



**X10QRH+**

**USER'S MANUAL**

Revision 1.1

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Manual Revision 1.1

Release Date: January 24, 2020

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## Preface

This manual is written for system integrators, IT professionals, and knowledgeable end-users. It provides information for the installation and use of the X10QRH+ motherboard.

### About This Motherboard

The Super X10QRH+ motherboard supports quad Intel® E5-4600v3/v4 Series (Socket R3) processors that offer Intel® QPI (Intel QuickPath Interface) Technology, providing point-to-point connections with a transfer speed of up to 9.6 GT/s. With the PCH C612 built in, the X10QRH+ motherboard supports Intel® Manageability Engine, Intel Rapid Storage Technology enterprise, Digital Media Interface (DMI), PCI-E Gen. 3.0, and up to 2400 MHz DDR4 memory. This motherboard is ideal for 1U or 2U 4-way server platforms. Please refer to our website (<http://www.supermicro.com>) for processor and memory support updates.

### Manual Organization

**Chapter 1** describes the features, specifications, and performance of the motherboard. It also provides detailed information about the Intel PCH C612 chipset.

**Chapter 2** provides hardware installation instructions. Read this chapter when installing the processor, memory modules, and other hardware components into the system. If you encounter any problems, see **Chapter 3**, which describes troubleshooting procedures for video, memory, and system setup stored in CMOS.

**Chapter 4** includes an introduction to BIOS, and provides detailed information on running the BIOS Setup utility.

**Appendix A** provides BIOS Error Beep Codes.

**Appendix B** lists software installation instructions.

**Appendix C** contains UEFI BIOS Recovery instructions.

## Conventions Used in the Manual

Pay special attention to the following symbols for proper system installation and to prevent damage to the system or injury to yourself:

**Warning:** Important information given to ensure proper system installation or to prevent damage to the components



**Note:** Additional information given to differentiate between various models or provides information for proper system setup.



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# Chapter 1

## Overview

### 1-1 Overview

#### Checklist

Congratulations on purchasing your computer motherboard from an acknowledged leader in the industry. Supermicro boards are designed with the utmost attention to detail to provide you with the highest standards in quality and performance.

This motherboard was designed to be used with an SMCI-proprietary chassis as an integrated server platform. There will be no shipping package included in the shipment.



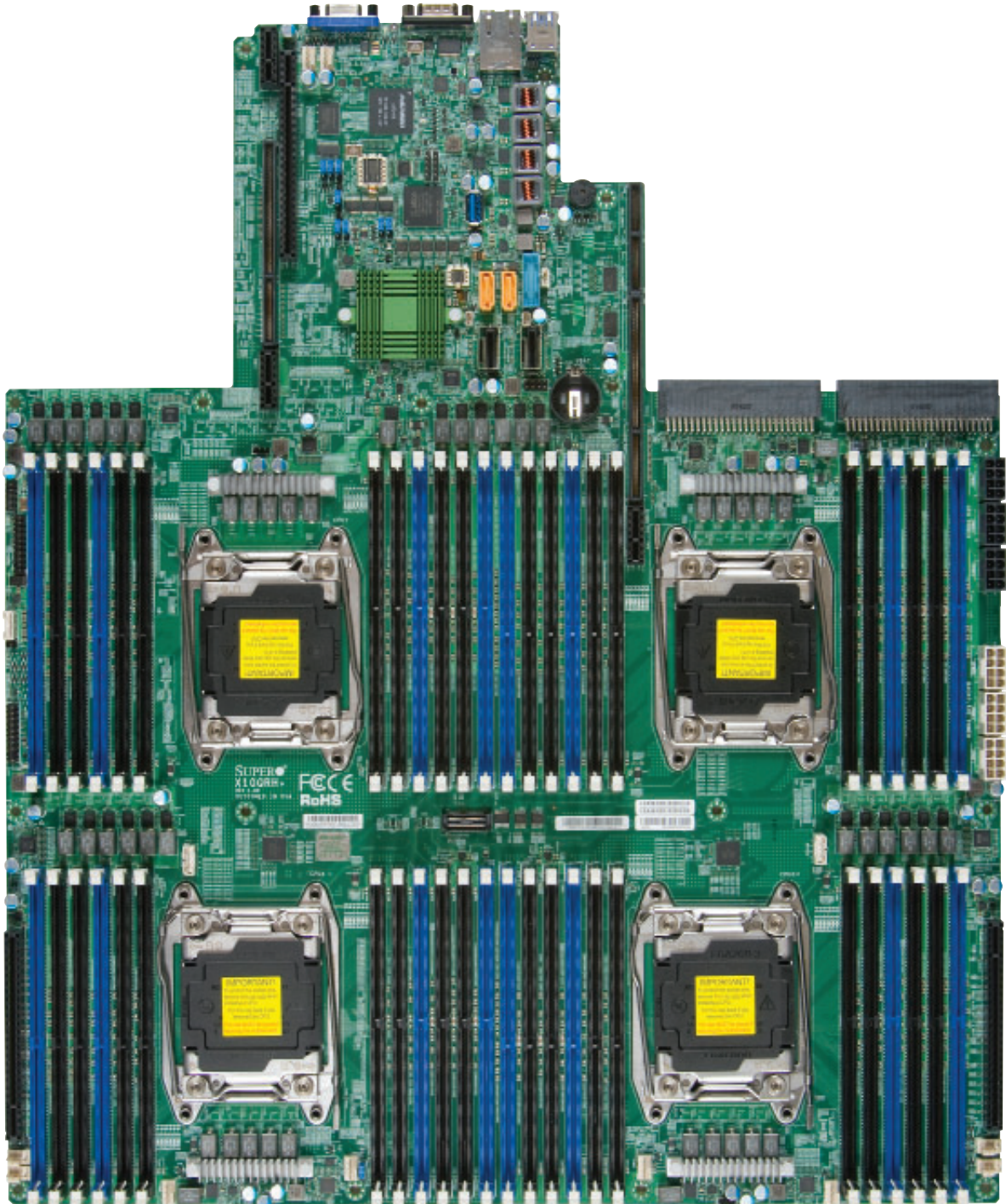
**Note:** For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your motherboard.


Supermicro product manuals: <http://www.supermicro.com/support/manuals/>

Product Drivers and utilities: <http://www.supermicro.com/wftp>

If you have any questions, please contact our support team at [support@supermicro.com](mailto:support@supermicro.com).

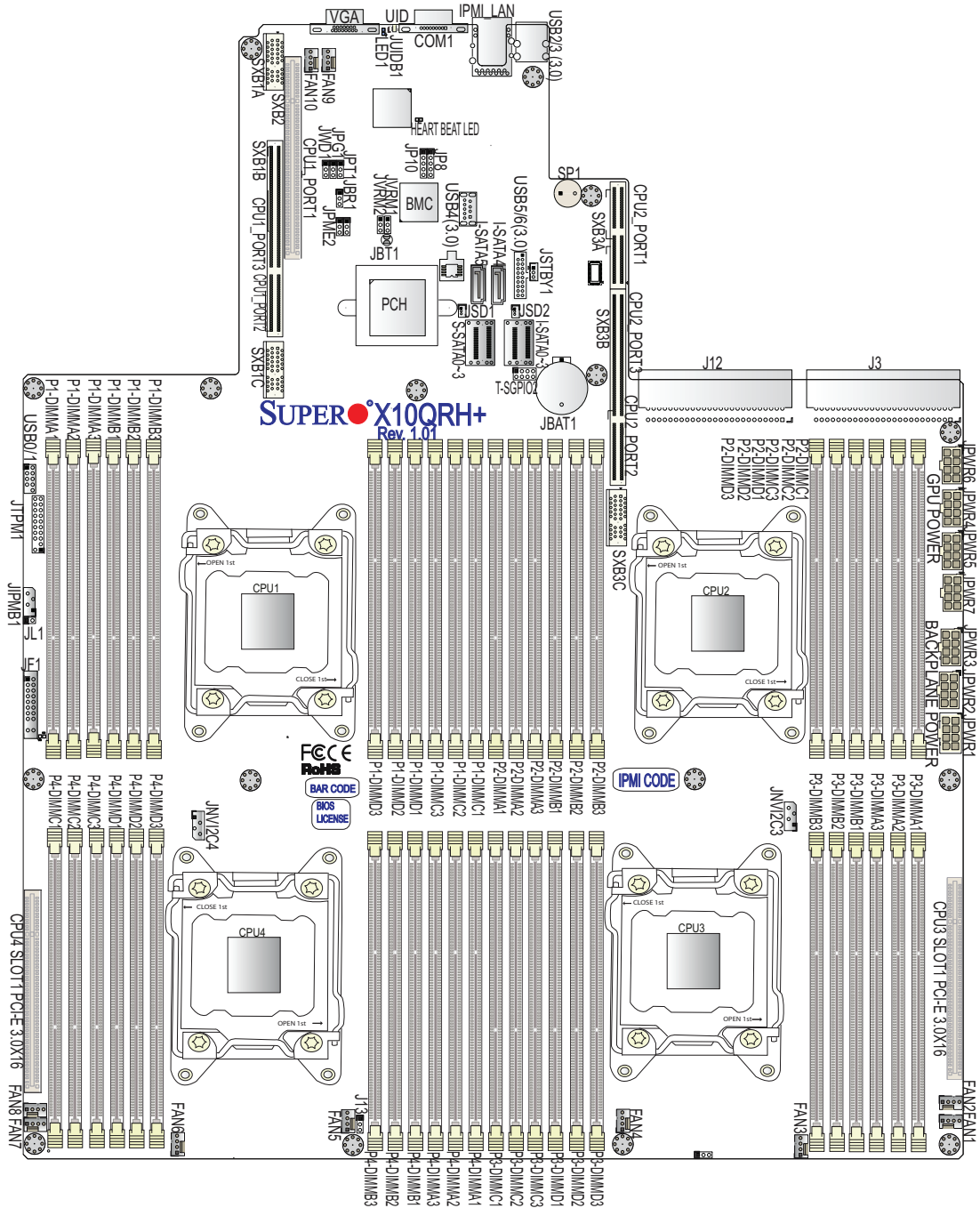
## Motherboard Image



 **Note:** All graphics shown in this manual were based upon the latest PCB Revision available at the time of publishing of the manual. The motherboard you've received may or may not look exactly the same as the graphics shown in this manual.



## Motherboard Layout



 **Notes:**

1. For the latest CPU/Memory updates, please refer to our website at <http://www.supermicro.com/products/motherboard/> for details.
2. Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid possible explosion.





**X10QRH+ Motherboard Jumpers**

<b>Jumper</b>	<b>Description</b>	<b>Default Setting</b>
J13	Power-Fail Trigger Thermal Throttling Enable	Pins 2-3 (Enabled)
JBT1	Clear CMOS/Reset BIOS Configuration	See Chapter 2
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPME2	Manufacture (ME) Mode Select	Pins 1-2 (Normal)
JPT1	Trusted-Platform Module (TPM) Enable	Pins 1-2 (Enabled)
JWD1	Watch Dog	Pins 1-2 (Reset)

**X10QRH+ Motherboard Connectors**



<b>Connector</b>	<b>Description</b>
Battery (JBAT1)	Onboard CMOS battery (See the Note on P. 1-3.)
COM1	Backplane COM port
FAN1-FAN10	System cooling fan headers (FAN1-FAN10)
J3/J12	SMC-proprietary main power connection headers
JF1	Front panel control header
JIPMB1	4-pin external BMC I <sup>2</sup> C header (for an IPMI Card)
JL1	Chassis intrusion header
JNVI <sup>2</sup> C3/4	System Management Bus (SMB) for non-volatile memory headers (JP12/JP11)
JPWR1-3	8-pin power connectors 1-3 for backplane use
JPWR4-7	8-pin power connectors 4/5/6/7 used for GPU devices
JSD1/JSD2	SATA DOM (Disk_On_Module) power connectors
JSTBY1	Standby power header
JTPM1	TPM (Trusted Platform Module)/Port 80 header
(IPMI) LAN	IPMI_dedicated LAN
I-SATA0-3	I-SATA 0-3 connections supported by the Intel PCH
I-SATA4/5	I-SATA 4/5 connectors with power pins built-in with support of SuperDOMs (Devices-on-Module)
S-SATA0-3	S-SATA 0-3 connections supported by the Intel PCH
(CPU3) Slot1	PCI-E 3.0 x16 Slot supported by CPU3 (used for SMC-proprietary add-on cards)
(CPU4) Slot2	PCI-E 3.0 x16 Slot supported by CPU4 (used for SMC-proprietary add-on cards)
SP1	Internal buzzer/speaker
SXB2	PCI-E 3.0 x8 in x16 slot supported by CPU1
SXB1A/1B/1C	PCI-E 3.0 x32 slot supported by CPU1 (used for SMC-proprietary riser cards)

SXB3A/3B/3C	PCI-E 3.0 x40 slot supported by CPU2 (used for SMC-proprietary riser cards)
T-SGPIO2	Seria_Link General Purpose I/O (SGPIO) header for I-SATA4/5
UID	UID (Unit Identifier) Switch (JUIDB1)
USB0/1 (2.0)	Front-accessible USB 2.0 header (USB 0/1)
USB2/3 (3.0)	Backpanel USB 3.0 ports 2/3
USB4 (3.0)	Type A USB 3.0 header (USB 4)
USB 5/6 (3.0)	Front-access USB 5/6 (3.0) header
VGA	Backpanel VGA Port

#### **X10QRH+ Motherboard LED Indicators**

<b>LED</b>	<b>State</b>
LED1 Unit_Identifier (UID) LED	Blue: (on/blinking) Unit Identified
Heartbeat LED: BMC Heartbeat LED	Green: blinking (BMC normal)

