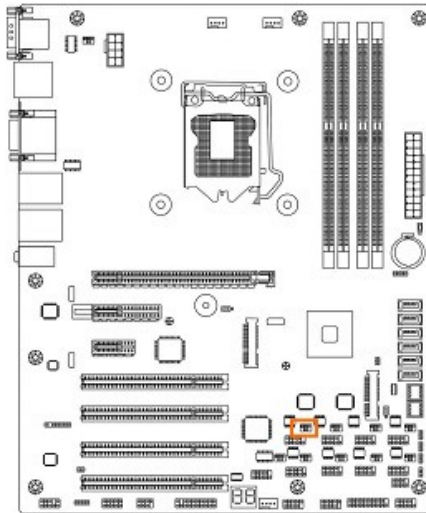


3-4 Closed:  
RI= 5V;

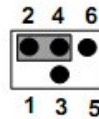


4-6 Closed:  
RI= 12V;

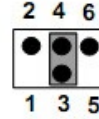
**JP5 (4-pin): COM3 Header Pin9 Function Select**



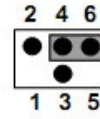
**JP5→COM3 Header**



**2-4 Closed:**  
RI=RS232

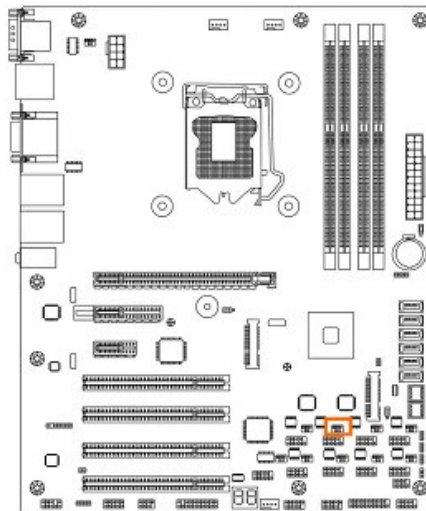


**3-4 Closed:**  
RI= 5V;

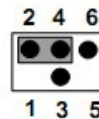


**4-6 Closed:**  
RI= 12V;

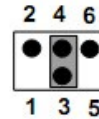
**JP6 (4-pin): COM5 Header Pin9 Function Select**



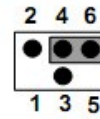
**JP6→COM5 Header**



**2-4 Closed:**  
RI=RS232

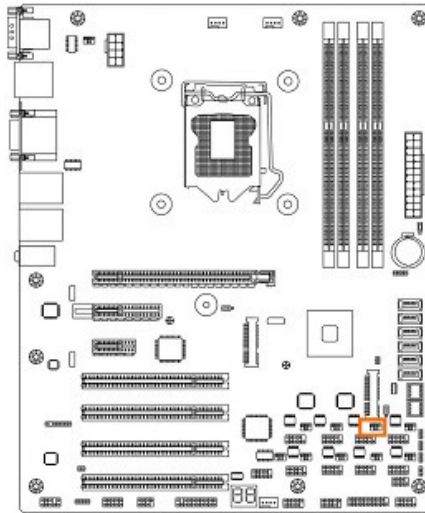


**3-4 Closed:**  
RI= 5V;

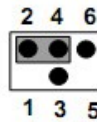


**4-6 Closed:**  
RI= 12V;

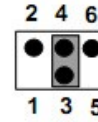
**JP7 (4-pin): COM7 Header Pin9 Function Select**



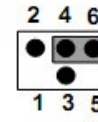
**JP7→COM7 Header**



**2-4 Closed:  
RI=RS232**

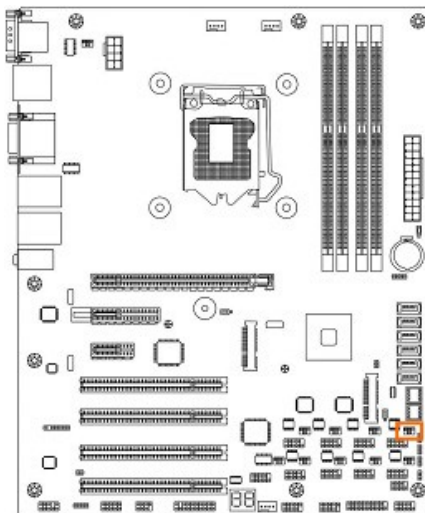


**3-4 Closed:  
RI= 5V;**

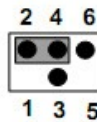


**4-6 Closed:  
RI= 12V;**

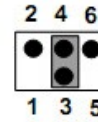
**JP8 (4-pin): COM9 Header Pin9 Function Select**



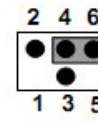
**JP8→COM9 Header**



**2-4 Closed:  
RI=RS232**

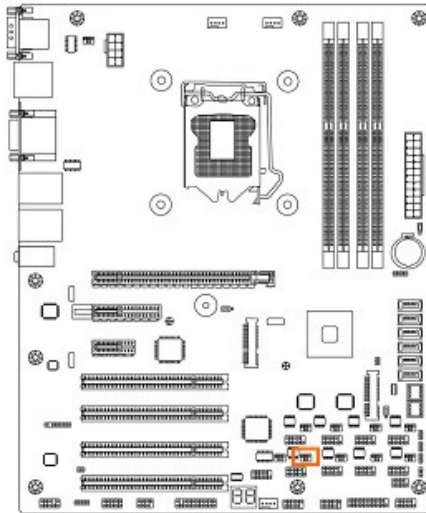


**3-4 Closed:  
RI= 5V;**

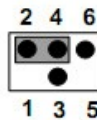


**4-6 Closed:  
RI= 12V;**

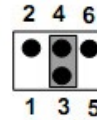
**JP10 (4-pin): COM4 Header Pin9 Function Select**



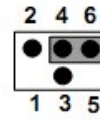
**JP10 → COM4 Header**



**2-4 Closed:**  
RI=RS232

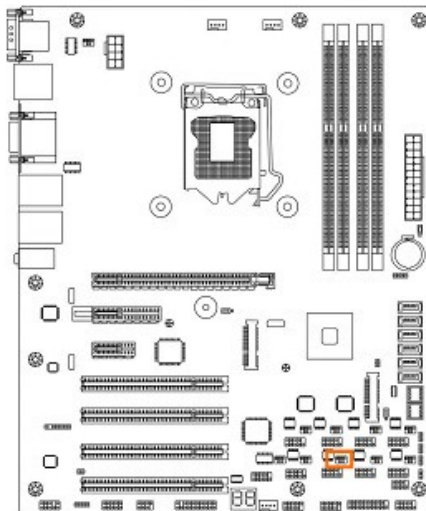


**3-4 Closed:**  
RI= 5V;

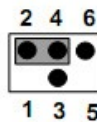


**4-6 Closed:**  
RI= 12V;

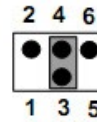
**JP11 (4-pin): COM6 Header Pin9 Function Select**



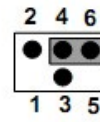
**JP11 → COM6 Header**



**2-4 Closed:**  
RI=RS232

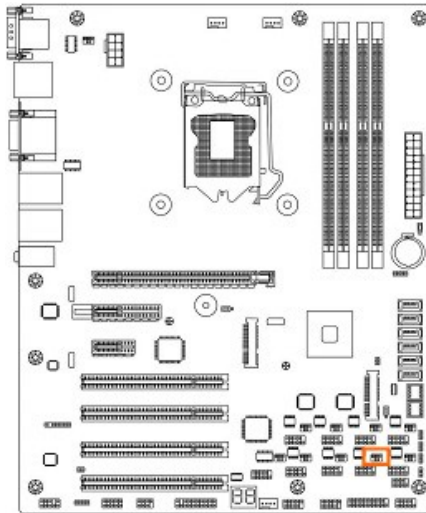


**3-4 Closed:**  
RI= 5V;

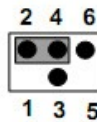


**4-6 Closed:**  
RI= 12V;

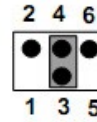
**JP12 (4-pin): COM8 Port Pin9 Function Select**



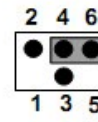
**JP12→COM8 Header**



**2-4 Closed:**  
RI=RS232

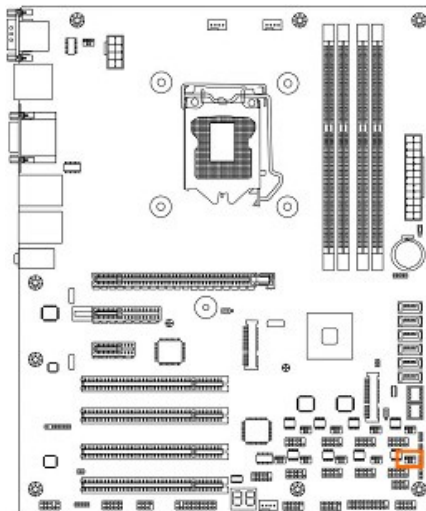


**3-4 Closed:**  
RI= 5V;

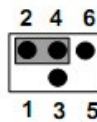


**4-6 Closed:**  
RI= 12V;

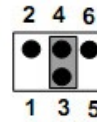
**JP13 (4-pin): COM10 Port Pin9 Function Select**



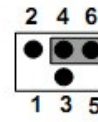
**JP13→COM10 Header**



**2-4 Closed:**  
RI=RS232



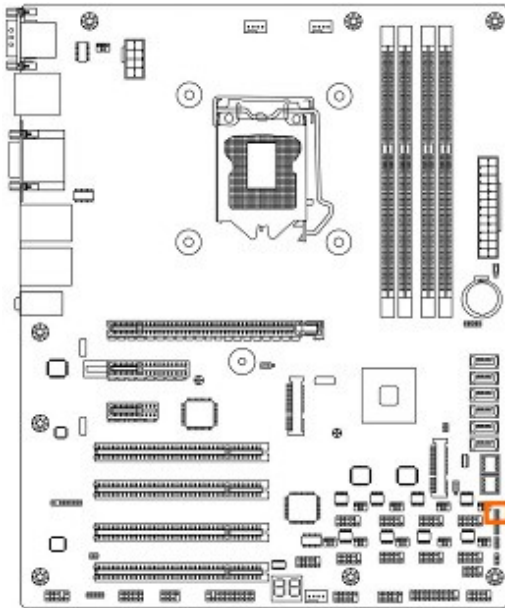
**3-4 Closed:**  
RI= 5V;



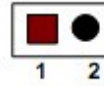
**4-6 Closed:**  
RI= 12V;



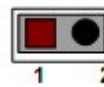
**JP14 (2-pin): ME Features Select**



**JP14**

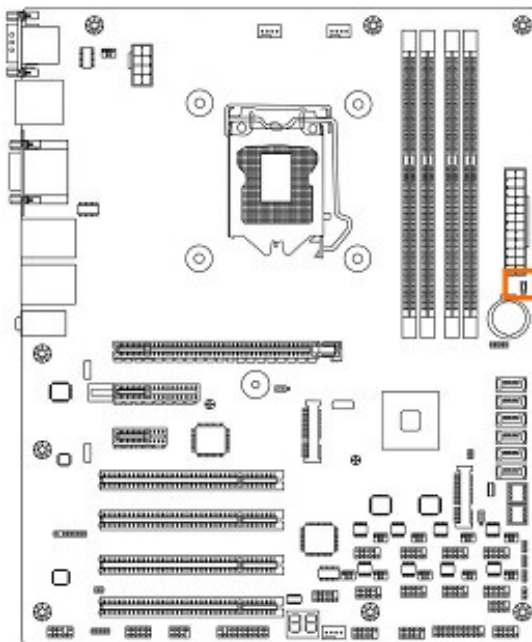


**1-2 Open:ME Features Enabled;**

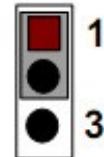


**1-2 Closed:ME Features Disabled.**

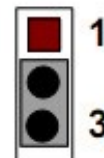
**JBAT (3-pin): Clear CMOS Function Settings**



**JBAT**

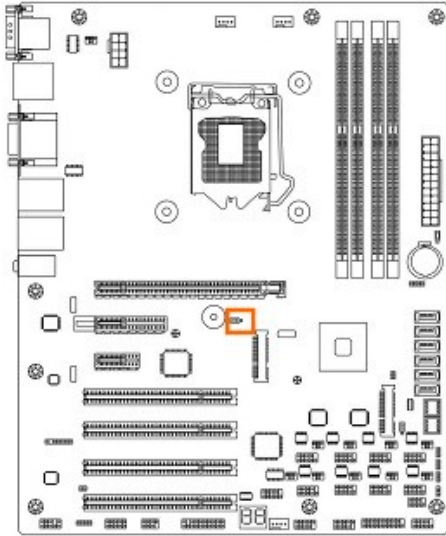


**1-2 Closed: Normal;**

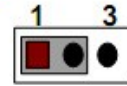


**2-3 Closed: Clear CMOS.**

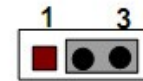
**JP2 (3-pin): Mini PCI-E (PE4) Slot VCC 3.3V/3.3 VSB Select**



**JP2 → PE4 Slot**

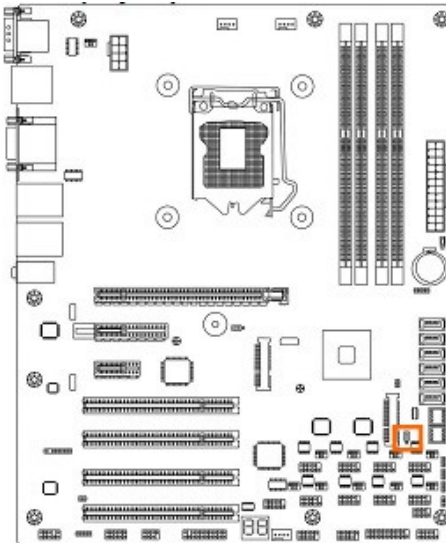


**1-2 Closed : MINI PCI-E VCC= 3.3V;**

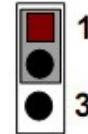


**2-3 Closed : MINI PCI-E VCC= 3.3VSB**

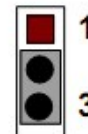
**JP4 (3-pin): MSATA Slot VCC 3.3V/3.3 VSB Select**



**JP4 → MSATA**

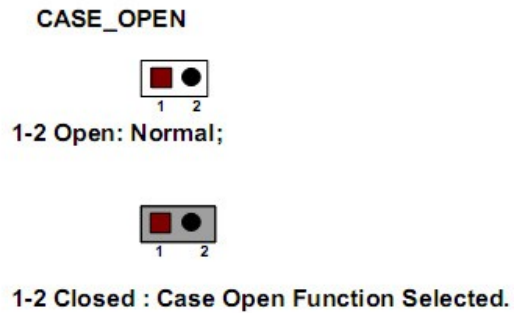
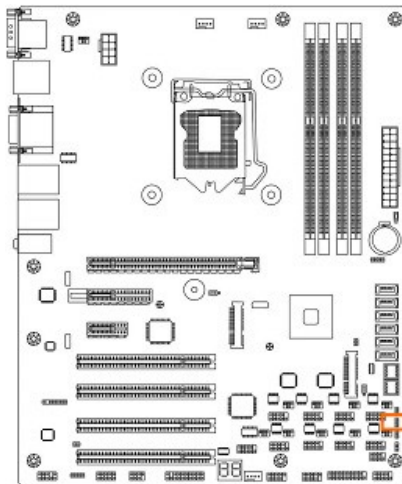


**1-2 Closed: MSATA VCC= 3.3V;**



**2-3 Closed: MSATA VCC= 3.3VSB**

**CASE\_OPEN (2-pin): Case Open Message Display Function Select**



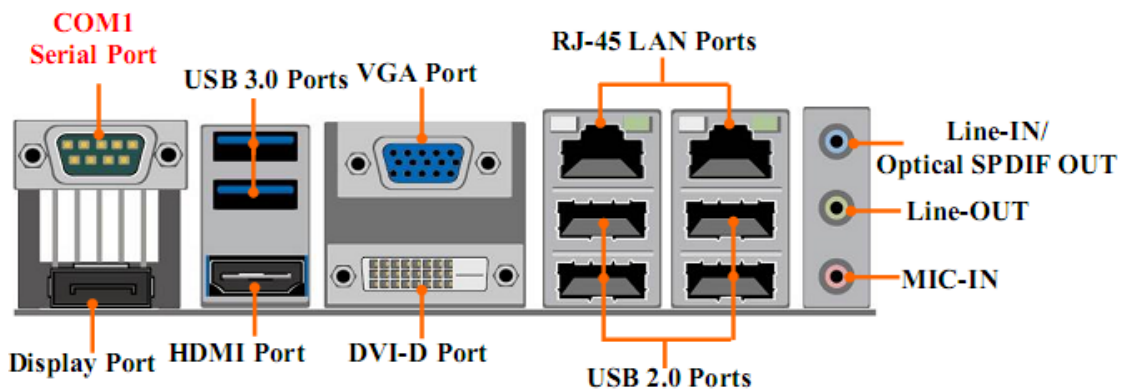
**1-2 Closed : Case Open Function Selected.**

*Pin 1-2 Closed: Case open display function enabled.*

*Use needs to enter BIOS and enable 'Case Open Detect' function. In this case if you case is removed, next time when you restart your computer a message will be displayed onscreen to inform you of this.*

**2-2 Connectors and Headers**

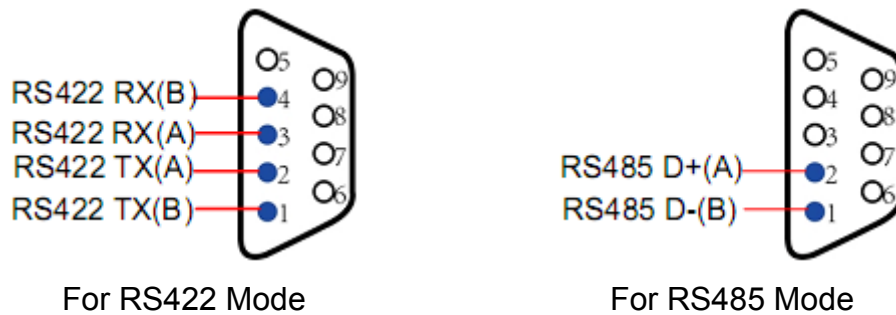
**2-2-1 Rear I/O Back Panel Connectors**



**(1) RS232/422/485 Serial port Connector: COM1**

COM1 port is for user to connect compatible mouse, modem or other peripherals. COM1 port can function as RS232/422/485 port. In normal settings COM3 functions as RS232 port. With compatible COM cable COM1 can function as RS422 or RS 485 port. User also needs to go to BIOS to set 'Transmission Mode Select' for COM1 (refer to Page 27) at first, before using

specialized cable to connect different pins of this port.



**(2) Display Port: DP**

Display port can support a maximum screen resolution of 2560 × 1600 (actual resolution depending on the monitor used) and high-quality audio playback. Please connect it to your monitor with DP cable if your monitor support display port.

**(3) USB 3.0 Port Connector: USB1**

These USB 3.0 connectors are for user to connect USB 3.0 compatible devices to the system board.

**(4) High-Definition Multimedia Interface: HDMI**

This point-to-point interface is for audio and video signals designed as a single-cable solution for home theater and consumer electronics equipment.

**(5) D-Sub 15-pin VGA Connector: CRT**

VGA connector is the 15-pin D-subminiature female connector; it is for the display devices, such as the CRT monitor, LCD monitor and so on.

**(6) Digital Visual Interface: DVI1**

This interface standard designed to maximize the visual quality of digital display devices such as flat panel LCD computer displays and digital projectors.

**(7) USB 2.0 Port Connector: UL1 (Middle & Bottom) / UL2 (Middle & Bottom)**

The connectors are 4-pin connector that connects USB devices to the system board.

**(8) RJ-45 LAN Port Connectors: UL1 (Top) / UL2 (Top)**

The connectors are standard RJ-45 connectors for Network.

**(9) Line-In (SPDIF Out), Lin-Out, MIC Audio connectors: AUDIO1**

These Connectors are 3 Phone-Jack for LINE-OUT, LINE-IN, MIC audio connections.

Color	Name	Function
Blue	Line-in/SPDIF Out	Audio input to sound chip/SPDIF Out Connector

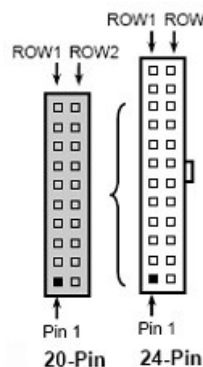
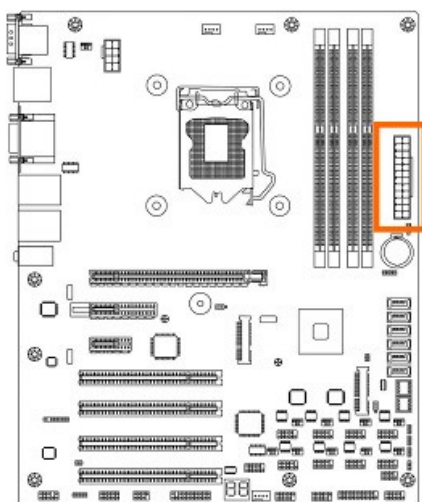
Color	Name	Function
Green	Line-out	Audio output to speaker
Pink	MIC	Microphone Connector

### 2-2-2 Motherboard Internal Connectors

#### (1) ATXPWR (24-pin block): Main Power Connector

ATX Power Supply connector: This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows using soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

- \*\* We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.
- \*\* If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.
- \*\* If you are using a 20-pin power plug, please refer to Figure1 for power supply connection. Power plug form power supply and power connectors from motherboard both adopt key design to avoid mistake installation. You can insert the power plug into the connector with ease only in the right direction. If the direction is wrong it is hard to fit in and if you make the connection by force if is possible.



PIN	ROW1	ROW2
1	+3.3V	+3.3V
2	+3.3V	-12V
3	GND	GND
4	+5V	Soft Power on
5	GND	GND
6	+5V	GND
7	GND	GND
8	Power OK	-5V

24-pin Main Power Connector

9	+5V Stand by	+5V
10	+12V	+5V
11	+12V	+5V
12	+3.3V	GND

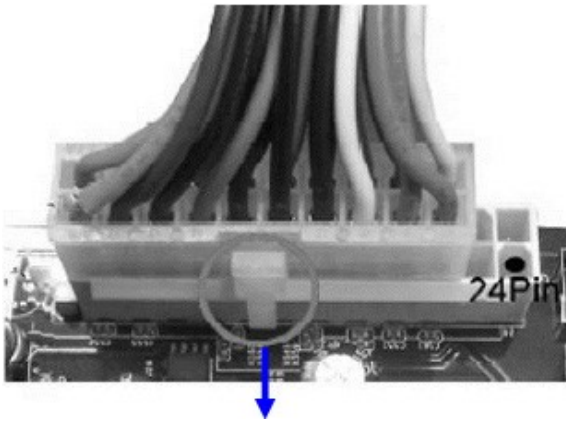


Figure 1: 20-pin power plug

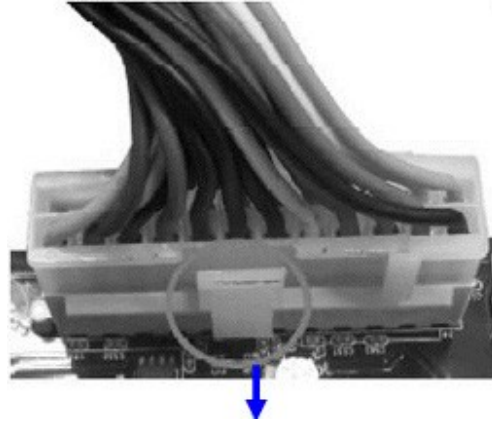
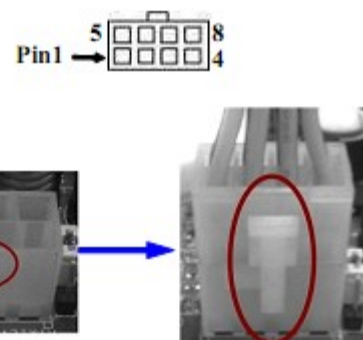
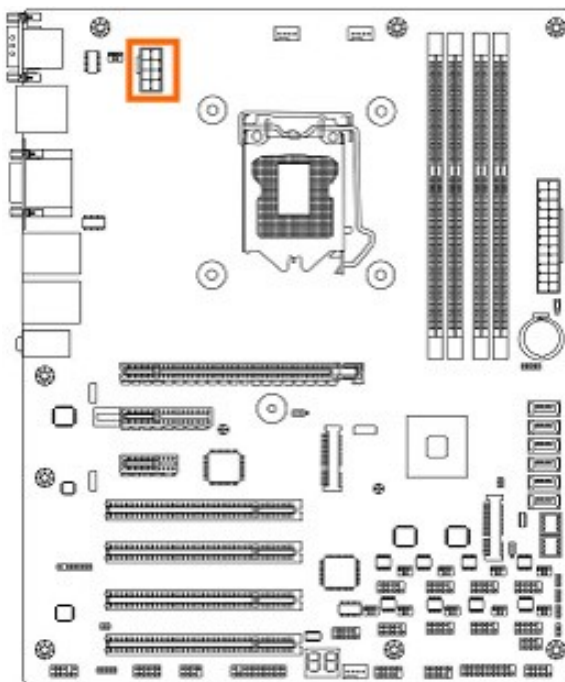