## Motherboard Features

<b>CPU</b>	<ul style="list-style-type: none"> <li>Quad Intel® E5-4600v3/v4 Series processors (Socket R3 LGA 2011); each processor supports quad full-width Intel QuickPath Interconnect (QPI) links (with Data Transfer Rate of up to 9.6 GT/s per QPI)</li> </ul> <p> <b>Note:</b> E5-4600v4 requires Revision 2.0 BIOS (or higher).</p>			
<b>Memory</b>	<ul style="list-style-type: none"> <li>Integrated memory controller supports up to 3 TB of Load Reduction (LRDIMM), and up to 1.5 TB of Registered (RDIMM) DDR4 (288-pin) ECC 2400/2133/1866/1600 MHz memory in 48 slots</li> </ul> <p> <b>Note:</b> Memory speed support is pending on the processors installed in the system. For the latest CPU/memory updates, please refer to our website at <a href="http://www.supermicro.com/products/motherboard">http://www.supermicro.com/products/motherboard</a>.</p>			
	<b>DIMM Sizes</b>			
	Up to 64GB @ 1.20V			
<b>Chipset</b>	<ul style="list-style-type: none"> <li>Intel® PCH C612</li> </ul>			
<b>Expansion Slots</b>	<ul style="list-style-type: none"> <li>One (1) PCI Express 3.0 x8 in x16 slot supported by CPU1 (SXB2)</li> <li>One (1) PCI Express 3.0 x32 slot supported by CPU1 (SXB1A/1B/1C)</li> <li>One (1) PCI Express 3.0 x40 slot supported by CPU2 (SXB3A/3B/3C)</li> <li>One (1) PCI Express 3.0 x16 slot (CPU3 Slot 1)</li> <li>One (1) PCI Express 3.0 x16 slot (CPU4 Slot 2)</li> </ul>			
<b>Graphics</b>	<ul style="list-style-type: none"> <li>ASpeed 2400 BMC Controller with integrated VGA</li> </ul>			
<b>IPMI_LAN</b>	<ul style="list-style-type: none"> <li>One (1) IPMI-dedicated LAN for remote console interface on the IO backplane to the I/O devices.</li> </ul>			
<b>I/O Devices</b>	<b>SATA Connections</b>			
	<table border="1"> <tr> <td data-bbox="578 1530 847 1913"> <ul style="list-style-type: none"> <li>SATA 3.0</li> </ul> </td> <td data-bbox="847 1530 1360 1913">           Ten (10) SATA 3.0 connections;            I-SATA 3.0 0-3 (supported by Intel PCH),            I-SATA 3.0 4/5 (supported by Intel PCH with power pins built-in to support SuperDOMs),            S-SATA 3.0 0-3 (supported by Intel PCH)         </td> </tr> <tr> <td data-bbox="578 1913 847 1961"> <ul style="list-style-type: none"> <li>RAID</li> </ul> </td> <td data-bbox="847 1913 1360 1961">RAID 0, 1, 5, 10 (from Intel PCH)</td> </tr> </table>	<ul style="list-style-type: none"> <li>SATA 3.0</li> </ul>	Ten (10) SATA 3.0 connections; I-SATA 3.0 0-3 (supported by Intel PCH), I-SATA 3.0 4/5 (supported by Intel PCH with power pins built-in to support SuperDOMs), S-SATA 3.0 0-3 (supported by Intel PCH)	<ul style="list-style-type: none"> <li>RAID</li> </ul>
<ul style="list-style-type: none"> <li>SATA 3.0</li> </ul>	Ten (10) SATA 3.0 connections; I-SATA 3.0 0-3 (supported by Intel PCH), I-SATA 3.0 4/5 (supported by Intel PCH with power pins built-in to support SuperDOMs), S-SATA 3.0 0-3 (supported by Intel PCH)			
<ul style="list-style-type: none"> <li>RAID</li> </ul>	RAID 0, 1, 5, 10 (from Intel PCH)			

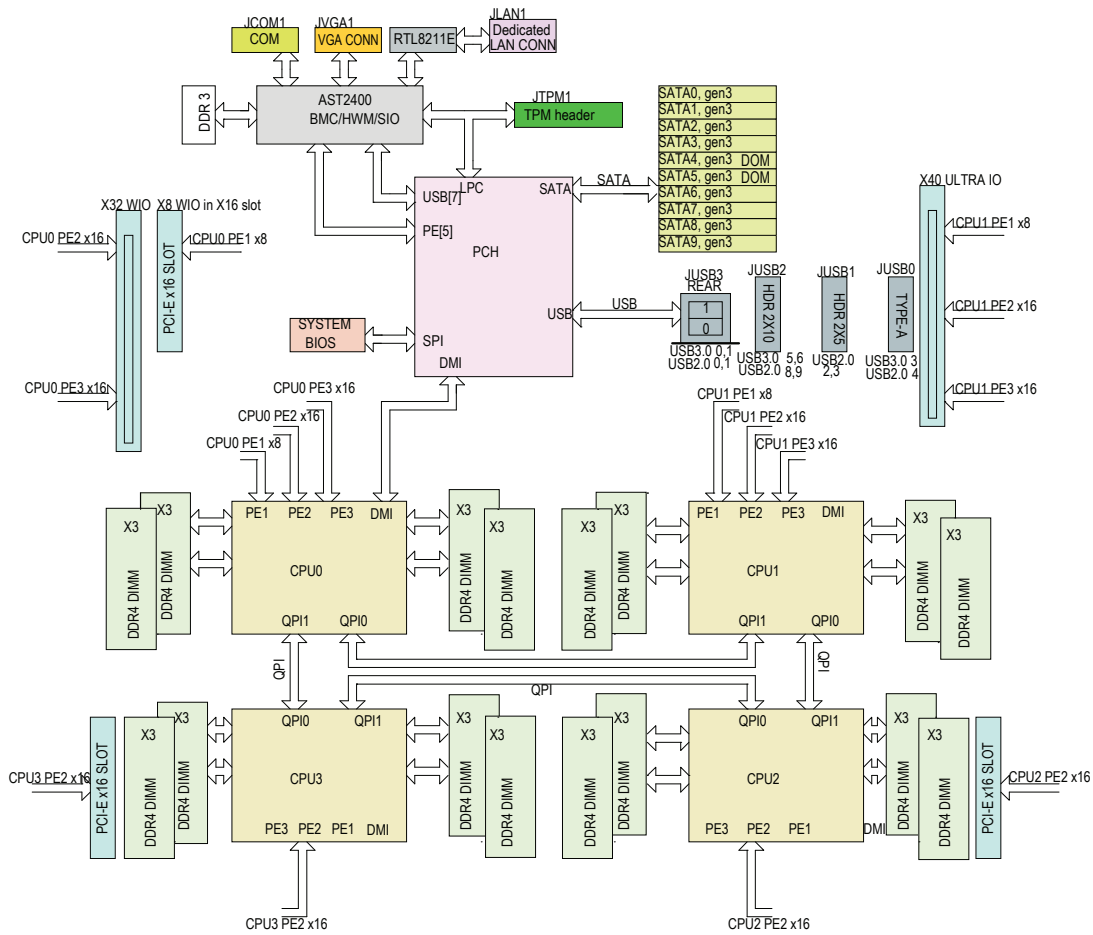
	<p style="text-align: center;"><b>IPMI 2.0</b></p> <ul style="list-style-type: none"> <li>• IPMI 2.0 supported by the ASpeed 2400 BMC</li> </ul> <p style="text-align: center;"><b>Serial (COM) Port</b></p> <ul style="list-style-type: none"> <li>• One (1) Fast UART 16550 connection header</li> </ul> <p style="text-align: center;"><b>VGA</b></p> <ul style="list-style-type: none"> <li>• Rear VGA Port</li> </ul>
<b>Peripheral Devices</b>	<p style="text-align: center;"><b>USB Devices</b></p> <ul style="list-style-type: none"> <li>• Two (2) USB 3.0 ports on the rear I/O panel (USB 2/3),</li> <li>• One (1) Type USB 3.0 connector (USB 4),</li> <li>• One USB header for two front-accessible USB 3.0 support (USB 5/6)</li> <li>• One USB header for two USB 2.0 front-accessible support (USB 0/1)</li> </ul>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>• 16 MB AMI SPI BIOS Flash ROM</li> <li>• DMI 2.3, PCI 2.3, ACPI 2.0/3.0/4.0, USB Keyboard, Plug &amp; Play (PnP), UEFI 2.3.1, and SMBIOS 2.7 or later</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• ACPI Power Management</li> <li>• Power-on mode for AC power recovery</li> <li>• Intel® Intelligent Power Node Manager (available when the NMView utility is installed)</li> <li>• Management Engine</li> <li>• Riser Card auto-detection</li> </ul>
<b>System Health Monitoring</b>	<p style="text-align: center;"><b>System Health Monitoring</b></p> <ul style="list-style-type: none"> <li>• Onboard system health monitors for 12V, +3.3V, +3.3V Standby, +5V, +5V Standby, VDIMM (DDR4 DIMM voltage), chipset voltage, and battery voltage.</li> <li>• CPU 5-Phase switching voltage regulator</li> <li>• CPU/System overheat LED and control</li> <li>• CPU Thermal Trip support</li> <li>• Thermal Monitor 2 (TM2) support</li> </ul> <p style="text-align: center;"><b>Fan Control</b></p> <ul style="list-style-type: none"> <li>• Fan status monitoring with firmware 4-pin fan speed control</li> <li>• Multi-speed fan control via onboard BMC</li> </ul>

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	<b>LED Indicators</b>
	<ul style="list-style-type: none"><li>• BMC (BaseBoard Management) LED</li><li>• InfiniBand LED</li></ul>
	<ul style="list-style-type: none"><li>• UID/Remote UID LED</li></ul>
<b>System Management</b>	<ul style="list-style-type: none"><li>• PECEI (Platform Environment Configuration Interface) 2.0 support</li></ul>
	<ul style="list-style-type: none"><li>• System resource alert via SuperDoctor® 5</li></ul>
	<ul style="list-style-type: none"><li>• Thermal Monitor 2 (TM2) support</li></ul>
	<ul style="list-style-type: none"><li>• SuperDoctor 5, Watch Dog, NMI</li></ul>
<b>Dimensions</b>	<ul style="list-style-type: none"><li>• 20.00" (L) x 16.80" (W) (508.00 mm x 426.72 mm)</li></ul>

X10QRH+ Block Diagram



### System Block Diagram

 **Notes:** 1. This is a general block diagram and may not exactly represent the features on your motherboard. See the Motherboard Features pages for the actual specifications of each motherboard. 2. This block diagram was provided for your reference only.

## 1-2 Processor and Chipset Overview

Built upon the functionality and capability of the Intel E5-4600v3/v4 Series processors (Socket R3) and the Intel C612 PCH, the X10QRH+ motherboard provides the best balanced solution of performance, power efficiency, and features to address the diverse needs of next-generation data centers.

With support of new Intel Microarchitecture 22nm (E5-4600v3)/14nm (E5-4600v4) Process Technology, the X10QRH+ motherboard dramatically increases system performance for a multitude of server applications.

The PCH C612 chip in conjunction with the E5-4600v3/v4 processors support the following features:

- Enterprise SMBus and MCTP support
- DDR4 288-pin memory support on Socket R3
- Support for MCTP Protocol and ME
- Support of SMBus speeds of up to 1 MHz for BMC connectivity
- Improved I/O capabilities to high-storage-capacity configurations
- SPI Enhancements
- Intel® Node Manager 3.0 for advanced power monitoring, capping and management for BMC enhancement (Note below)
- BMC supports remote management, virtualization, and the security package for enterprise platforms



### Notes:

1. E5-4600v4 requires Revision 2.0 BIOS (or higher).
2. Intel Node Manager 3.0 support is dependent on the power supply used in the system.

## 1-3 Special Features

### Recovery from AC Power Loss

The Basic I/O System (BIOS) provides a setting that determines how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must press the power switch to turn it back on), or for it to automatically return to the power-on state. See the Advanced BIOS Setup section for this setting. The default setting is **Last State**.

## 1-4 System Health Monitoring


This section describes the features of system health monitoring of the motherboard. This motherboard has an onboard Baseboard Management Controller (BMC) chip that supports system health monitoring. Once a voltage becomes unstable, a warning is given, or an error message is sent to the screen. The user can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

### Fan Status Monitor with Firmware Control

The system health monitor embedded in the BMC chip can check the RPM status of a cooling fan. The CPU and chassis fans are controlled via IPMI 2.0.

### Environmental Temperature Control

System Health sensors in the BMC monitor temperatures and voltage settings of onboard processors and the system in real time via the IPMI interface. Whenever the temperature of the CPU or the system exceeds a user-defined threshold, system/CPU cooling fans will be turned on to prevent the CPU or the system from overheating.

 **Note:** To avoid possible system overheating, please be sure to provide adequate airflow to your system.

### System Resource Alert

This feature is available when used with SuperDoctor 5. SuperDoctor 5 is used to notify the user of certain system events. For example, you can configure SuperDoctor 5 to provide you with warnings when the system temperature, CPU temperatures, voltages and fan speeds go beyond a predefined range.



## 1-5 ACPI Features

ACPI stands for Advanced Configuration and Power Interface. The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a computer system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as network cards, hard disk drives and printers.

In addition to enabling operating\_system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with Windows 2012/R2, Windows 2016, or newer operating systems.

## 1-6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates. In areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

## 1-7 Serial Port


The X10QRH+ motherboard supports one serial communication connection. COM 1 can be used for input/output. The UART provide legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

## 1-8 Advanced Power Management

The following new advanced power management features are supported by the motherboard.

### **Intel® Intelligent Power Node Manager (NM) (Available when the Supermicro Power Manager [SPM] is installed)**

The Intel® Intelligent Power Node Manager (IPNM) provides your system with real-time thermal control and power management for maximum energy efficiency. Although IPNM Specification Version 2.0/3.0 is supported by the BMC (Baseboard Management Controller), your system must also have IPNM-compatible Management Engine (ME) firmware installed to use this feature.

 **Note:** Support for IPNM 2.0/3.0 support is dependent on the power supply used in the system.

### **Management Engine (ME)**

The Management Engine, which is an ARC controller embedded in the IOH (I/O Hub), provides Server Platform Services (SPS) to your system. The services provided by SPS are different from those provided by the ME on client platforms.

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## Chapter 2

### Installation

#### 2-1 Standardized Warning Statements

The following statements are industry-standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this section in its entirety before installing or configuring components in the Supermicro chassis.

#### Battery Handling



##### Warning!

There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

電池更換不當會有爆炸危險。請只使用同類電池或制造商推薦的功能相當的電池更換原有電池。請按製造商的說明處理廢舊電池。

警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

#### Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

#### ¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

#### **אזהרה!**

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת.

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة استبدال البطارية بطريقة غير صحيحة فعليك استبدال البطارية فقط بنفس النوع أو ما يعادلها كما أوصت به الشركة المصنعة تخلص من البطاريات المستعملة وفقا لتعليمات الشركة الصانعة

#### 경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

#### Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

## Product Disposal



### Warning!

Ultimate disposal of this product should be handled according to all national laws and regulations.

### 製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

### 警告

本产品的废弃处理应根据所有国家的法律和规章进行。

### 警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

### Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

### ¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

### Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

## 2-2 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid possible damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

### Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure that the person handling it is static protected.

## 2-3 Processor and Heatsink Installation

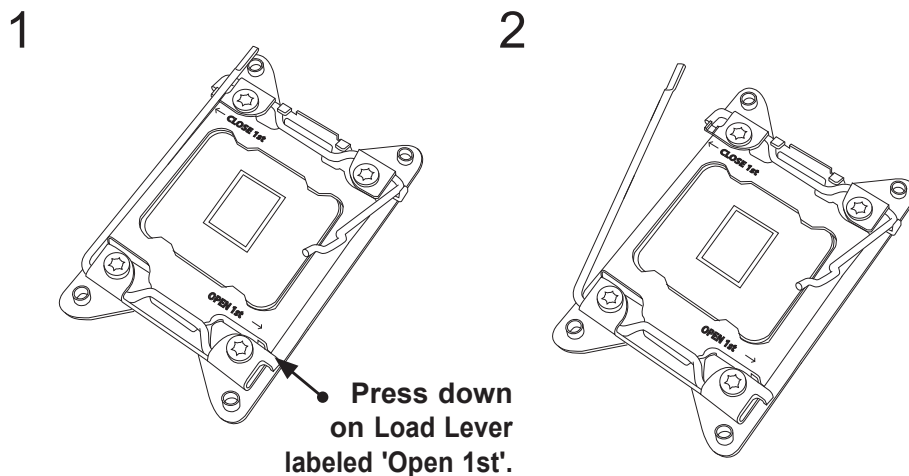
**Warning:** When handling the processor package, avoid placing direct pressure on the label area. Also, improper CPU installation or socket/pin misalignment can cause serious damage to the CPU or the motherboard that will require RMA repairs. Be sure to read and follow all instructions thoroughly before installing your CPU and heatsink.


 **Notes:**

- Always connect the power cord last, and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the system board into the chassis before you install the CPU heatsink.
- When receiving a motherboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Supermicro website for updates on CPU support.

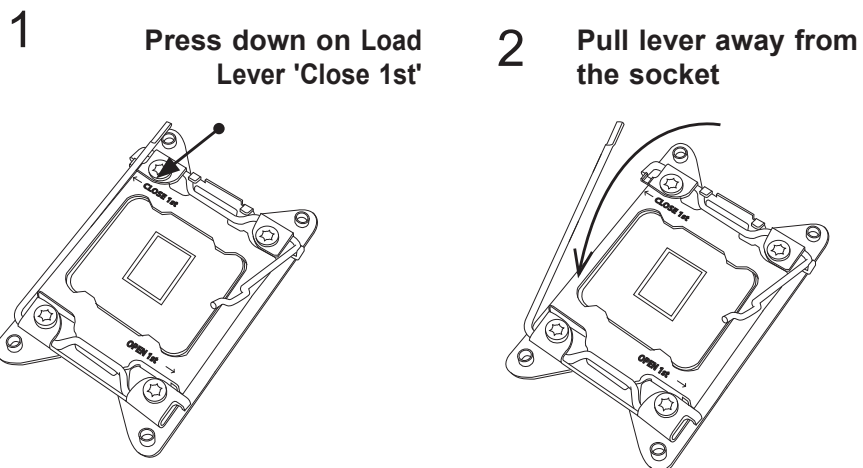
### Installing the LGA2011 Processor

1. There are two load levers on the LGA2011 socket. To open the socket cover, first press and release the load lever labeled 'Open 1st'.

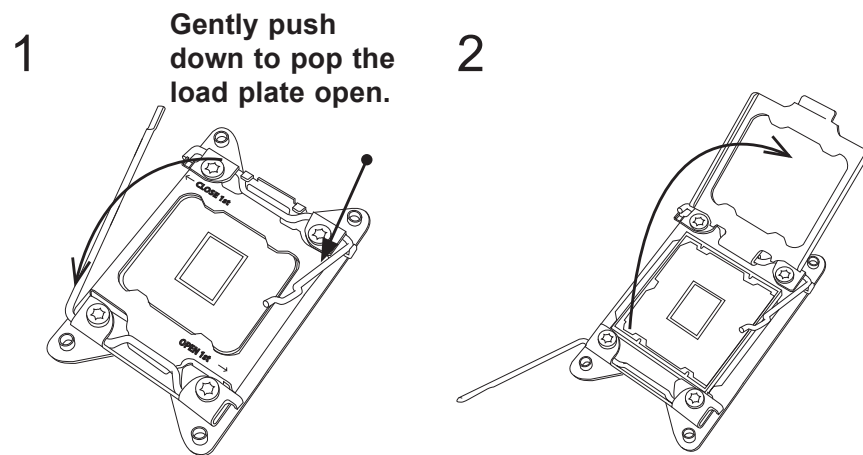


 **Note:** Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.

2. Press the second load lever labeled 'Close 1st' to release the load plate that covers the CPU socket from its locking position.

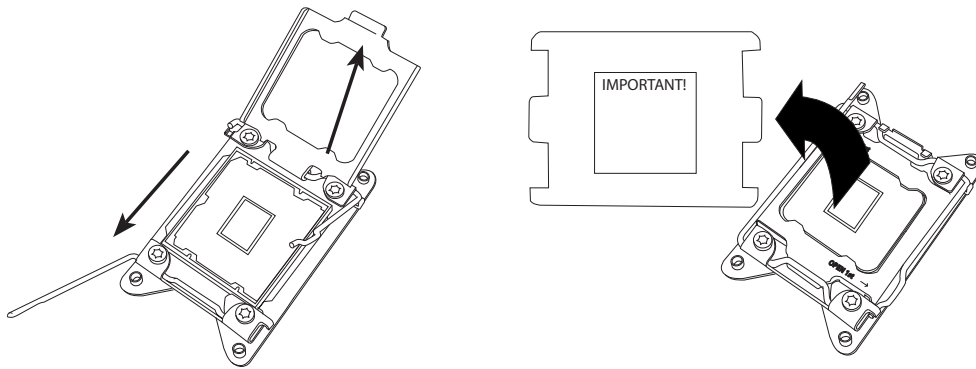


3. With the 'Close 1st' lever fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

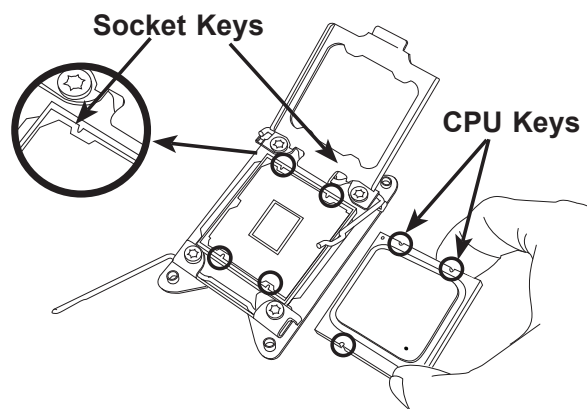




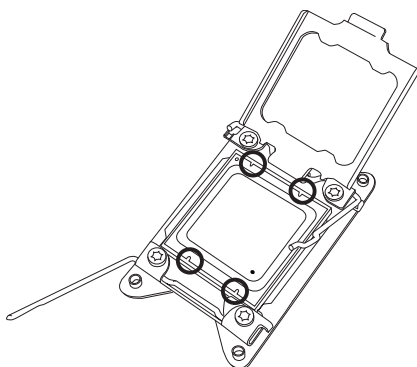
- Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.



- Use your thumb and index finger to hold the CPU on its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.



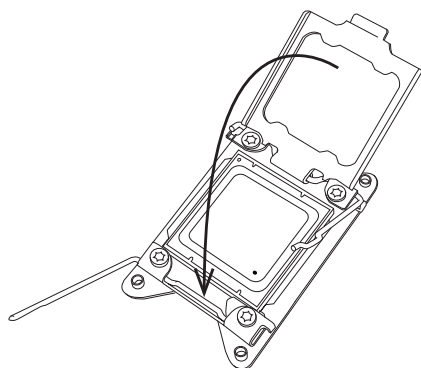
- Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.)



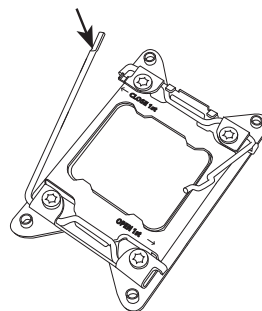
**Warning:** You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

7. With the CPU inside the socket, inspect the four corners of the CPU to make sure that the CPU is properly installed.
8. Close the load plate with the CPU inside the socket. Lock the 'Close 1st' lever first, then lock the 'Open 1st' lever second. Use your thumb to gently push the load levers down to the lever locks.

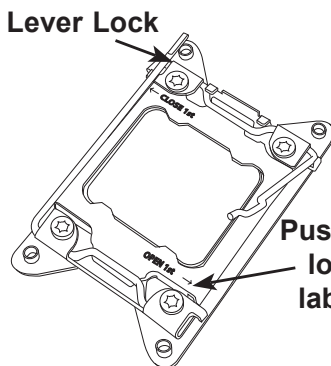
**1** Gently close the load plate.



**2** Push down and lock 'Close 1st' lever.

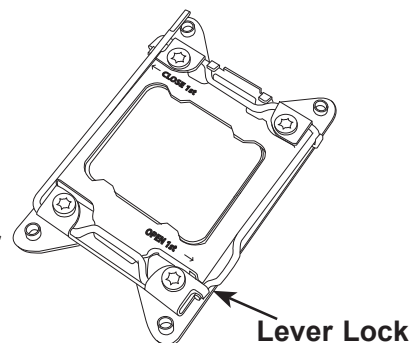


**3**  
Lever Lock



Push down and lock the lever labelled 'Open 1st'.

**4**

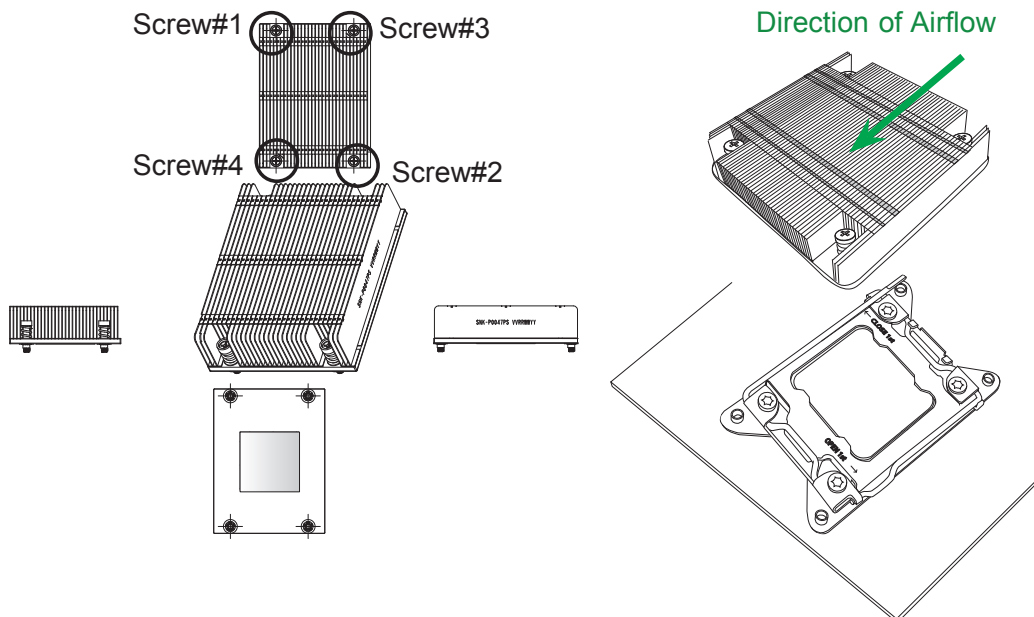



## Installing a Passive CPU Heatsink

1. Apply the proper amount of thermal grease to the heatsink.
2. Place the heatsink on top of the CPU so that the two mounting holes on the heatsink are aligned with those on the retention mechanism.
3. Insert two push-pins on the sides of the heatsink through the mounting holes on the motherboard, and turn the push-pins clockwise to lock them.

## Installing the Backplate

1. Locate the six mounting holes on the backplate and the six correspondent mounting holes on the motherboard.
2. Insert the correct type of screws into the mounting holes and tighten the screws till just snug. (Do not over-tighten the screws to avoid possible damage to the motherboard.)

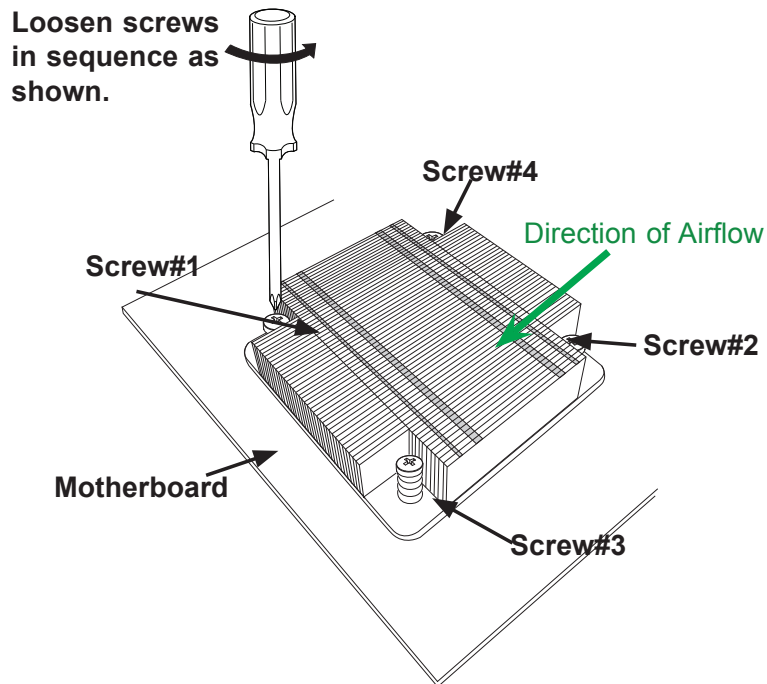


 **Note:** For optimized airflow, please follow your chassis airflow direction to properly install the CPU heatsink. Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.


## Removing the Passive Heatsink

**Warning:** We do not recommend that the CPU or the heatsink be removed. However, if you do need to remove the heatsink, please follow the instructions below to uninstall the heatsink to avoid damaging the CPU or other components.

1. Unplug the power cord from the power supply.
2. Press down the push-pin on the heatsink, and turn counter-clock-wise to loosen it. Repeat the same step to loosen the second push-pin.
3. Hold the heatsink as shown in the picture below, and gently wriggle the heatsink to loosen it. (Do not use excessive force when wriggling the heatsink.)



4. Once the heatsink is loosened, remove it from the motherboard.

 **Note:** For optimized airflow, please follow your chassis airflow direction to properly install the CPU heatsink. Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.

## 2-4 Installing and Removing the Memory Modules

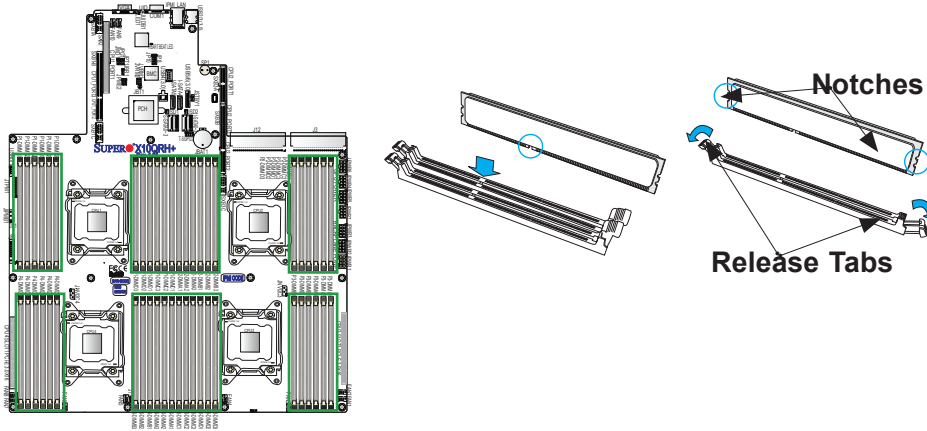
 **Note:** Check Supermicro's website for recommended memory modules.

### CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

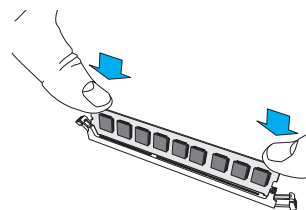
### Installing & Removing DIMMs

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMMA1. (For best performance, please use the memory modules of the same type and speed in the same bank.)
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.