Figure 2: 24-pin power plug

**(2) ATX12V (8-pin block): 12V Power Connector**

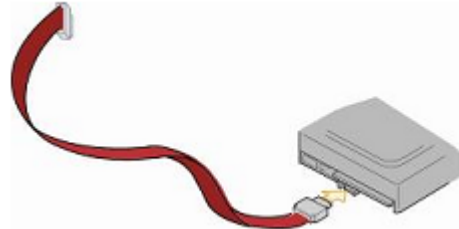
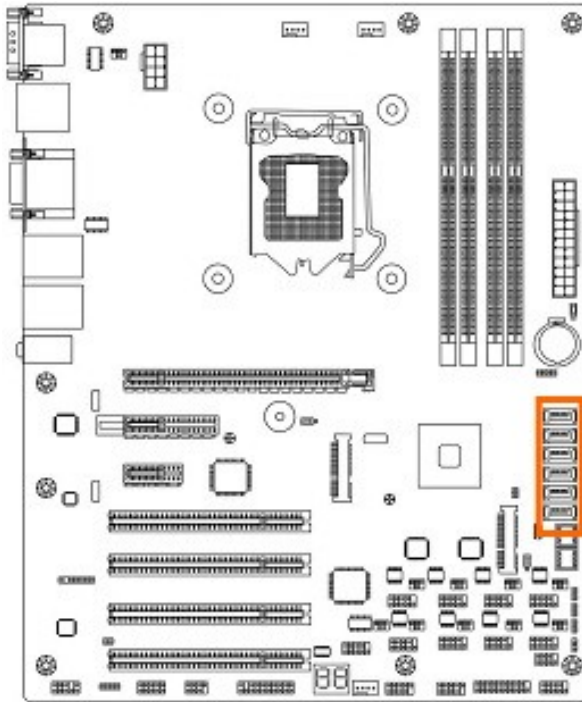
This is a new defined 8-pin connector that usually comes with ATX Power Supply that supports extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.



Pin	Definition	No.	Definition
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

**(3) SATA1/2/3/4/5/6: SATAIII Port connector**

These connectors are high-speed SATAIII ports that support 6 GB/s transfer rate.

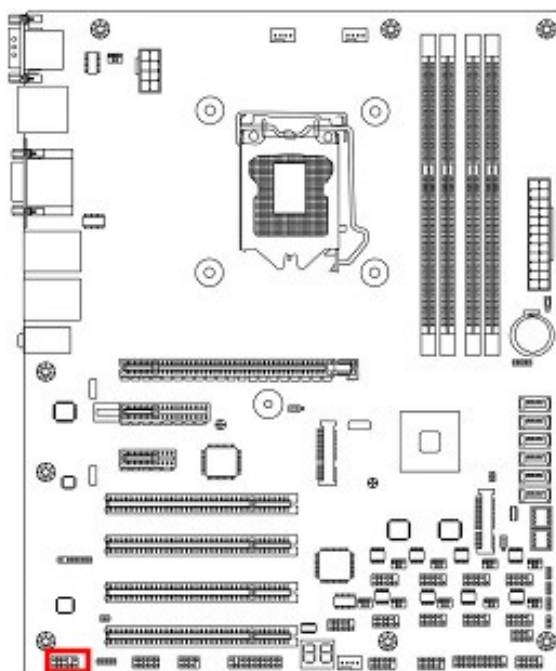


Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

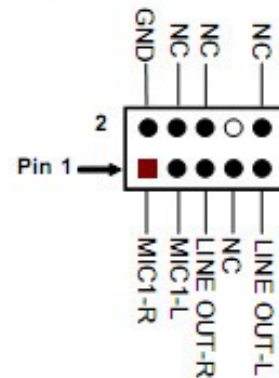
**2-2-3 Header Pin Definition**

**(1) FP\_AUDIO (9-pin): Line-Out, MIC-In Header**

This header is connected to Front Panel Line-out, MIC connector with cable.



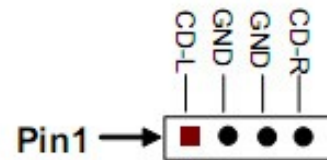
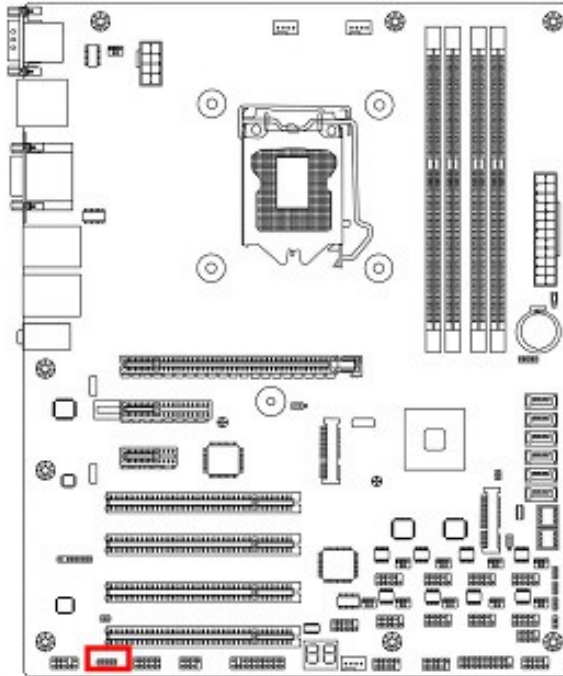
FP\_AUDIO



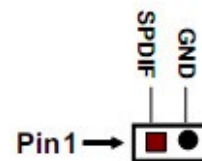
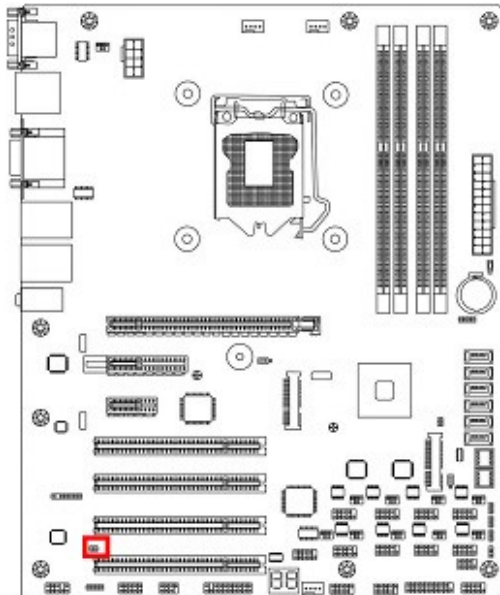
Line-Out, MIC Header

**(2) CD\_IN (4-pin): CD AUDIO-In Header**

CDIN header is for CD-Audio Input signal. Please connect it to CD-ROM CD Audio output connector.



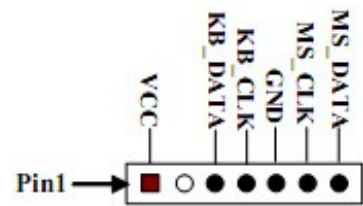
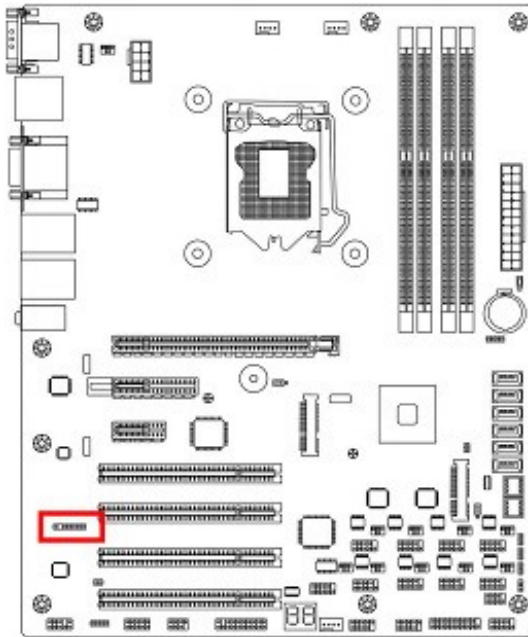
**(3) HDMI\_SPDIF (2-pin): HDMI-SPDIF Out header**



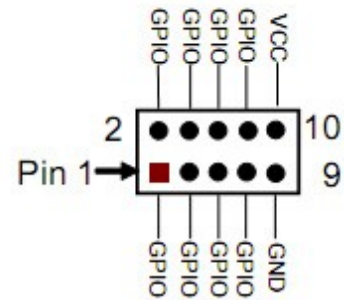
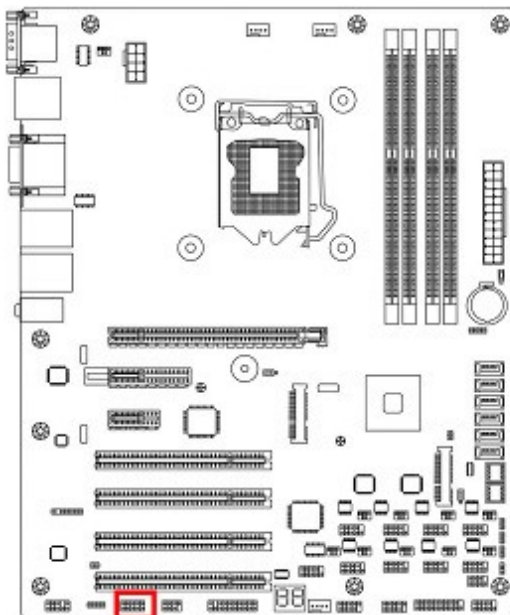
**HDMI\_SPDIF Header**



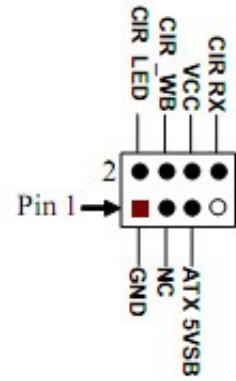
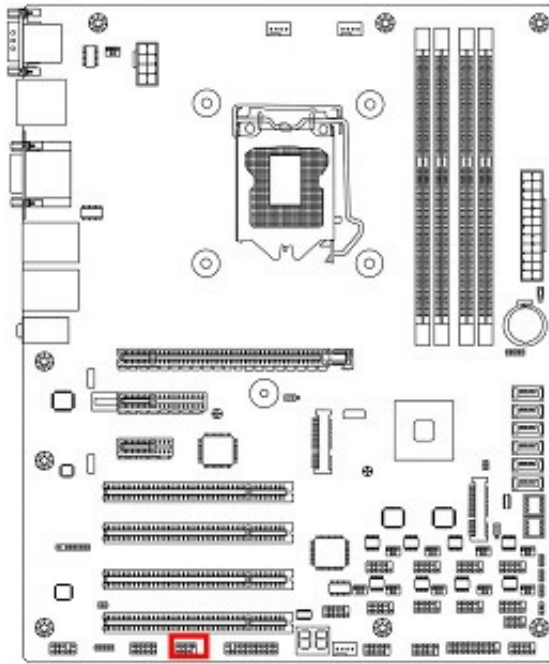
(4) KBMS (6-pin): PS/2 Keyboard & Mouse Header