3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Use two thumbs together to press the notches on both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the locking positions to secure the DIMM module into the slot.

Press both notches straight down into the memory slot at the same time.




### Removing Memory Modules

Press the release tabs on both ends of the memory module to unlock it. Once it is loosened, remove the DIMM module from the memory slot.

### Memory Support for the X10QRH+ Motherboard

The X10QRH+ motherboard supports up to 3 TB of Load Reduction (LRDIMM), and up to 1.5 TB of Registered (RDIMM) DDR4 (288-pin) ECC 2400/2133/1866/1600 MHz memory in 48 slots

 **Note:** Memory speed support is pending on the processors installed in the system. For the latest CPU/memory updates, please refer to our website at <http://www.supermicro.com/products/motherboard>.

### Processor & Memory Module Population Configuration

For memory to work properly, follow the tables below for memory installation.

Processors and their Corresponding Memory Modules												
CPU#	Corresponding DIMM Modules											
(CPU1) P1-DIMM-	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3
(CPU2) P2-DIMM-	A1	B1	C1	C1	A2	B2	C2	D2	A3	B3	C3	D3
(CPU3) P3-DIMM-	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3
(CPU4) P4-DIMM-	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	D3	D3

Processor and Memory Module Population for Optimal Performance				
(D=DIMMs, P=per, C=Channel)	(When CPU1 is installed)- P1-DIMM-	(When CPU2 is installed)- P2-DIMM-	(When CPU3 is installed)- P3-DIMM-	(When CPU4 is installed)- P4-DIMM-
Populating 1 DPC	P1-DIMM-A1/B1/C1/D1 (*All 4 DIMMs are needed)	P2-DIMM-A1/B1/C1/D1 (*All 4 DIMMs are needed)	P3-DIMM-A1/B1/C1/D1 (*All 4 DIMMs are needed)	P4-DIMM-A1/B1/C1/D1 (*All 4 DIMMs are needed)
Populating 2 DPC	P1-DIMM-A1/B1/C1/D1, P1-DIMM-A2/B2/C2/D2 (*All 8 DIMMs are needed)	P2-DIMM-A1/B1/C1/D1, P2-DIMM-A2/B2/C2/D2 (*All 8 DIMMs are needed)	P3-DIMM-A1/B1/C1/D1, P3-DIMM-A2/B2/C2/D2 (*All 8 DIMMs are needed)	P4-DIMM-A1/B1/C1/D1, P4-DIMM-A2/B2/C2/D2 (*All 8 DIMMs are needed)
Populating 3 DPC	P1-DIMM-A1/B1/C1/D1, P1-DIMM-A2/B2/C2/D2 P1-DIMM-A3/B3/C3/D3 (*All 12 DIMMs are needed)	P2-DIMM-A1/B1/C1/D1, P2-DIMM-A2/B2/C2/D2 P2-DIMM-A3/B3/C3/D3 (*All 12 DIMMs are needed)	P3-DIMM-A1/B1/C1/D1, P3-DIMM-A2/B2/C2/D2 P3-DIMM-A3/B3/C3/D3 (*All 12 DIMMs are needed)	P4-DIMM-A1/B1/C1/D1, P4-DIMM-A2/B2/C2/D2 P4-DIMM-A3/B3/C3/D3 (*All 12 DIMMs are needed)

### Populating RDIMM/LRDIMM DDR4 Memory Modules for the E5-4600v3-based Motherboard

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slot Per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel	2 Slots Per Channel		3 Slots Per Channel		
				1DPC	1DPC	2DPC	1DPC	2DPC	3DPC
		4Gb	8Gb	1.2V	1.2V	1.2V	1.2V	1.2V	1.2V
RDIMM	SRx4	8GB	16GB	2133	2133	1866	2133	1866	1600
RDIMM	SRx8	4GB	8GB	2133	2133	1866	2133	1866	1600
RDIMM	DRx8	8GB	16GB	2133	2133	1866	2133	1866	1600
RDIMM	DRx4	16GB	32GB	2133	2133	1866	2133	1866	1600
LRDIMM	QRx4	32GB	64GB	2133	2133	2133	2133	2133	1600
LRDIMM <sup>†</sup> 3DS	8Rx4	64GB	128GB	2133	2133	2133	2133	2133	1600

### Populating RDIMM/LRDIMM DDR4 Memory Modules for the E5-4600v4-based Motherboard

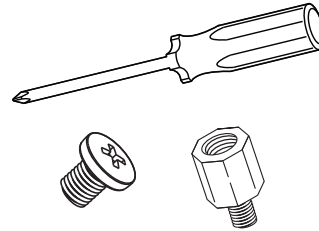
Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slot Per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel	2 Slots Per Channel		3 Slots Per Channel		
				1DPC	1DPC	2DPC	1DPC	2DPC	3DPC
		4Gb	8Gb	1.2V	1.2V	1.2V	1.2V	1.2V	1.2V
RDIMM	SRx4	8GB	16GB	2400	2400	2133	2400	2133	1600
RDIMM	SRx8	4GB	8GB	2400	2400	2133	2400	2133	1600
RDIMM	DRx8	8GB	16GB	2400	2400	2133	2400	2133	1600
RDIMM	DRx4	16GB	32GB	2400	2400	2133	2400	2133	1600
LRDIMM	QRx4	32GB	64GB	2400	2400	2400	2400	2400	1866
LRDIMM <sup>†</sup> 3DS	8Rx4	64GB	128GB	2400	2400	2400	2400	2400	1866

## 2-5 Motherboard Installation

All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both motherboard and chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly. Then use a screwdriver to secure the motherboard onto the motherboard tray.

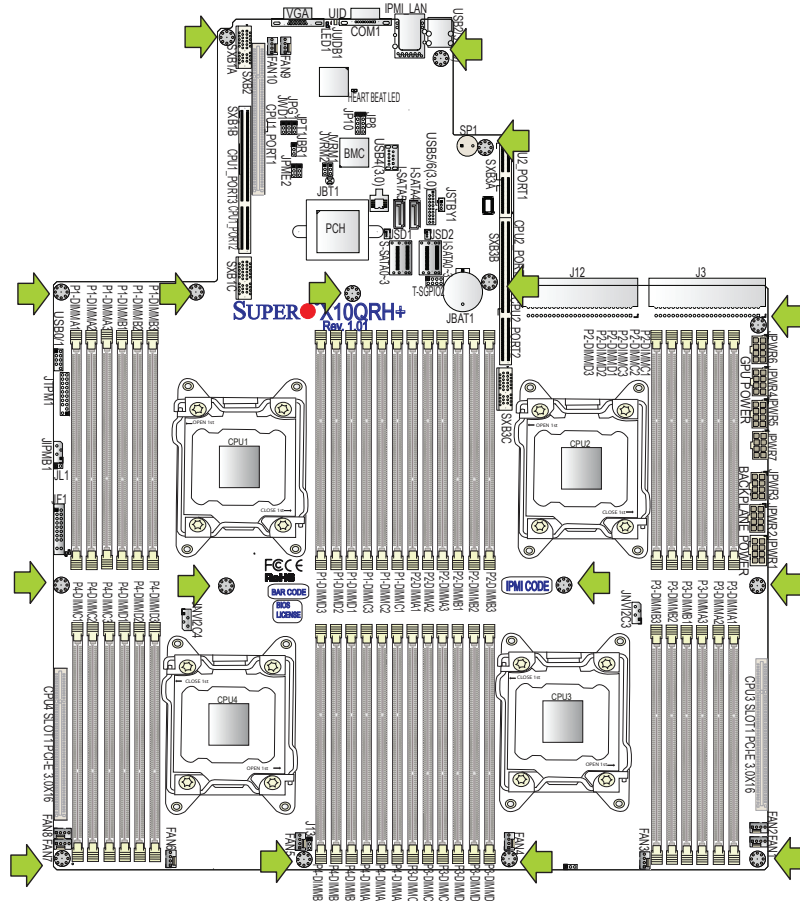
### Tools Needed

- Phillips Screwdriver
- Pan head screws (16 pieces)
- Standoffs (16 pieces, if needed)



### Location of Mounting Holes

There are sixteen (16) mounting holes on this motherboard indicated by the arrows.



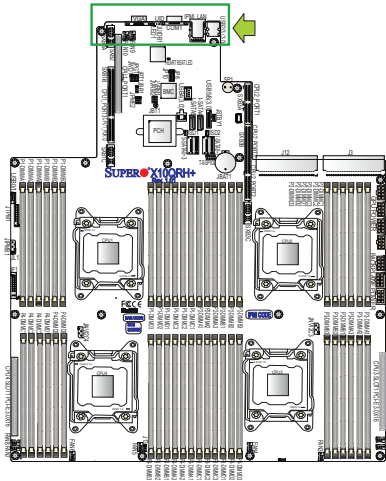
**Caution:** 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to prevent damage to these components when installing the motherboard to the chassis.



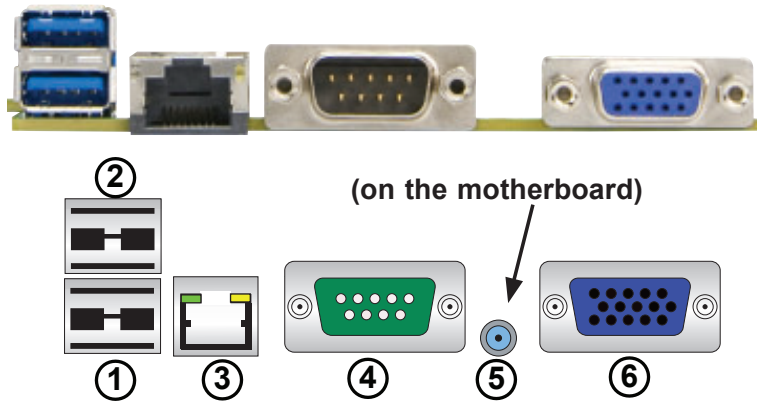
## 2-6 Control Panel Connectors and I/O Ports

The I/O ports are intended to be used in SMC Twin servers. See the picture below for the locations of I/O ports.

### Back Panel Connectors and I/O Ports



### Back Panel I/O Port Locations and Definitions



1. Backpanel USB 3.0 Port 2
2. Backpanel USB 3.0 Port 3
3. IPMI_dedicated LAN
4. COM Port 1
5. UID Switch/LED (on the motherboard)
6. Back Panel VGA (Blue)

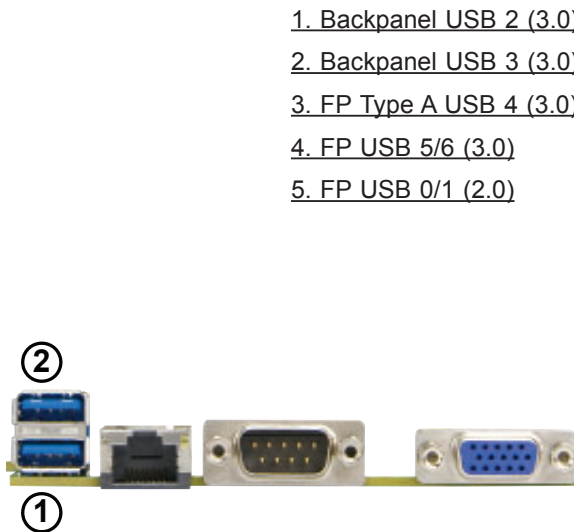
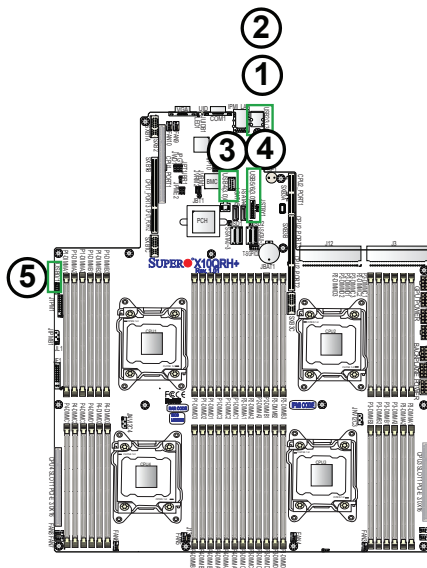
## Universal Serial Bus (USB)

Two USB 3.0 ports (USB 2/3) are located on the I/O backpanel. An internal USB header, located next to I-SATA4, provides two USB 3.0 connections (USB 5/6). In addition, a Type A header, located next to the BMC chip, also provides USB 3.0 support (USB 4). A USB 2.0 header, located next to P1-DIMMA1 slot, provides two USB connections (USB 0/1). (Cables are not included). A See the tables on the right and below for pin definitions.

BP USB 2/3 (3.0), Type A USB 4 (3.0) Pin Definitions	
Pin#	Description
1	VBUS
2	SSRX-
3	SSRX+
4	Ground
5	SSTX-
6	SSTX+
7	GND_DRAIN
8	D-
9	D+

Front Panel USB 5/6 (3.0) Pin Definitions			
Pin #	Definition	Pin #	Definition
1	+5V	2	+5V
3	USB_PN2	4	USB_PN3
5	USB_PP2	6	USB_PP3
7	Ground	8	Ground
9	Key	10	Ground

Front Panel USB 0/1 (2.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	5	+5V
2	USB_PN1	6	USB_PN0
3	USB_PP1	7	USB_PP0
4	Ground	8	Ground



1. Backpanel USB 2 (3.0)
2. Backpanel USB 3 (3.0)
3. FP Type A USB 4 (3.0)
4. FP USB 5/6 (3.0)
5. FP USB 0/1 (2.0)

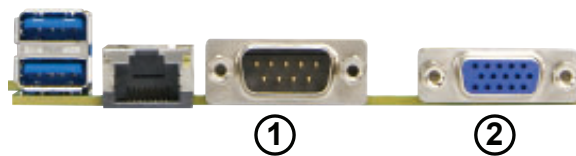
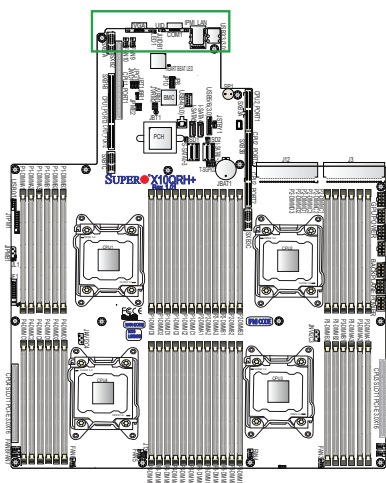
## Serial Port

A serial port (COM1) is located on the I/O backpanel on the motherboard. This connection provides serial connection support. See the table on the right for pin definitions.

Serial COM) Ports Pin Definitions			
Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	N/A

## Video Connection

A Video (VGA) port is located next to LAN port 2 on the I/O backplane. Refer to the motherboard layout below for the location.



1. COM Port 1

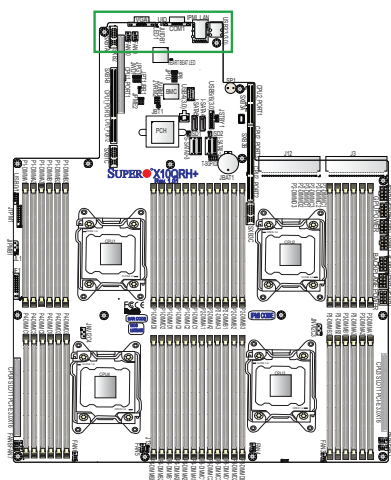
2. VGA

### IPMI\_LAN Port

An IPMI\_Dedicated LAN is located next to USB 3.0 ports 2/3 on the backplane. This Ethernet port accepts RJ45 type cable. Please refer to the LED Indicator section for LAN LED information.

LAN Ports Pin Definition			
Pin#	Definition		
1	P2V5SB	10	SGND
2	TD0+	11	Act LED
3	TD0-	12	P3V3SB
4	TD1+	13	Link 100 LED (Yellow, +3V3SB)
5	TD1-	14	Link 1000 LED (Yellow, +3V3SB)
6	TD2+	15	Ground
7	TD2-	16	Ground
8	TD3+	17	Ground
9	TD3-	18	Ground

(NC: No Connection)



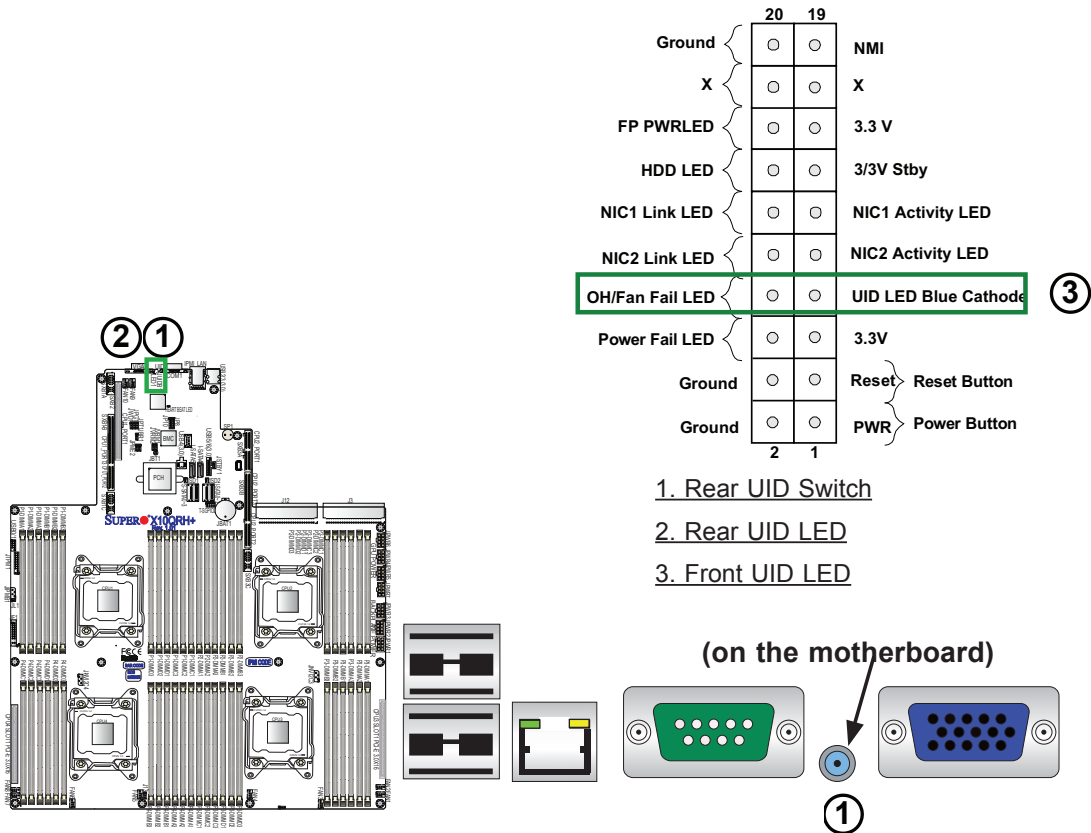
1. IPMI\_LAN



### Unit Identifier Switch/LED Indicators

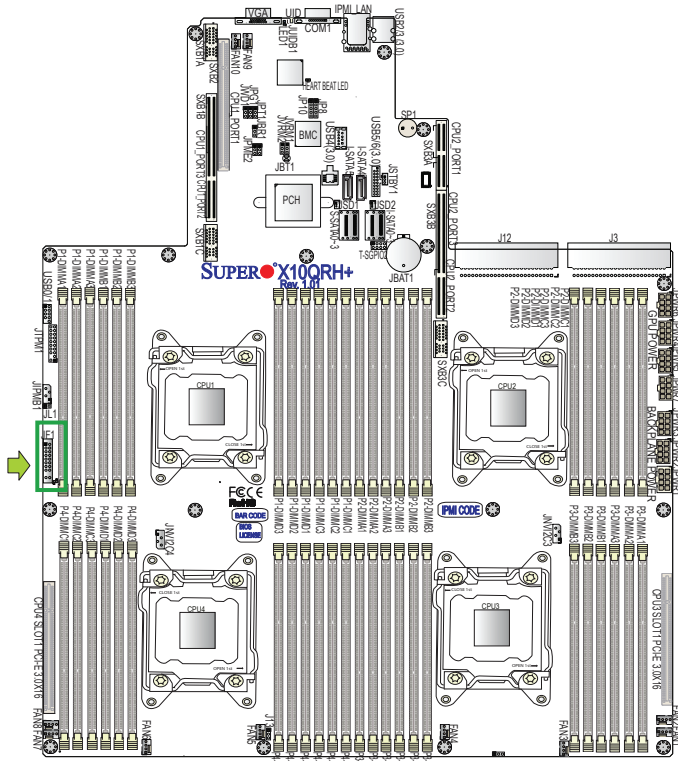
A Unit Identifier (UID) switch and two LED indicators are located on the motherboard. The rear UID switch is located between the VGA connector and COM Port 1 on the IO backpanel. The front UID LED is located at pin 7 of JF1, and the rear UID LED is located at LED1. When the user presses the UID switch on the back panel, both front UID LED and rear UID LED indicators will be turned on. Press the UID switch again to turn off both LED indicators. These UID Indicators provide easy identification of a system unit that may be in need of service. See the table on the right for pin definitions.

**Note:** UID LED is supported by the physical switch or the BMC. When it is controlled by the physical switch, it will stay solid. When it is controlled by the BMC, it will blink.



## Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro's chassis. See the figure below for the descriptions of the control panel buttons and LED indicators. Refer to the following section for descriptions and pin definitions.



JF1 Header Pins

	20	19	
Ground	○	○	NMI
X	○	○	X
FP PWRLED	○	○	3.3 V
HDD LED	○	○	3/3V Stby
NIC1 Link LED	○	○	NIC1 Activity LED
NIC2 Link LED	○	○	NIC2 Activity LED
OH/Fan Fail LED	○	○	UID LED Blue Cathode
Power Fail LED	○	○	3.3V
Ground	○	○	Reset } Reset Button
Ground	○	○	PWR } Power Button
	2	1	

## Front Control Panel Pin Definitions

### NMI Button

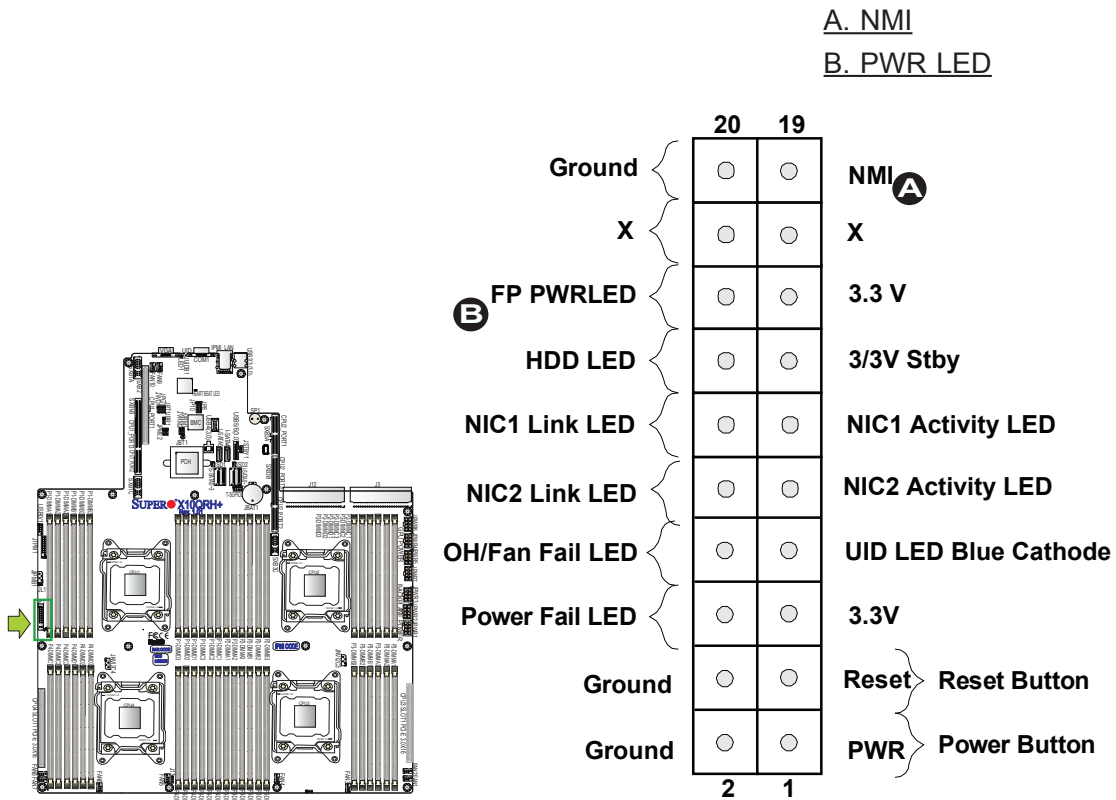
The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)	
Pin#	Definition
19	Control
20	Ground

### Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	3.3V
16	PWR LED



### HDD/UID LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a cable here to indicate HDD activity. See the table on the right for pin definitions.

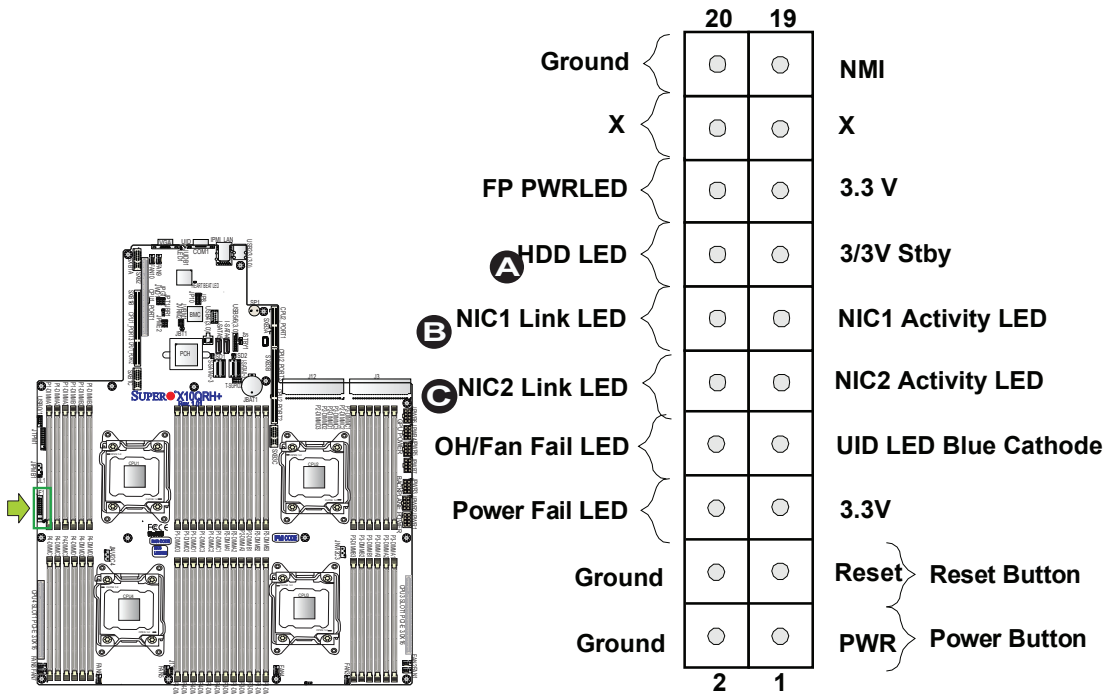
HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	3.3V Standby
14	HD Active

### NIC1/NIC2 LED Indicators

The NIC (Network Interface Controller) LED connection for LAN Port 1 is located on pins 11 and 12 of JF1, and for LAN Port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table on the right for pin definitions.

GLAN1/2 LED Pin Definitions (JF1)	
Pin#	Definition
9	NIC 2 Activity LED
10	NIC 2 Link LED
11	NIC 1 Activity LED
12	NIC 1 Link LED

- A. HDD LED
- B. NIC1 LED
- C. NIC2 LED





### Overheat (OH)/Fan Fail/UID LED

Connect an LED cable to pins 7 and 8 of Front Control Panel to use the Overheat/Fan Fail and UID LED connections. The Red LED on pin 8 provides warnings of overheating, fan failure or power failure. The Blue LED on pin 7 works as the front panel UID LED indicator. Refer to the tables on the right for pin definitions.