(5) GPIO\_CON (10-pin): GPIO Header

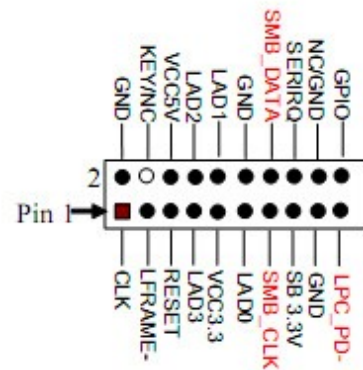
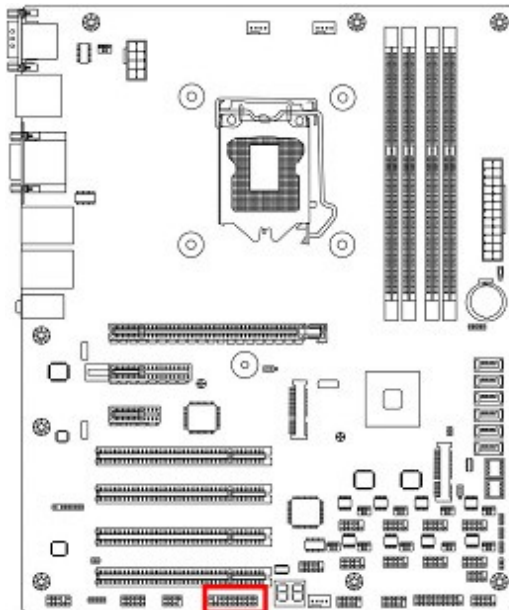


(6) CIR\_CON (7-Pin): CIR Header

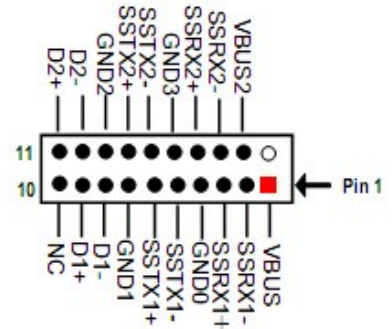
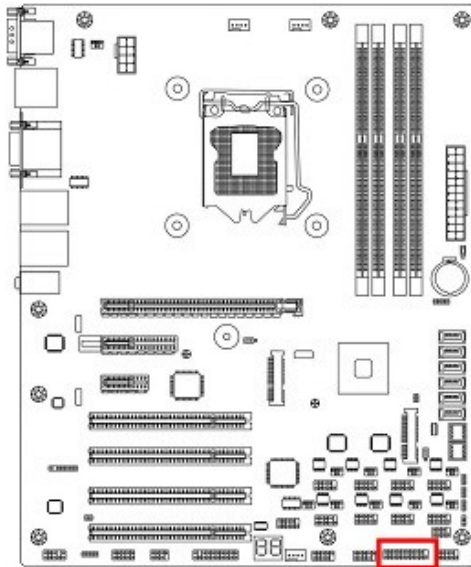


CIR Header

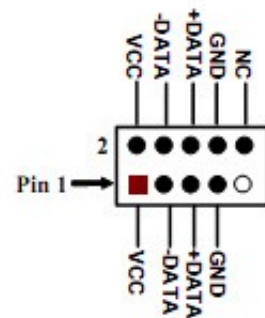
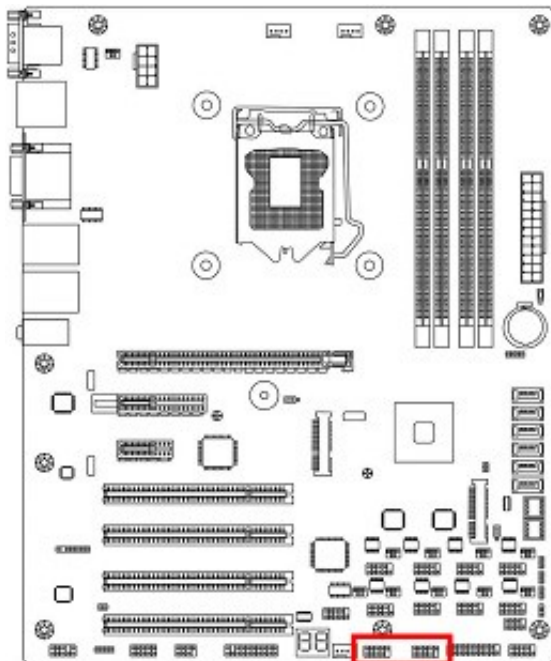
(7) TPM (19-pin): TPM Header



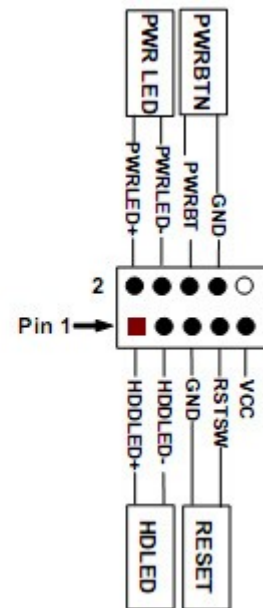
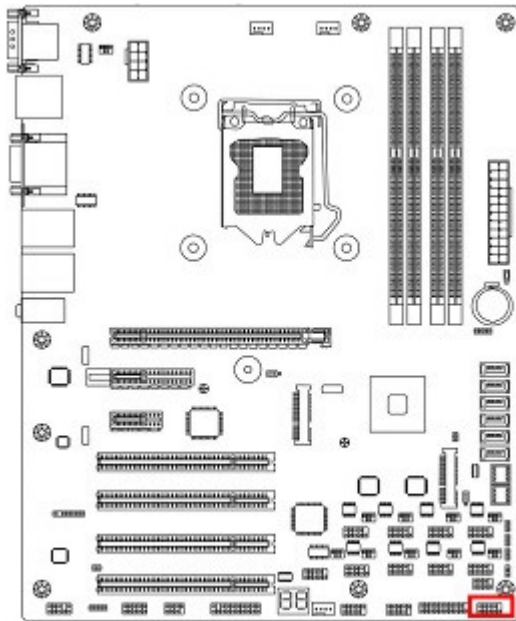
(8) USB 3.0 Port Header (19-pin): USB2



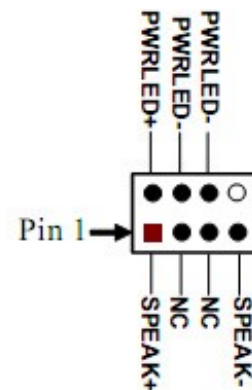
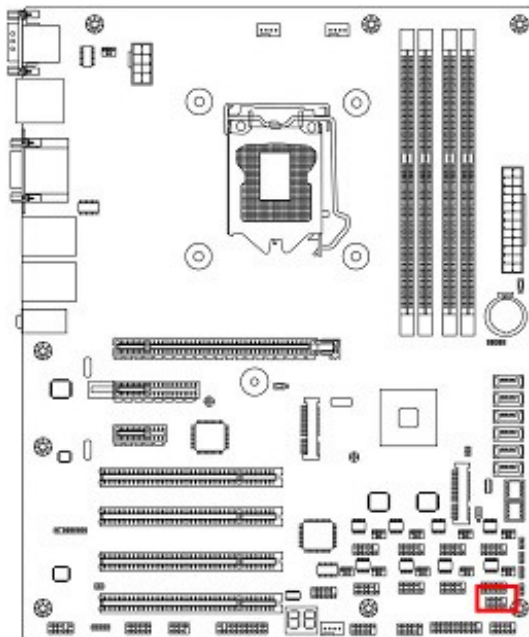
(9) USB 2.0 Port Headers (9-pin): USB3/USB4



(10) JW-FP (9-pin): Front Panel Header



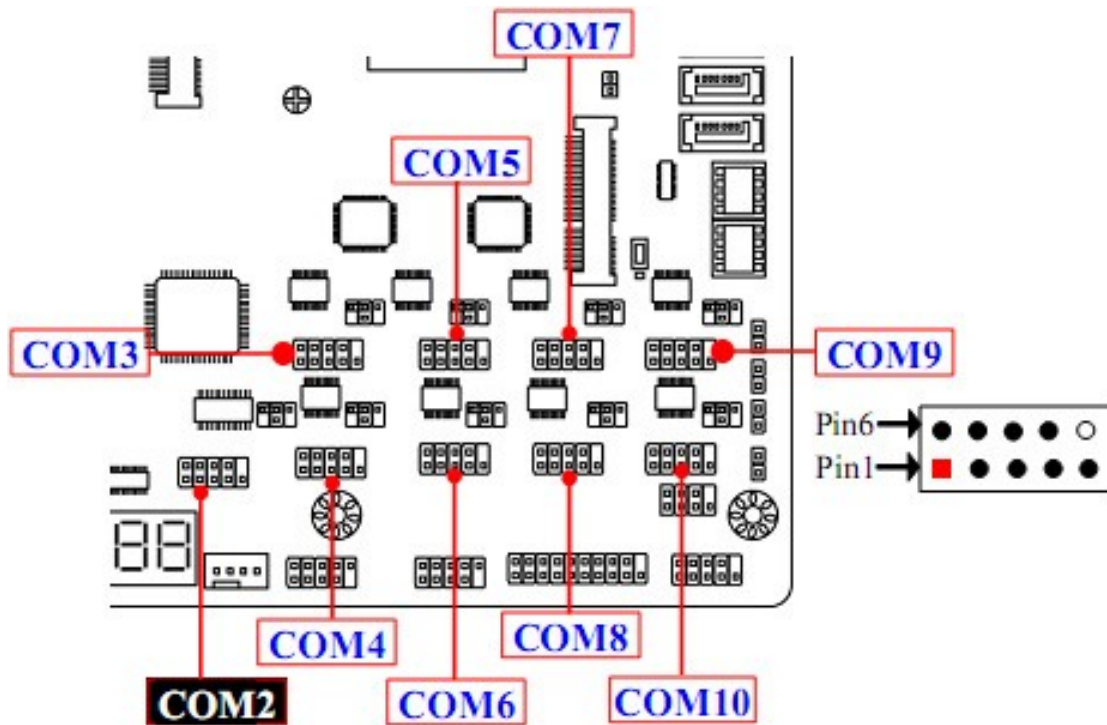
(11) JP15 (7-pin): PWR LED Header & Speaker Header



**(12) COM2/3/4/5/6/7/8/9/10 (9-Pin): Serial Port Header**

COM2:RS232/422/485 serial port header;

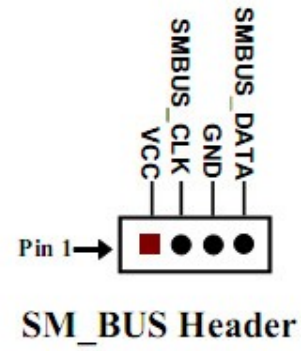
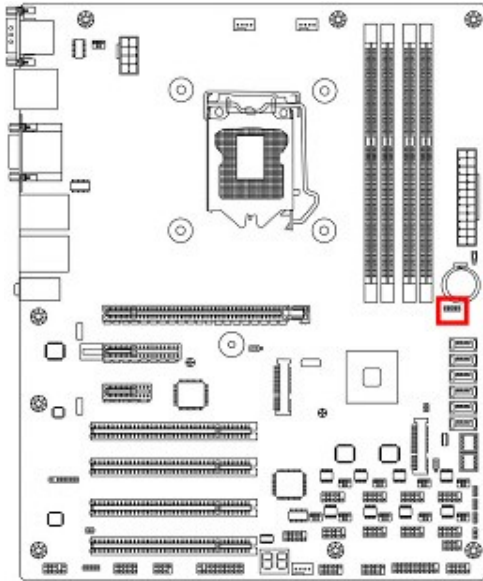
COM3/4/5/6/7/8/9/10: RS232 serial port header only;