OH/Fan Fail/ PWR Fail/Blue_UID LED Pin Definitions (JF1)	
Pin#	Definition
7	Blue_UID LED
8	OH/Fan Fail/Power Fail

OH/Fan Fail/PWR Fail LED Status (Red LED)	
State	Definition
Off	Normal
On	Overheat
Flashing	Fan Fail

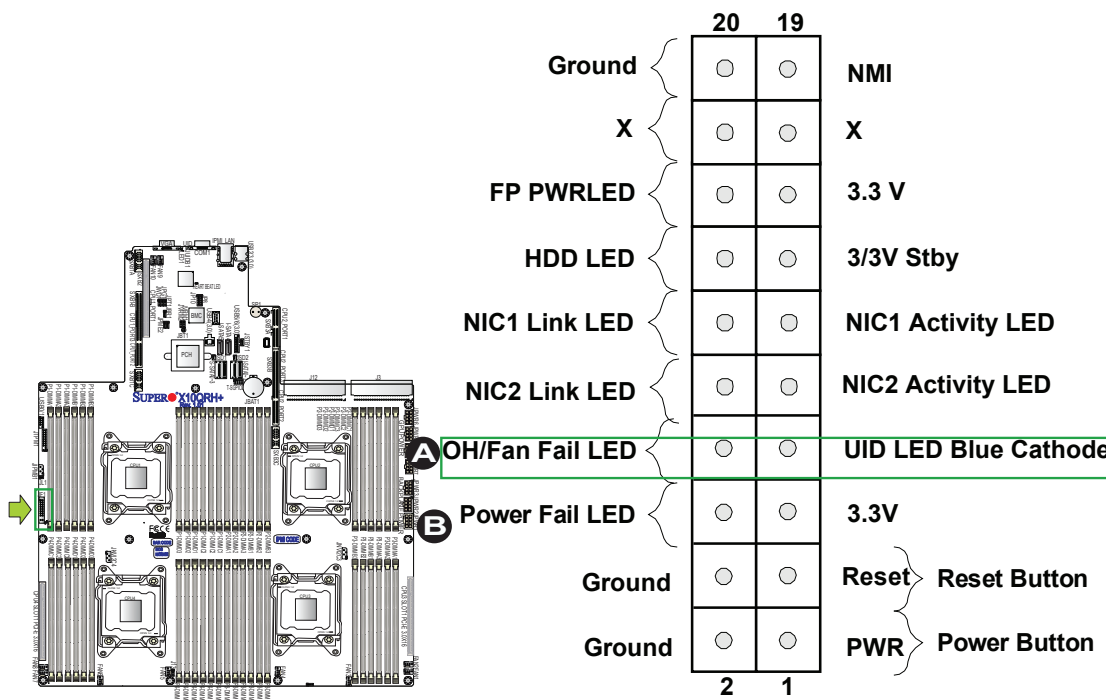
### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

PWR Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	PWR Supply Fail

A. OH/Fail/PWR Fail LED

B. PWR Supply Fail



### Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

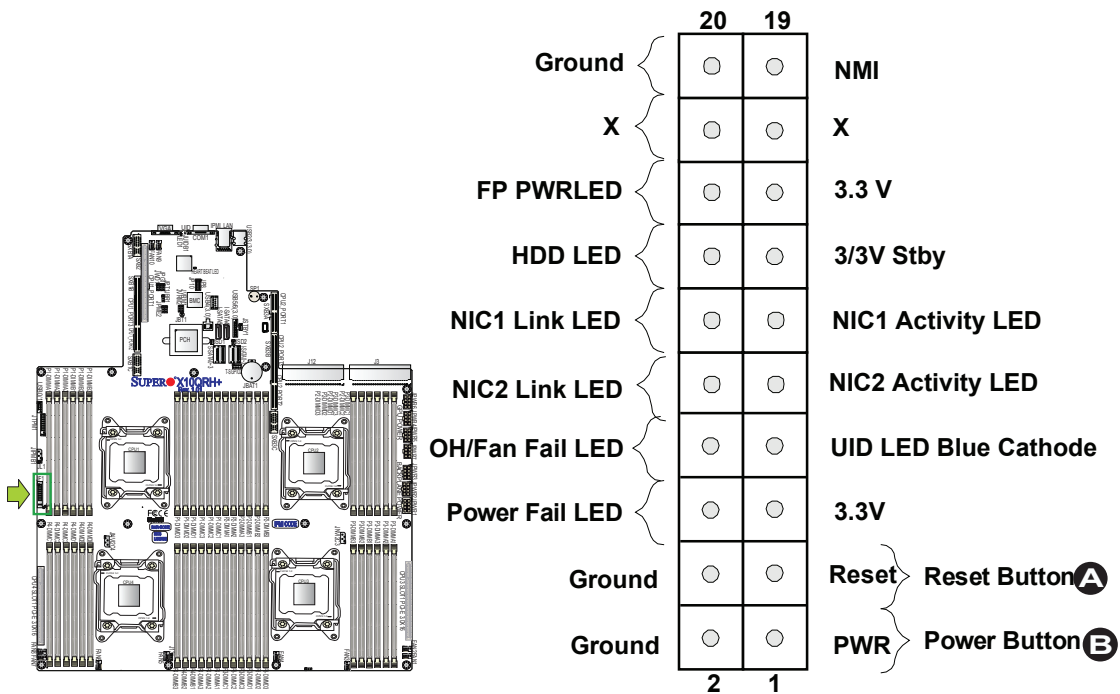
### Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - See Chapter 4). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table on the right for pin definitions.

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	Ground

A. Reset Button

B. PWR Button

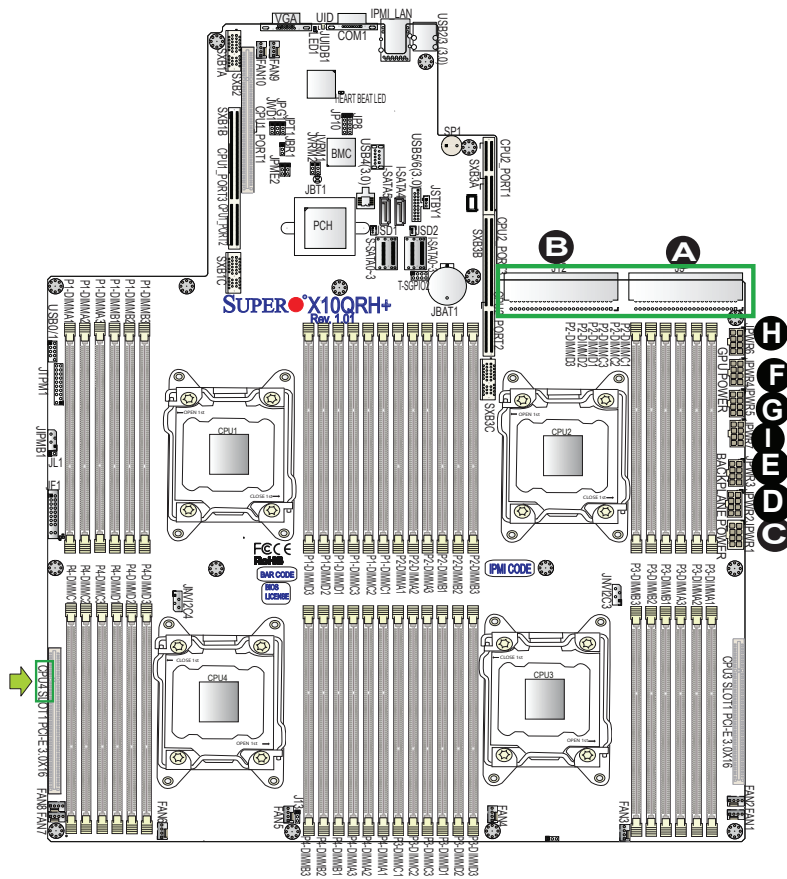


## 2-7 Connecting Cables

### Power Connectors

Two SMC-proprietary power connection headers (J3/J12) are used as main power supply connectors for the motherboard. In addition, three 8-pin power connectors (JPWR1-3) are used to provide power to backplane devices, and another four 8-pin power connectors (JPWR4-7) are used for GPU devices. These power connectors meet the SSI EPS 12V specification. See the table on the right for pin definitions for 8-pin power connectors.

12V 8-pin Power Connector Pin Definitions	
Pins	Definition
1 through 4	Ground
5 through 8	+12V



- A. J3: Main PWR
- B. J12: Main PWR
- C. JPWR1: PWR for backplane devices
- D. JPWR2: PWR for backplane devices
- E. JPWR3: PWR for backplane devices
- F. JPWR4: GPU PWR
- G. JPWR5: GPU PWR
- H. JPWR6: GPU PWR
- I. JPWR7: GPU PWR

### TPM Header/Port 80 Header

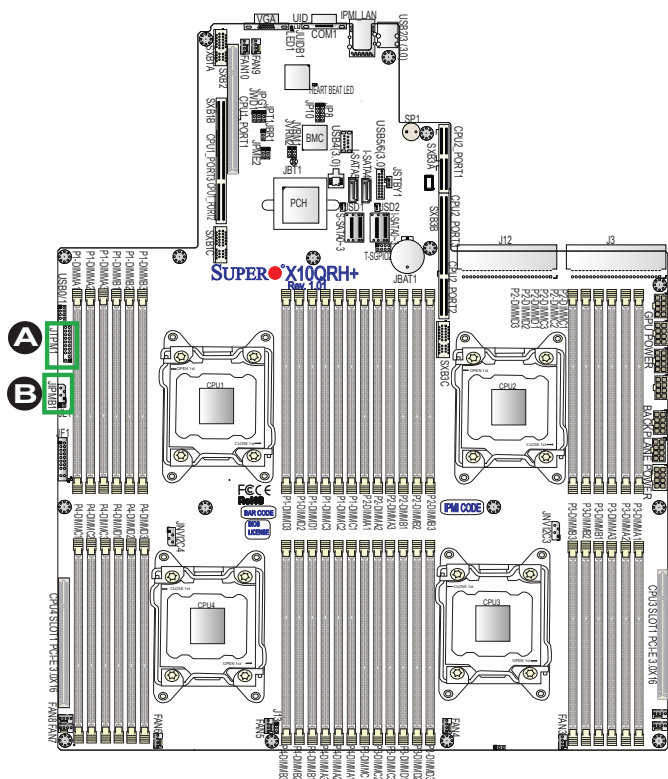
A Trusted Platform Module/Port 80 header is located at JTPM1 to provide TPM support and Port 80 connection. Use this header to enhance system performance and data security. See the table on the right for pin definitions.

TPM/Port 80 Header Pin Definitions			
Pin #	Definition	Pin #	Definition
1	LCLK	2	GND
3	LFRAME#	4	<(KEY)>
5	LRESET#	6	+5V (X)
7	LAD 3	8	LAD 2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4	14	SMB_DAT4
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)

### IPMB I<sup>2</sup>C SMB

A System Management Bus header for the IPMI slot is located at JIPMB1. Connect an appropriate cable here to use the IPMB I<sup>2</sup>C connection on your system.

IPMB SMB Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection



A. JTPM1

B. IPMB

### T-SGPIO2 Header

T-SGPIO2 (Serial-Link General Purpose Input/Output), located next to the CMOS battery, supports Serial\_Link interface for onboard I-SATA4/5 connections. See the table on the right for pin definitions.

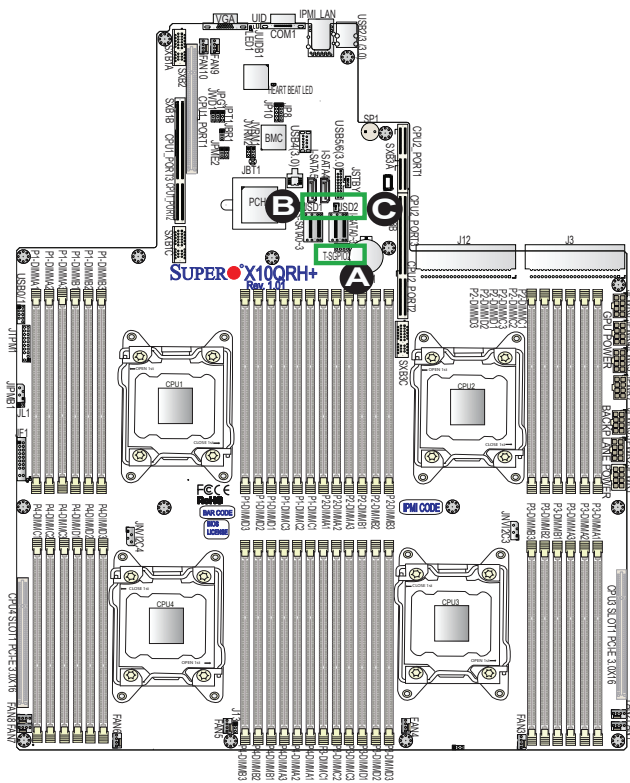
T-SGPIO2 Pin Definitions			
Pin#	Definition	Pin#	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	Clock	8	NC

**Note:** NC= No Connection

### SATA\_DOM Power Connectors

Two 3-pin power connectors (JSD1/ JSD2) provide power to onboard SATA DOM (Disk\_On\_Module) devices. Connect appropriate cables here to provide power for your SATA DOM devices. See the layout below for the locations of the power connectors.

SATA_DOM Connectors Pin Definitions	
Pin#	Definition
1	+5V
2	Ground
3	Ground



A. T-SGPIO2

B. JSD1

C. JSD2

### Fan Headers

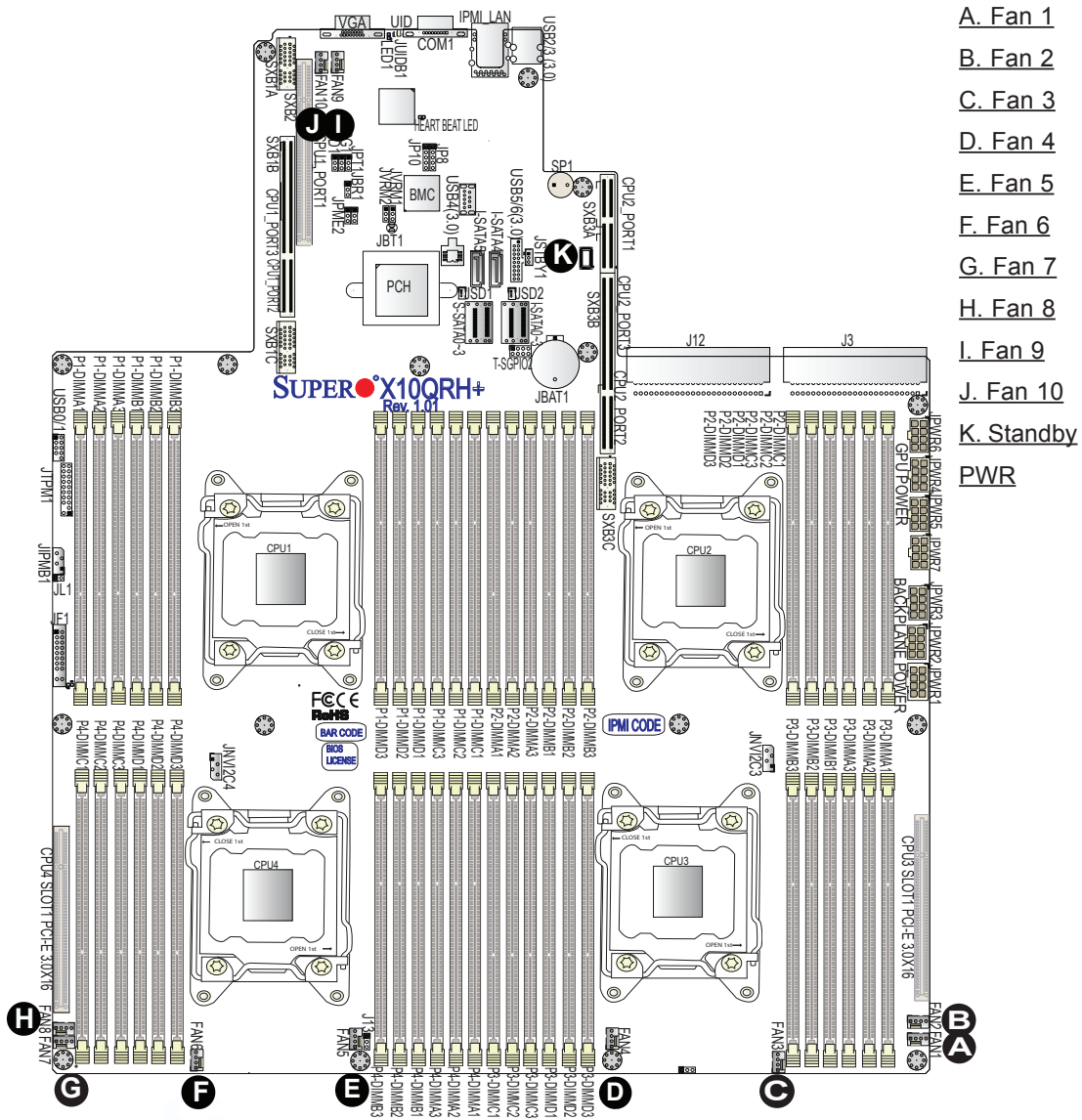
This motherboard has ten system/CPU cooling fan headers (FAN1-10) on the motherboard. These 4-pin fans headers are backward compatible with the traditional 3-pin fans. However, fan speed control is only available for 4-pin fans via IPMI 2.0 interface. See the table on the right for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation

### Standby Power Header

The Standby Power header is located at JSTBY1 on the motherboard. See the table on the right for pin definitions.

Standby Power Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up



- A. Fan 1
- B. Fan 2
- C. Fan 3
- D. Fan 4
- E. Fan 5
- F. Fan 6
- G. Fan 7
- H. Fan 8
- I. Fan 9
- J. Fan 10
- K. Standby PWR



### Internal Speaker

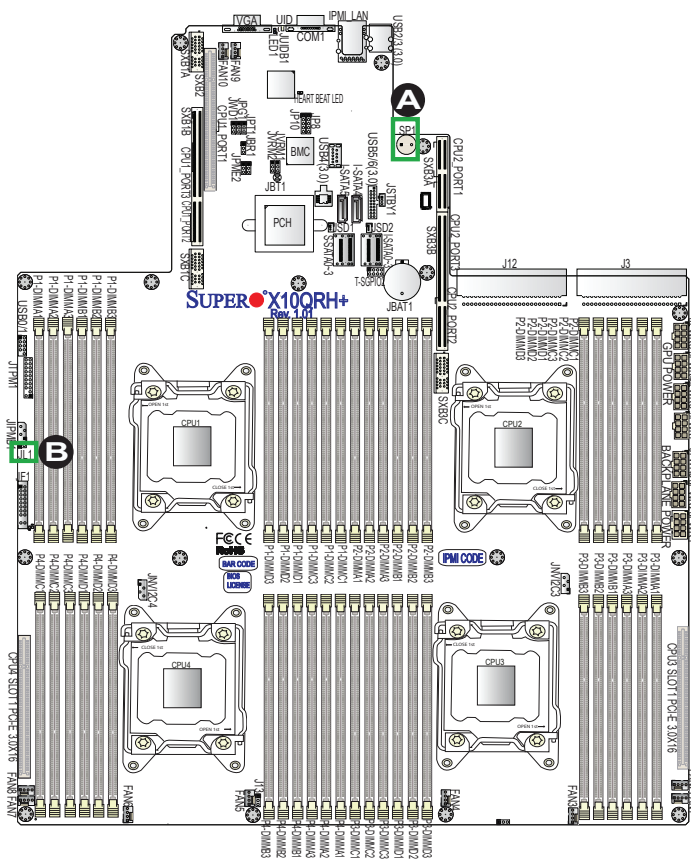
The Internal Speaker, located at SP1, can be used to provide audible indications for various beep codes. See the table on the right for pin definitions. Refer to the layout below for the locations of the Internal Buzzer (SP1).

Internal Buzzer (SP1) Pin Definition		
Pin#	Definitions	
Pin 1	Pos. (+)	VCC
Pin 2	Neg. (-)	Beep In

### Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the motherboard. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

Chassis Intrusion Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground



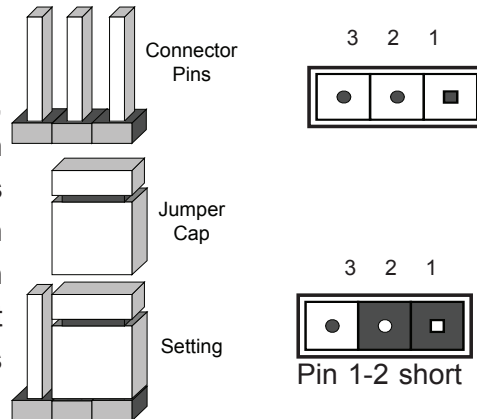
A. Internal Buzzer

B. Chassis Intrusion

## 2-8 Jumper Settings

### Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.



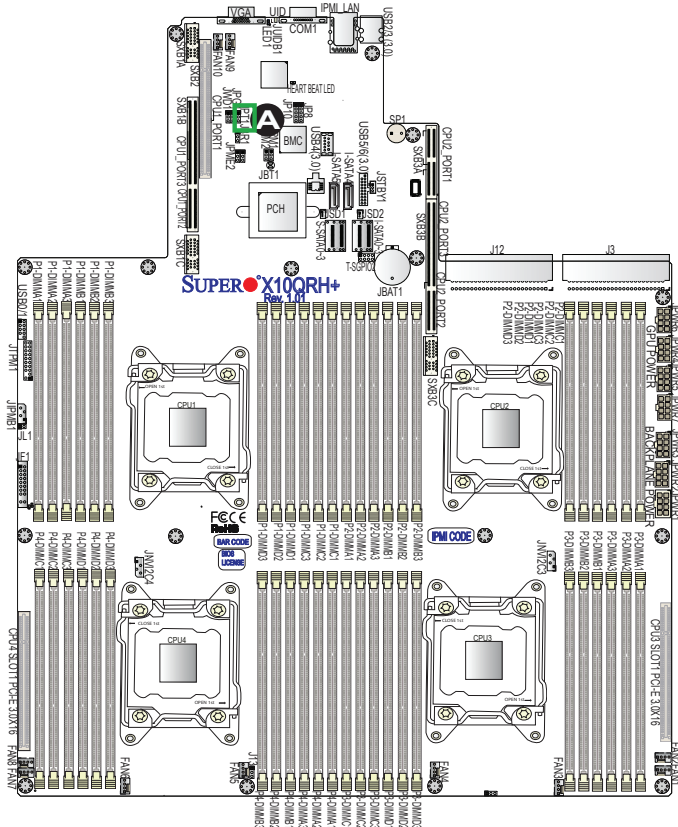
**Note:** On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

### TPM Enable

Close pins 1 & 2 to enable Jumper JPT1 for onboard Trusted Platform Module (TPM) support to enhance data security of your system. See the table on the right for jumper settings.

TPM Enable Jumper Settings	
Jumper Setting Definition	
1-2	Enabled (default)
2-3	Disabled


A. TPM Enable





### CMOS Clear

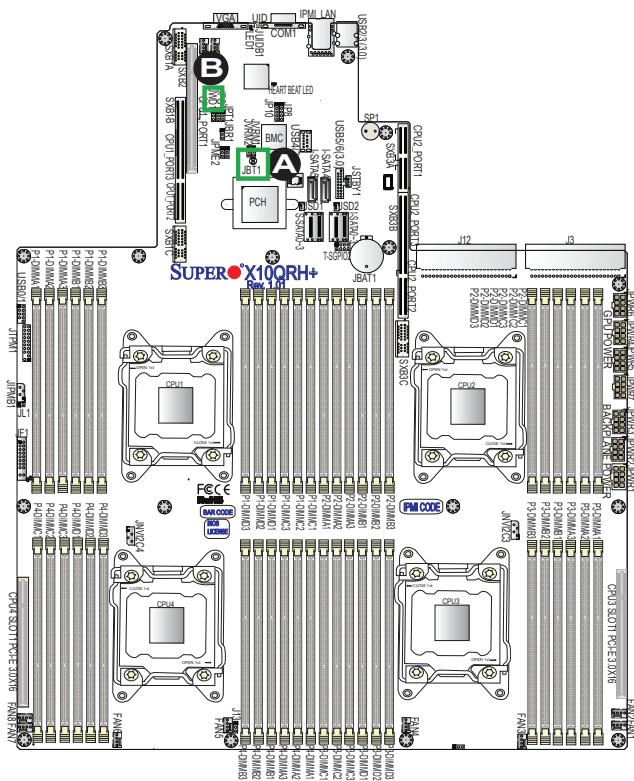
JBT1 is used to clear CMOS. Instead of pins, this "jumper" consists of contact pads to prevent accidental clearing of CMOS. To clear CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection. Always remove the AC power cord from the system before clearing CMOS. ⚠

 **Note:** Be sure to remove the onboard CMOS Battery before you short JBT1 to clear CMOS.

### Watch Dog Enable/Disable

Watch Dog (JWD1) is a system monitor that can reboot the system when a software application hangs. Close pins 1-2 to reset the system if an application hangs. Close pins 2-3 to generate non-maskable interrupt signals for the application that hangs. See the table on the right for jumper settings. Watch Dog must also be enabled in the BIOS.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset (default)
Pins 2-3	NMI
Open	Disabled



A. Clear CMOS

B. Watch Dog

### VGA Enable

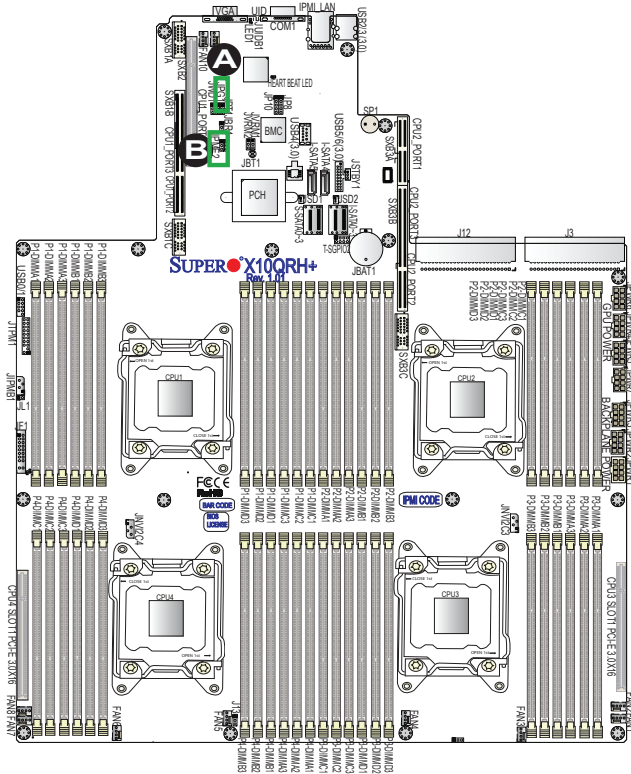
Jumper JPG1 allows the user to enable the onboard VGA connector. The default setting is 1-2 to enable the connection. See the table on the right for jumper settings.

VGA Enable Jumper Settings	
Jumper Setting	Definition
1-2	Enabled (Default)
2-3	Disabled

### Manufacture Mode Select

Close pins 2-3 of Jumper JPME2 to bypass SPI flash security and force the system to operate in the Manufacturer mode, which will allow the user to flash the system firmware from a host server for system setup modifications. See the table on the right for jumper settings. See the table on the right for jumper settings.

ME Mode Select Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Manufacture Mode

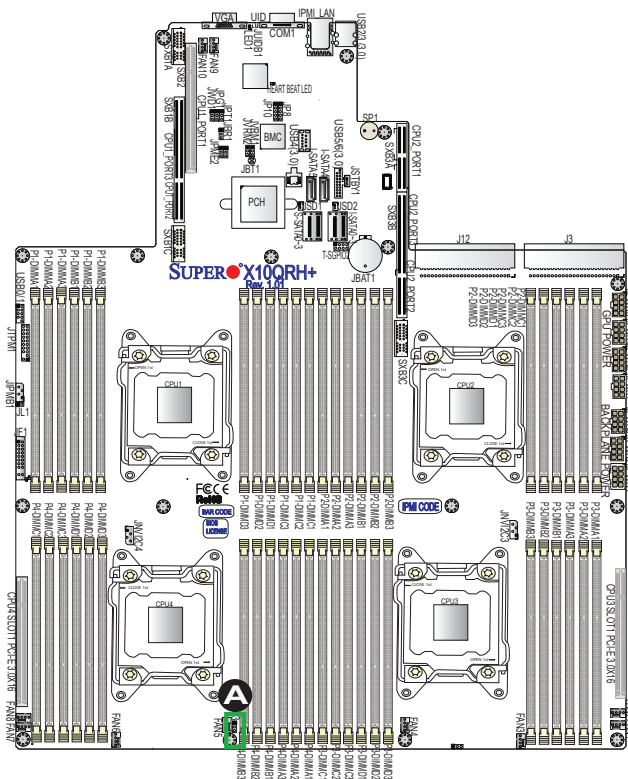


- A. VGA Enabled
- B. ME Mode Select

### Power-Fail Trigger Thermal Throttling Jumper

Close pins 2-3 to enable CPU thermal throttling when system power fails. The default setting is on pins 2-3 to enable this jumper. See the table on the right for jumper settings.

PWR-Fail Trigger Thermal Throttling Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Disabled
Pins 2-3	Enabled (Default)

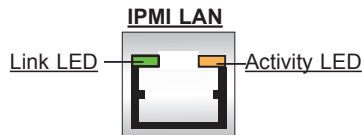


A. PWR-Fail Thermal Throttling Enabled

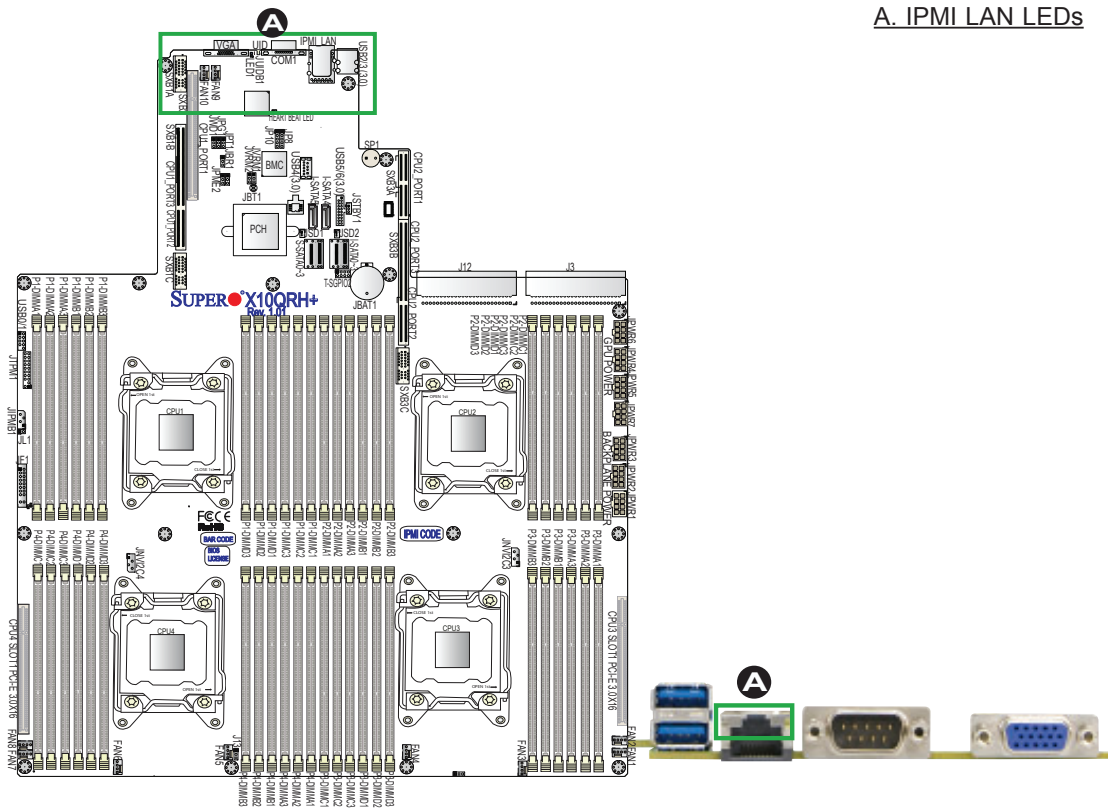
## 2-9 Onboard LED Indicators

### IPMI Dedicated LAN LEDs

An IPMI-dedicated LAN is located on the backpanel. The amber LED on the right of the IPMI LAN indicates activity, while the link LED on the left indicates the speed of the connection. See the tables at right for more information.