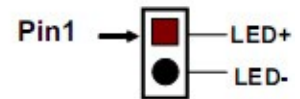
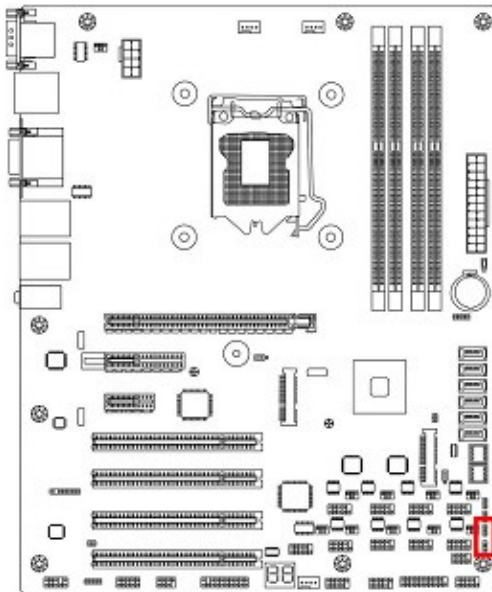
Pin NO.	RS232	*RS422 (COM2 only)	*RS485 (COM2 only)
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

*In most cases COM2 serves as RS232 serial port. For RS422 & RS485 function user also needs to go to BIOS to set 'Transmission Mode Select' as [RS422] or [RS485] before connecting compatible COM cable to corresponding header.*

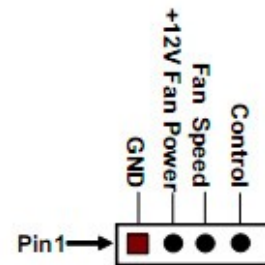
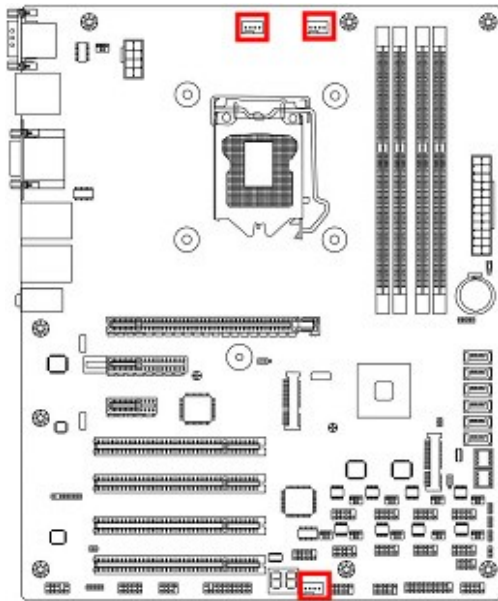
(13) SM\_BUS (4-pin): SM BUS Header



(14) NIC\_LED1/ NIC\_LED2 (2-pin): LANLED Header

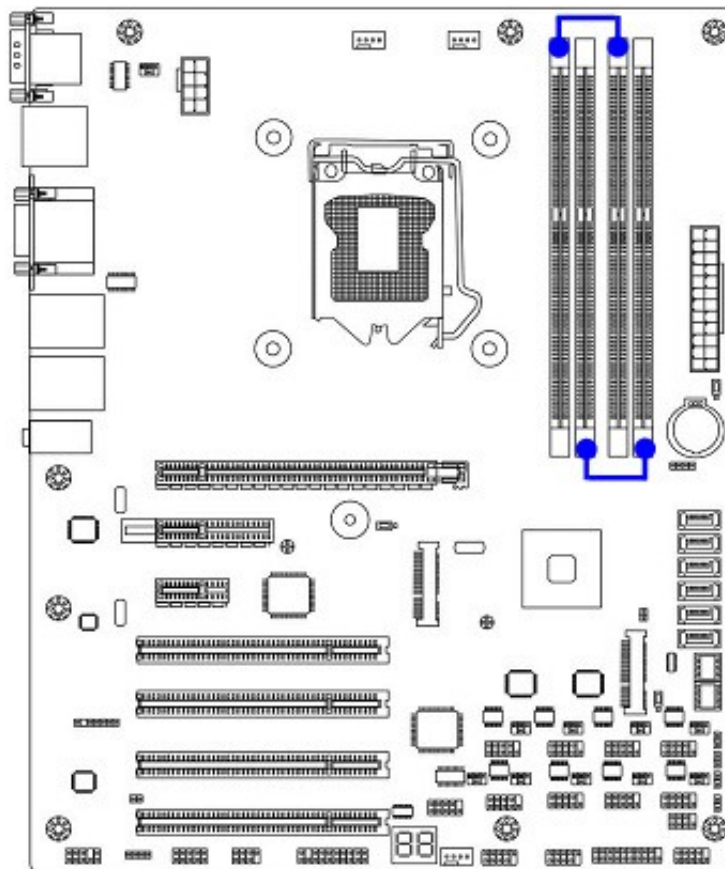


(15) SYSFAN1/SYSFAN2/CPUFAN1 (4-pin): FAN Headers



CPUFAN/SYSFAN1/SYSFAN2

(16) Dual Channel Memory Installation



<b>config</b>	<b>Slot 1</b>	<b>Slot 2</b>	<b>Slot 3</b>	<b>Slot 4</b>
1	install	--	install	--
2	--	install	--	install
3	install	install	install	install

**Notice!**

- For dual channel installation, you need to install the same brand, speed, size and type memory module.
- It is unable to activate dual channel feature if you install one or three memory modules, or you install slot 1 & slot 4 / slot 2 & slot 3. Slot order can be from left- to-right or right-to-left, and it must be installed in pairs.
- If you install memory modules in wrong direction, it will damage the motherboard and memory module.



## Chapter 3 Introducing BIOS

**Notice!** The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard.

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

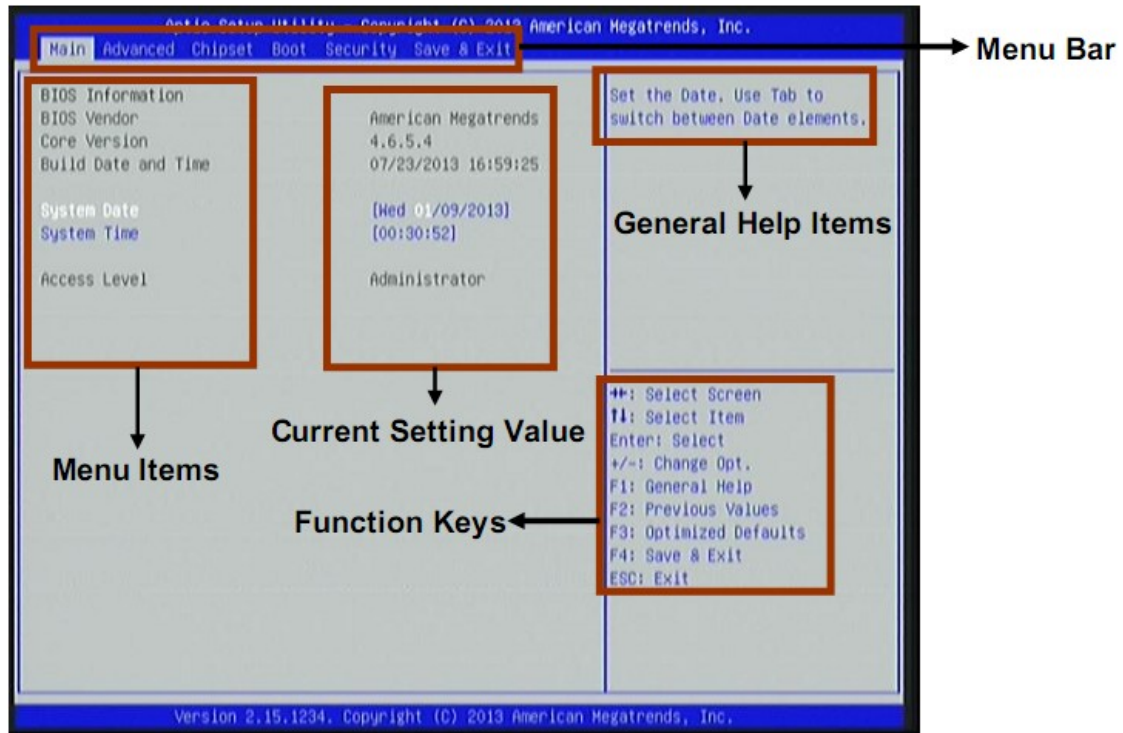
### 3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press <Del> to enter Setup.

### 3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



BIOS Menu Screen

### 3-3 Function Keys

In the above BIOS Setup main menu of, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press ← → (left, right) to select screen;
- Press ↑ ↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press <Enter> to select.
- Press <+>/<-> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F2]: Previous value.
- [F3]: Optimized defaults.
- [F4]: Save & Reset.
- Press <Esc> to quit the BIOS Setup.

### **3-4 Getting Help**

#### **Main Menu**

The on-line description of the highlighted setup function is displayed at the top right corner the screen.

#### **Status Page Setup Menu/Option Page Setup Menu**

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

### **3-5 Menu Bars**

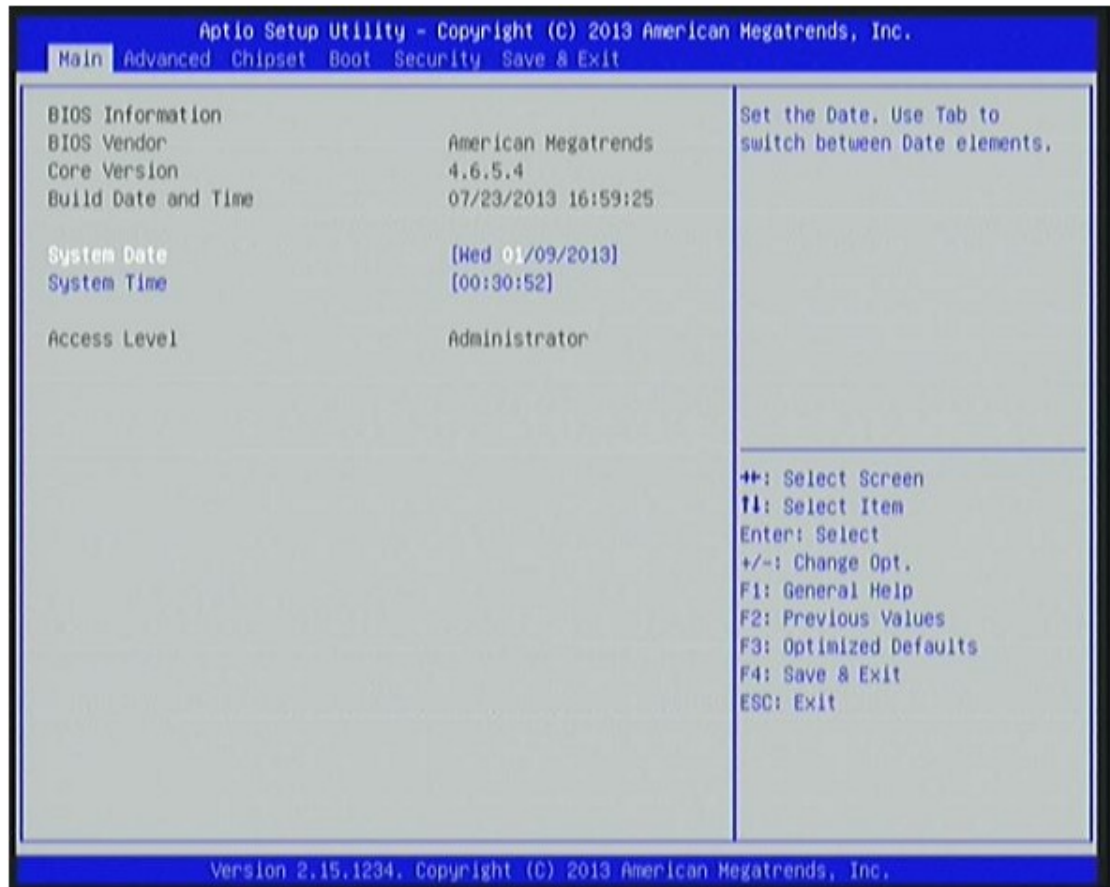
**There are six menu bars on top of BIOS screen:**

<b>Main</b>	To change system basic configuration
<b>Advanced</b>	To change system advanced configuration
<b>Chipset</b>	To change chipset configuration
<b>Boot</b>	To change boot settings
<b>Security</b>	Password settings
<b>Save &amp; Exit</b>	Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

### **3-6 Main Menu**

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.



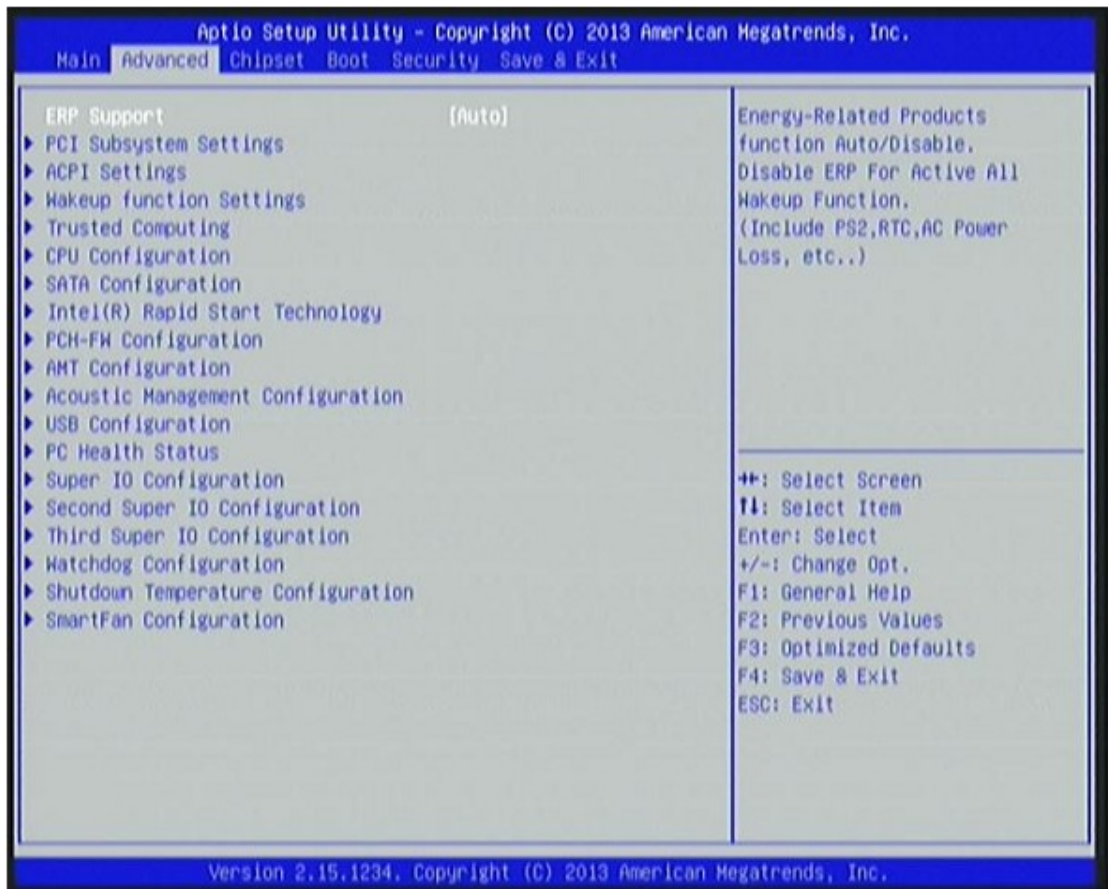
**System Date**

Set the date. Please use [Tab] to switch between data elements.

**System Time**

Set the time. Please use [Tab] to switch between time elements.

### 3-7 Advanced Menu



#### ERP Function

Use this item to enable or disable ERP function for this board. This item should be set as [Disabled] if you wish to have Active All Wakeup Function.

#### ▶ PCI Subsystem Settings

Press [Enter] to enter and make settings for the following sub-items:

##### **PCI Common Settings:**

##### **PCI Latency Timer**

Use this item to set value to be programmed into PCI latency timer register.

##### **VGA Palette Snoop**

Use this item to enable or disable VGA palette registers snooping.

##### **PERR# Generation**

Use this item to enable or disable PCI device to generate PERR#.

##### **SERR# Generation**

Use this item to enable or disable PCI device to generate SERR#.

#### ▶ PCI Express Settings

Press [Enter] to make settings for the following sub-items:

**PCI Express Device Register Settings:**

**Relaxed Ordering**

Use this item to enable or disable PCI express device relaxed ordering.

**Extended Tag**

If set as [Enabled] it will allow device to use 8-bit tag field as a requester.

**No Snoop**

Use this item to enable or disable PCI Express device No Snoop option.

**Maximum Payload**

Use this item to set maximum payload of PCI Express device or allow system BIOS to select the value.

**Maximum Read Request**

Use this item to set maximum read request size of PCI Express device or allow system BIOS to select the value.

▶ **ACPI Settings**

Press [Enter] to make settings for the following sub-items:

**ACPI Settings**

**ACPI Sleep State**

Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.

The optional settings are: [Suspend Disabled]; [S3 only (Suspend to RAM)].

▶ **Wakeup Function Settings**

Press [Enter] to make settings for the following sub-items:

**Wake System with Fixed Time**

Use this item to enable or disable system wake on alarm event. When set as [Enabled], system will wake on the hour/min/sec specified.

**CIR Wakeup**

Use this item to enable or disable CIR wakeup.

**PS2 KB/MS Wakeup**

Use this item to enable or disable PS2 KB/MS wakeup. This function is only supported when ERP function is disabled.

**PCI PME Wakeup**

Use this item to enable or disable S3/S4/S5 PCI PME Wakeup. This function is only supported when ERP function is disabled.

**USB S3/S4 Wakeup**

Use this item to enable or disable USB S3/S4 wakeup. This function is only supported when ERP function is disabled.

▶ **Trusted Computing**

Press [Enter] to enable or disable Security Device Support.

**Security Device Support**

Use this item to enable or disable BIOS support for security device. TCG EFI protocol and INT1A interface will not be available.

The optional settings: [Disabled]; [Enabled].

► **CPU Configuration**

Press [Enter] to view current CPU configuration and make settings for the following sub-items:

**Hyper-Threading**

The optional settings: [Disabled]; [Enabled].

[Enabled]: for Windows XP and Linux (OS optimized for Hyper-Threading Technology).

[Disabled]: for other OS (OS optimized not for Hyper-Threading Technology).

**Active Processor Cores**

Use this item to select number of cores to enable in each processor package.

**Limit CPUID Maximum**

The optional settings: [Disabled]; [Enabled].

This item should be set as [Disabled] for Windows XP.

**Execute Disable Bit**

The optional settings: [Disabled]; [Enabled].

**Intel Virtualization Technology**

The optional settings: [Enabled]; [Disabled].

When set as [Enabled], a VHM can utilize the additional hardware capabilities provided by Vanderpool Technology.

**EIST**

Use this item to enable or disable Intel SpeedStep.

**Turbo Mode**

Use this item to enable or disable Turbo Mode.

*\*This item might not be available depending on configuration.*

**Energy Performance**

Use this item to optimize between performance and power savings.

The optional settings are: [Performance]; [Balanced Performance]; [Balanced Energy]; [Energy Efficient].

*\*This item might not be available depending on configuration.*

**CPU C Status**

Use this item to enable or disable CPU C status.

The optional settings: [Disabled]; [Enabled].

When set as [Enabled], the following sub-items shall appear:

**CPU C6 Report**

Use this item to enable or disable CPU C6 report to OS.

### **CPU C7 Report**

Use this item to enable or disable CPU C7 report to OS.

The optional settings are: [Disabled]; [CPU C7]; [CPU C7s].

### ▶ **SATA Configuration**

Press [Enter] to make settings for the following sub-items:

#### **SATA Controller(s)**

The optional settings are: [Disabled]; [Enabled].

#### **SATA Mode Selection**

The optional settings are: [IDE]; [AHCI]; [RAID].

*\*When set as [IDE] or [RAID], user can make further settings in 'IDE Legacy/Native Mode Selection'.*

#### **IDE Legacy/Native Mode Selection**

The optional settings are: [Native]; [Legacy].

*\*When set as [AHCI] or [RAID], user can make further settings in the following items:*

#### **Aggressive LPM Support**

Use this item to enable PCH to aggressively enter link power state.

The optional settings are: [Enabled]; [Disabled].

#### **SATA Controller Speed**

The item is for user to set the maximum speed the SATA controller can support.

The optional settings are: [Default]; [Gen1]; [Gen2]; [Gen3].

*\*When set as [AHCI] or [RAID], user can also make further settings for each available SATA (1~6) port or MSATA port:*

#### **Serial ATA Port 1/2/3/4/5/6/mSATA**

##### **Port 1/ Port 2/ Port 3/ Port 4/ Port 5/ Port 6/ mSATA**

The optional settings are: [Disabled]; [Enabled].

Use this item to enable or disable each SATA port.

#### **SATA Device Type**

The optional settings are: [Hard Disk Drive]; [Solid State Drive].

### ▶ **Intel(R) Rapid Start Technology**

Press [Enter] to go to next screen to enable or disable 'Intel(R) Rapid Start Technology'.

*\*When set as [Enabled], user can also make further settings in the following items that appear:*

#### **Entry on S3 RTC Wake**

Use this item to enable or disable RapidStart innovation upon S3 RTC wake.

##### **Entry After**

Use this item to enable RTC wake timer at S3 entry. Value ranges



from 0 (immediately) to 120 minutes.

**Active Page Threshold Support**

Use this item to enable or disable support for RST with small partition.

**Hybrid Hard Disk Support**

Use this item to enable or disable Hybrid Hard Disk Support.

**RapidStart Display Save/Restore**

Use this function to enable or disable RapidStart Display Save/Restore function.

▶ **PCH-FW Configuration**

Press [Enter] to view ME information and make settings for 'Firmware Update Configuration'.

▶ **Firmware Update Configuration**

Press [Enter] to make settings for ME FW Image RE-Flash.

**ME FW Image RE-Flash**

Use this item to enable or disable ME FW Image Re-Flash function.

▶ **AMT Configuration**

Use this item to configure Active Management Technology parameters.

Press [Enter] to make settings for the following sub-items:

**Intel AMT**

Use this item to enable or disable Intel Active Management Technology BIOS extension.

**BIOS Hotkey Pressed**

Use this function to enable or disable BIOS Hotkey Press function.

**MEBx Selection Screen**

Use this function to enable or disable MEBx Selection Screen function.

**Hide Un-Configure ME Confirmation**

Use this function to enable or disable Hide Un-Configure ME without password Configuration Prompt function.

**MEBx Debug Message Output**

Use this function to enable or disable MEBx Debug Message Output function.

**Un-Configure ME**

Use this function to enable or disable Un-Configure ME without password function.

**Amt Wait Timer**

Use this item to set time to wait before sending ASF\_GET\_BOOT\_OPTIONS.

**Disable ME**

Use this item to set ME to soft Temporary Disabled function.

**ASF**

Use this item to enable or disable Alert Specification Format.

**Active Remote Assistance Process**

Use this item to enable or disable Trigger CIRA boot function.

**USB Configure**

Use this item to enable or disable USB configure function.

**PET Progress**

Use this item to enable or disable PET events progress to receive PET event or not.

**WatchDog**

Use this item to enable or disable WatchDog Timer. When set as [Enabled], the following sub-items shall appear:

**OS Timer**

Use this item to set OS watch dog timer.

**BIOS Timer**

Use this item to set BIOS watch dog timer.

▶ **Acoustic Management Configuration**

Press [Enter] to make settings for the following sub-items:

Press [Enter] to go to next screen to enable or disable '**Automatic Acoustic Management**'.

▶ **USB Configuration**

Press [Enter] to make settings for the following sub-items:

**Legacy USB Support**

The optional settings are: [Enabled]; [Disabled]; [Auto].

[Enabled]: To enable legacy USB support.

[Disabled]: to keep USB devices available only for EFI specification,

[Auto]: To disable legacy support if no USB devices are connected.

**XHCI Hand-off**

This is a workaround for Oses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

The optional settings are: Enabled]; [Disabled].

**EHCI Hand-off**

This is a workaround for Oses without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

The optional settings are: [Disabled]; [Enabled].

**USB Mass Storage Driver Support**

The optional settings are: [Disabled]; [Enabled].

**USB hardware delay and time-out**

**USB Transfer time-out**

Use this item to set the time-out value for control, bulk, and interrupt transfers.

The optional settings are: [1 sec]; [5 sec]; [10 sec]; [20 sec].

**Device reset time-out**

Use this item to set USB mass storage device start unit command time-out.

The optional settings are: [10 sec]; [20 sec]; [30 sec]; [40 sec].

**Device power-up delay**

Use this item to set maximum time the device will take before it properly reports itself to the host controller. 'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor. The optional settings: [Auto]; [Manual]. Select [Manual] you can set value for the following sub-item: **Device Power-up delay in seconds**, the delay range in from 1 to 40 seconds, in one second increments.

▶ **PC Health Status**

Press [Enter] to view hardware health status.

▶ **Super I/O Configuration**

Press [Enter] to make settings for the following sub-items:

**Super IO Configuration**

▶ **COM1 Port Configuration**

Press [Enter] to make settings for the following items:

**Serial Port**

Use this item to enable or disable serial port (COM).

**Change Settings**

Use this item to select an optimal setting for super IO device.

**Select RS232/RS422/RS485**

The optional settings are: [RS422]; [RS232]; [RS485].

**Mode Speed Select**

The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps, RS422/RS485=10Mbps].

▶ **COM2 Port Configuration**

Press [Enter] to make settings for the following sub-items:

**Serial Port**

Use this item to enable or disable serial port (COM).

**Change Settings**

Use this item to select an optimal setting for super IO device.

**Select RS232/RS422/RS485**

The optional settings are: [RS422]; [RS232]; [RS485].

**Mode Speed Select**

The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps, RS422/RS485=10Mbps].

**CIR Controller**

Use this item to enable or disable CIR controller.

**Case Open Detect**

Use this item to detect case has already open or not, show message in POST.

▶ **Second Super IO Configuration**

**Second Super IO Configuration**

▶ **COM3/COM4/ COM5/COM6 Configuration**

**Serial Port**

Use this item to enable or Disable serial port (COM).

**Change Settings**

Use this item to select an optimal setting for super IO device.

▶ **Third Super IO Configuration**

▶ **COM7/COM8/COM9/COM10 Configuration**

**Serial Port**

Use this item to enable or Disable serial port (COM).

**Change Settings**

Use this item to select an optimal setting for super IO device.

▶ **WatchDog Configuration**

Press [Enter] to make settings for Watchdog Configuration:

**Watchdog Configuration:**

**WatchDog Timer Control**

Use this item to enable or disable WatchDog Timer Control. When set as [Enabled], the following sub-items shall appear:

**WatchDog Timer Val**

User can set a value in the range of 4 to 255.

**WatchDog Timer Unit**

The optional settings are: [Second];[Minute].

▶ **Shutdown Temperature Configuration**

Use this item to select system shutdown temperature.

The optional settings are: [Disabled]; [70°C/158°F]; [75°C/167°F]; [80°C/176°F]; [85°C/185°F].

▶ **SmartFan Configuration**

Press [Enter] to make settings for SmartFan Configuration:

**CPUFAN 3/4 Pin Fan Select**

The optional settings are: [3 pin]/ [4 pin].

**SYSFAN1 3/4 Pin Fan Select**

The optional settings are: [3 pin]/ [4 pin].

**SYSFAN2 3/4 Pin Fan Select**

The optional settings are: [3 pin]/ [4 pin].

**CPUFAN / SYSFAN1/ SYSFAN2 Smart Mode**

When set as [Enabled], the following sub-items shall appear:

**CPUFAN / SYSFAN1/ SYSFAN2 Full Speed Temp**

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 full speed temp. Fan will run at full speed when above this temperature.

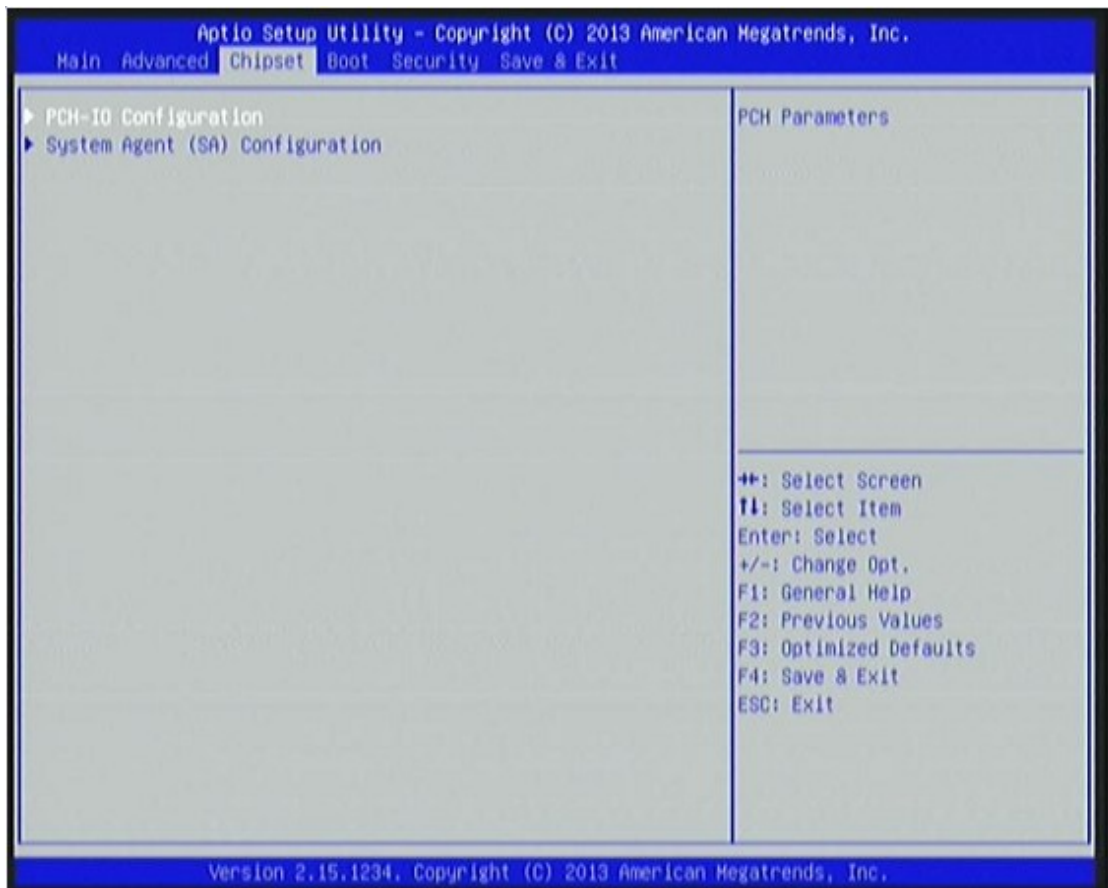
**CPUFAN / SYSFAN1/ SYSFAN2 Idle Temp**

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 idle speed temperature. Fan will run at idle speed when below this temperature.

**SYSFAN1/ SYSFAN2 Stop Temp**

Use this item to set SYSFAN1/SYSFAN2 stop temp. Fan will stop when below this temperature.

### 3-8 Chipset Menu



► **PCH-IO Configuration**

Press [Enter] to make settings for the following sub-items:

► **USB Devices Configuration**

Press [Enter] to further setting USB device configuration.

**USB Configuration**

### **XHCI Mode**

Use this item to select mode of operation for XHCI controller.

The optional settings are: [Smart Auto]; [Auto]; [Enabled]; [Disabled]; [Manual].

*\*When set as **[Disabled]**, the following sub-items shall appear:*

### **EHCI1/EHCI2**

Use this item to control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.

*\*When set as **[Manual]**, the following sub-items shall appear:*

### **Route USB 2.0 pins to which HC7**

The optional settings are: [Route Per-Pin]; [Route all Pins to EHCI]; [Route all Pins to XHCI].

### **Enable USB 3.0 pins**

The optional settings are: [Select Per-Pin]; [Disable all Pins]; [Enable all Pins].

### **Azalia HD Audio**

The optional settings are: [Disabled]; [Enabled]; [Auto].

### **Onboard LAN1 Controller**

Use this item to enable or disable onboard LAN controller.

#### **Wake on LAN1**

Use this item to enable or disable integrated LAN to wake the system.

The Wake on LAN can not be disabled if ME is on at Sx state.

### **Onboard LAN2 Device**

Use this item to control the PCI Express root port.

### **SLP\_S4 Assertion Width**

Use this item to select a minimum assertion width of the SLP\_S4# signal to ensure that the DRAMs has been safely power-cycled.

The optional settings are: [1-2 Seconds]; [2-3 Seconds]; [3-4 Seconds]; [4-5 Seconds].

### **Restore AC Power Loss**

Use this item to select AC power state when power is re-applied after a power failure. The optional settings are: [Power Off]; [Power On]; [Last State].

## ► **System Agent (SA) Configuration**

Press [Enter] to make settings for the following sub-items:

### **VT-D**

The optional settings are: [Enabled]; [Disabled]. This item might not be available depending on configuration.

### **Azalia Internal HDMI Codec**

Use this item to enable or disable DP/HDMI/DVI port audio device.

The optional settings are: [Enabled]; [Disabled].

► **Graphics Configuration**

Press [Enter] to make further settings for Graphics Configuration.

**Graphics Configuration**

**Primary IGFX Boot Display**

Use this item to select the video device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.

The optional settings are: [VBIOS Default]; [CRT]; [HDMI]; [DVI]; [Display Port].

*\*When set as [CRT]; [HDMI]; [DVI] or [Display Port], the following sub-item shall appear:*

**Secondary IGFX Boot Display**

The optional settings are: [Disabled]; [CRT]; [HDMI]; [DVI]; [Display Port].

**Primary Display**

Use this item to select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable GFX.

The optional settings are: [Auto]; [IGFX]; [PEG]; [PCI].

**Internal Graphics**

The optional settings are: [Auto]; [Disabled]; [Enabled].

**Aperture Size**

The optional settings are: [128MB]; [256MB]; [512MB].

**DVMT Pre-Allocated**

Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

The optional settings are: [32M]; [64M]; [128M]; [256M]; [512M]; [1024M].

**DVMT Total Gfx Mem**

Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device.

The optional settings are: [128M]; [256M]; [MAX].

► **PEG Configuration**

Press [Enter] to make settings for the following sub-items:

**PEG Slot Configuration**

**PEG-Gen X**

The optional settings are: [Auto]; [Gen1]; [Gen2]; [Gen3].

**Enable PEG**

The optional settings are: [Disabled]; [Enabled]; [Auto].

**Detect Non-Compliance Device**

Use this item to detect non-compliance PCI Express device in PEG.

The optional settings are: [Disabled]; [Enabled].

**Program PCIe ASPM after OpROM**

The optional settings are: [Enabled]; [Disabled].

**[Enabled]:** PCIe ASPM will be programmed after OpROM.

**[Disabled]:** PCIe ASPM will be programmed before OpROM.

**PEG De-emphasis Control**

Use this item to configure the De-emphasis control on PEG.

The optional settings are: [-6 dB]; [-3.5 dB].

**PEG ASPM**

Use this item to control ASPM support for the PEG device. This has no effect if PEG is not the currently active device.

The optional settings are: [Disabled]; [Auto]; [ASPM L0s]; [ASPM L1]; [ASPM L0sL1].

► **Memory Configuration**

Press [Enter] to make settings for the following sub-items:

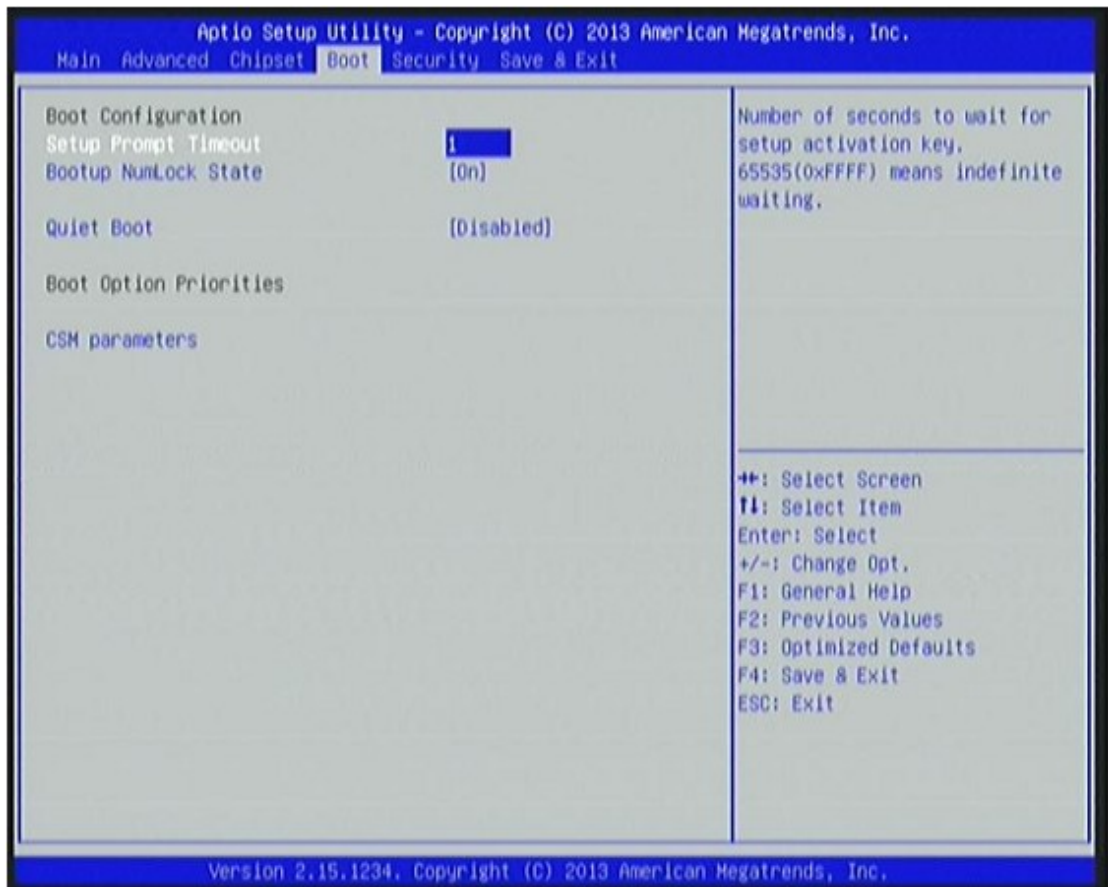
**Memory Frequency Limiter**

Use this item to set maximum memory frequency selection in Mhz.

The optional settings are: [Auto]; [1067]; [1333]; [1600]; [1867].



### 3-9 Boot Menu



#### **Boot Configuration**

##### **Setup Prompt Timeout**

Use this item to set number of seconds to wait for setup activation key.

##### **Bootup Numlock State**

Use this item to select keyboard numlock state. The optional settings are: [On]; [Off].

##### **Quiet Boot**

The optional settings are: [Disabled]; [Enabled].

#### **Boot Option Priorities**

##### ► **CSM parameters**

Press [Enter] to make settings for the following sub-items:

##### **Boot option filter**

This option controls what device system can boot to.

The optional settings are: [UEFI and Legacy]; [Legacy only]; [UEFI only].

##### **Launch PXE OpROM policy**

This option controls the execution of UEFI and Legacy PXE OpROM.

The optional settings are: [Do not launch]; [UEFI only]; [Legacy only].

**Launch Storage OpROM policy**

This option controls the execution of UEFI and Legacy Storage OpROM. The optional settings are: [Do not launch]; [UEFI only]; [Legacy only].

**Launch Video OpROM policy**

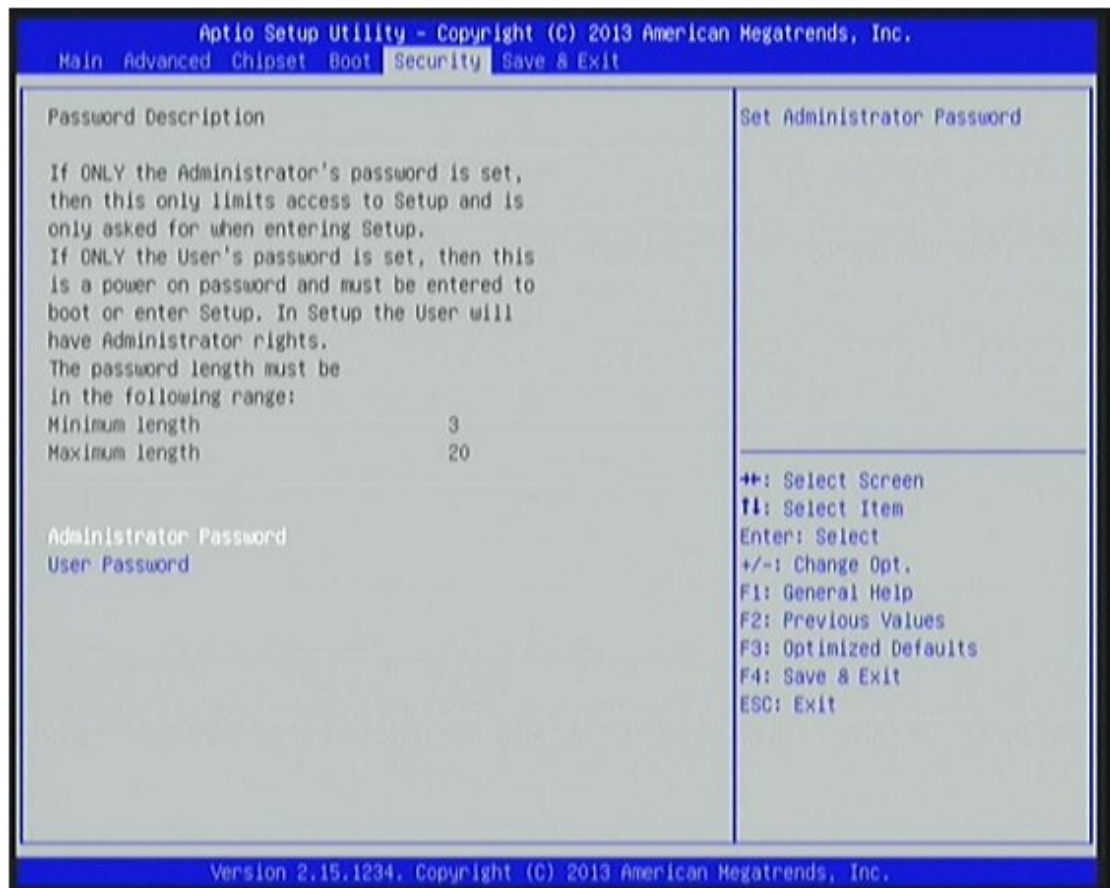
This option controls the execution of UEFI and Legacy Video OpROM. The optional settings are: [Do not launch]; [UEFI only]; [Legacy only].

**Other PCI device ROM priority**

This item is for PCI devices other than Network, Mass storage or video defines which OpROM to launch.

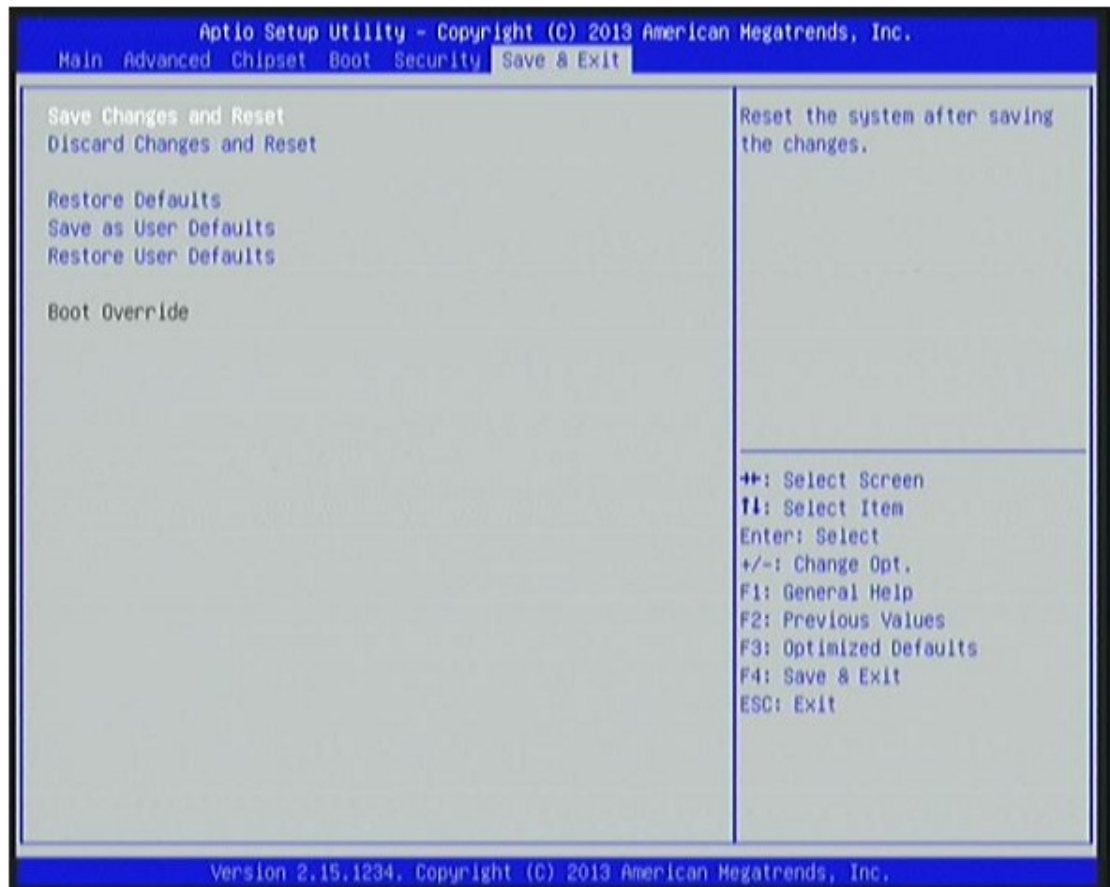
The optional settings are: [UEFI OpROM]; [Legacy OpROM].

**3-10 Security Menu**



Security menu allow users to change administrator password and user password settings.

### 3-11 Save & Exit Menu



#### **Save Changes and Reset**

This item allows user to reset the system after saving the changes.

#### **Discard Changes and Reset**

This item allows user to reset the system without saving any changes.

#### **Restore Defaults**

Use this item to restore /load default values for all the setup options.

#### **Save as User Defaults**

Use this item to save the changes done so far as user defaults.

#### **Restore User Defaults**

Use this item to restore defaults to all the setup options.