IPMI LAN Link LED (Left) & Activity LED (Right)		
	Color/State	Definition
Link (Left)	Green	100 Mbps
	Amber	1 Gbps
Activity (Right)	Amber: Blinking	Active

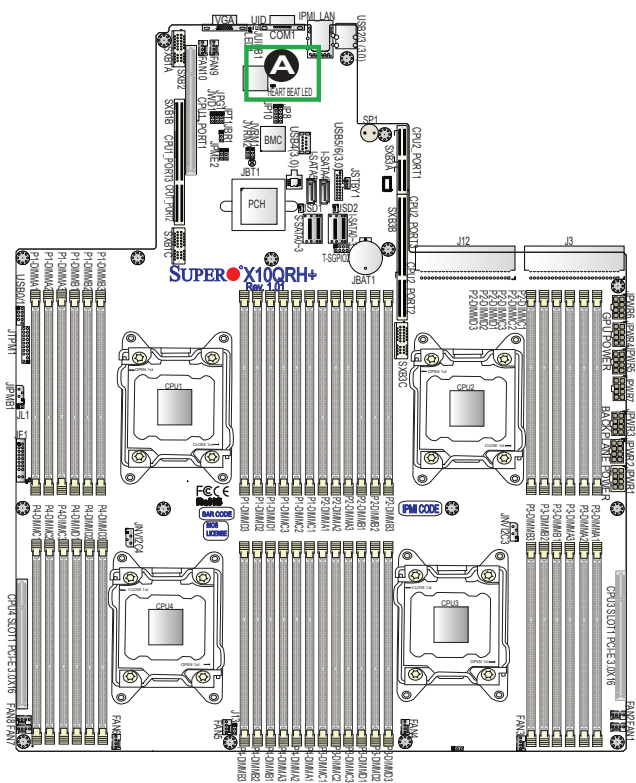


A. IPMI LAN LEDs

**BMC Heartbeat LED**

A BMC Heartbeat LED is located at Heartbeat\_LED on the motherboard. When this LED is blinking, BMC is normal. See the table at right for more information.

BMC Heartbeat LED Status	
Color/State	Definition
Green: Blinking	BMC: Normal

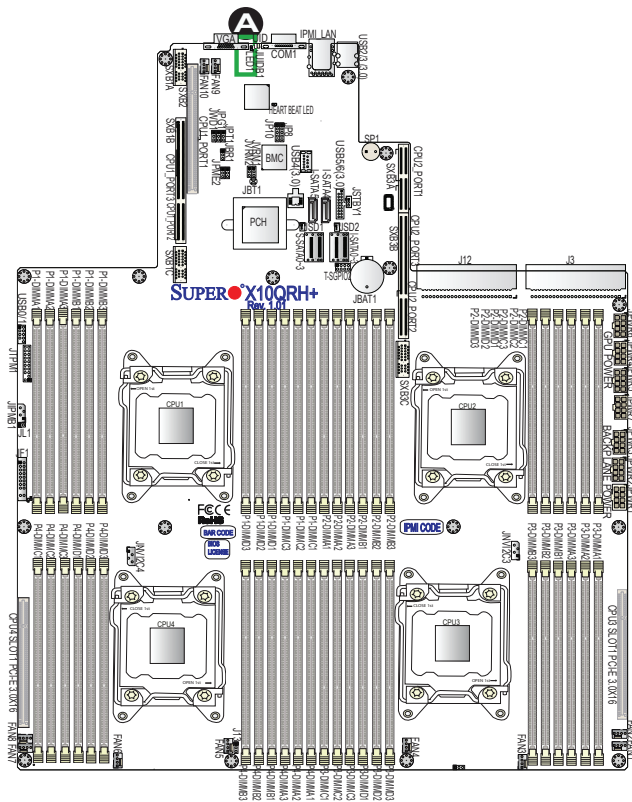


A. BMC Heartbeat LED

### Rear UID LED

The rear UID LED is located at UID\_1 on the rear of the motherboard. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service. Refer to UID Switch on Page 2-19 for more information.

UID LED Status		
Color/State	OS	Status
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified




A. UID LED

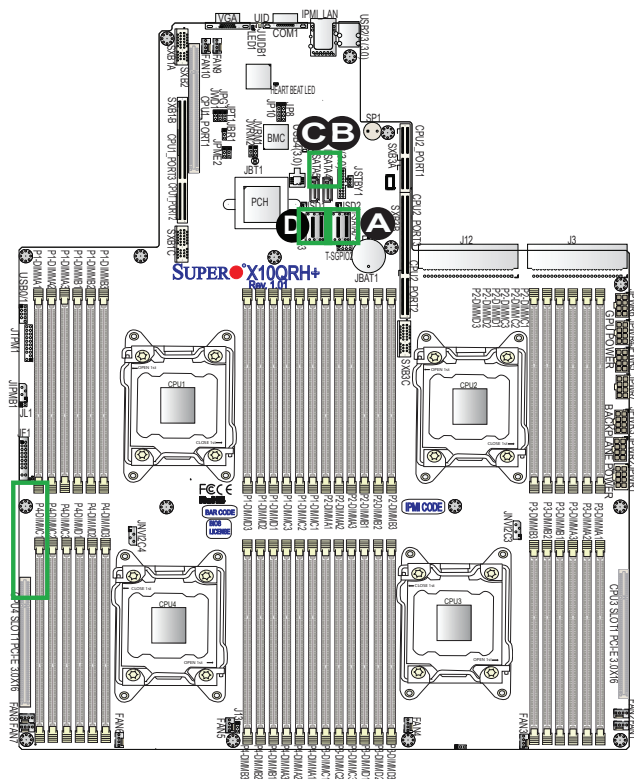
## 2-10 SATA 3.0 Connections

### SATA 3.0 Connections

Ten SATA 3.0 ports (I-SATA0-3, I-SATA 4/5, S-SATA0-3) are located on the motherboard. All these SATA 3.0 connections are supported by the Intel PCH. In addition, I-SATA4/5 can be used with Supermicro SuperDOMs which are yellow SATA DOM connectors with power pins built in, and no external cables are required. Supermicro SuperDOMs are backward-compatible with regular SATA HDDs or SATA DOMs that require external power cables. All these SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA. See the table on the right for pin definitions.

SATA 3.0 Pin Definitions	
Pin#	Definition
1	Ground
2	TX_P
3	TX_N
4	Ground
5	RX_N
6	RX_P
7	Ground

 **Notes:** For more information on SATA HostRAID configuration, please refer to the Intel SATA HostRAID User's Guide posted on our website @ <http://www.supermicro.com>.



- A. I-SATA 0-3
- B. I-SATA 4
- C. I-SATA 5
- D. S-SATA 0-3



## Chapter 3

# Troubleshooting

### 3-1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/or 'Returning Merchandise for Service' section(s) in this chapter. Note: Always disconnect the power cord before adding, changing or installing any hardware components.

#### **Before Power On**

1. Make sure that there are no short circuits between the motherboard and chassis.
2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.
3. Remove all add-on cards.
4. Install CPU 1 first (making sure that it is fully seated) and connect the front panel connectors to the motherboard.

#### **No Power**

1. Make sure that no short circuits between the motherboard and the chassis.
2. Make sure that all power connectors are properly connected.
3. Check that the 115V/230V switch on the power supply is properly set, if available.
4. Turn the power switch on and off to test the system, if applicable.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.



## No Video

1. If the power is on, but you do not have video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes.

## System Boot Failure

If the system does not display POST or does not respond after the power is turned on, check the following:

1. Check for any error beep from the motherboard speaker.
  - If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, try to turn on the system again with only one processor installed in CPU Socket#1. If there is still no error beep, replace the motherboard.
  - If there are error beeps, clear the CMOS settings by unplugging the power cord and contracting both pads on the CMOS Clear Jumper (JB1). (Refer to Section 2-8 in Chapter 2.)
2. Remove all components from the motherboard, especially the DIMM modules. Make sure that the system power is on, and memory error beeps are activated.
3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this Chapter.

## Losing the System's Setup Configuration

1. Make sure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information. Refer to Section 2-7 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.
3. If the steps indicated above do not fix the Setup Configuration problem, contact your vendor for repairs.

## Memory Errors

When a No\_Memory\_Beep\_Code is issued by the system, check the following:

1. Make sure that the memory modules are compatible with the system and that the DIMM modules are properly and fully installed. (For memory compatibility, refer to the Memory Compatibility Chart posted on our website @ <http://www.supermicro.com>.)
2. Check if DIMM modules with different speeds have been installed. It is strongly recommended that you use the same RAM speed for all DIMMs in the system.
3. Make sure that you are using the correct type of Registered (RDIMM)/Load Reduced (LRDIMM) ECC DDR4 SDRAM modules as recommended by the manufacturer.
4. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.
5. Make sure that all memory modules are fully seated in their slots. Follow the instructions given in Section 2-4 in Chapter 2.
6. Please follow the instructions given in the DIMM Population Tables listed in Section 2-4 to install your memory modules.

## When the System Becomes Unstable

***A. When the system becomes unstable during or after OS installation, check the following:***

1. CPU/BIOS support: Make sure that your CPU is supported, and you have the latest BIOS installed in your system.
2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.



**Note:** Refer to the product page on our website <http://www.supermicro.com> for memory and CPU support and updates.

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.
4. System cooling: Check system cooling to make sure that all heatsink fans, CPU fans and system fans work properly. Check Hardware Monitoring set-

tings in BIOS to make sure that the CPU and System temperatures are within the normal range. Also check the front panel Overheat LED, and make sure that the Overheat LED is not on.

5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on minimum power requirement.
6. Proper software support: Make sure that the correct drivers are used.

***B. When the system becomes unstable before or during OS installation, check the following:***

1. Installation Devices: Make sure that the devices used for installation are working properly, including boot devices such as CD/DVD-ROM.
2. Cable connection: Check to make sure that all cables are connected and working properly.
3. Using minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use minimum configuration (with a CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.
4. Identifying bad components by isolating them: If necessary, remove a component in question from the chassis, and test it in isolation to make sure that it works properly. Replace a bad component with a good one.
5. Check and change one component at a time instead of changing several items at the same time. This will help isolate and identify the problem.
6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

## 3-2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, please note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please go through the 'Troubleshooting Procedures' and 'Frequently Asked Question' (FAQ) sections in this chapter or see the FAQs on our website (<http://www.supermicro.com/>) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website (<http://www.supermicro.com>).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
  - Motherboard model and PCB revision number
  - BIOS release date/version (This can be seen on the initial display when your system first boots up.)
  - System configuration
4. An example of a Technical Support form is on our website at (<http://www.supermicro.com/RmaForm/>).
  - Distributors: For immediate assistance, please have your account number ready when placing a call to our technical support department. We can be reached by e-mail at [support@supermicro.com](mailto:support@supermicro.com).

## 3-3 Battery Removal and Installation

### Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below.
3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.
4. Remove the battery.

### Proper Battery Disposal

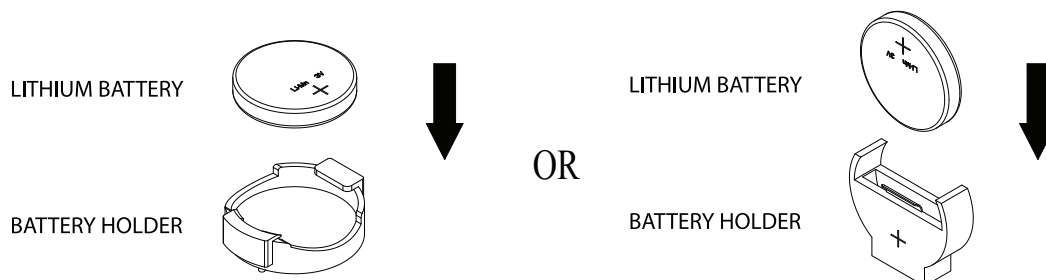
**Warning:** Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

### Battery Installation

To install an onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below.
3. Identify the battery's polarity. The positive (+) side should be facing up.
4. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

**Warning:** When replacing a battery, be sure to only replace it with the same type.



## 3-4 Frequently Asked Questions

**Question: What are the various types of memory that my motherboard can support?**

**Answer:** The motherboard supports DDR4 ECC DIMM modules. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given on Section 2-4 in Chapter 2.

**Question: How do I handle the used battery?**

**Answer:** Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly. Refer to Section 3-3 on Page 3-6.

**Question: How do I update my BIOS under DOS?**


It is recommended that you **do not** upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at <http://www.supermicro.com>. Please check our BIOS warning message and the information on how to update your BIOS on our website. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading. You can choose from the zip file and the .exe file. If you choose the zip BIOS file, please unzip the BIOS file onto a bootable USB device. Run the batch file using the format FLASH.BAT filename.rom from your bootable USB device to flash the BIOS. Then, your system will automatically reboot.

**Warning:** Do not shut down or reset the system while updating the BIOS to prevent possible system boot failure!




**Note:** The SPI BIOS chip used on this motherboard cannot be removed. Send your motherboard back to our RMA Department at Supermicro for repair. For BIOS Recovery instructions, please refer to the AMI BIOS Recovery Instructions posted at <http://www.supermicro.com>.

**Question: How do I update my BIOS under UEFI Shell?**

 **Note:** We do not recommend that you update your BIOS if you are not experiencing a BIOS-related problem. If you need to update your BIOS, please follow the steps below to properly update your BIOS under UEFI Shell.

1. Download and save the BIOS update package to your computer
2. Extract the files from the UEFI folder of the BIOS package to a USB stick.

 **Note:** The USB stick doesn't have to be bootable; however, it has to be formatted with the FAT/FAT32 file system.

3. Insert the USB stick into a USB port, boot to the UEFI Built-In Shell, and type the following commands to start the BIOS update:

```
Shell> fs0:
```

```
fs0:\> cd UEFI
```

```
fs0:\UEFI> flash.nsh BIOSname#.###
```

4. The FLASH.NSH script will compare the Flash Descriptor Table (FDT) code in the new BIOS with the existing one in the motherboard:

**a. If a different FDT is found**

- A new file, STARTUP.NSH, will be created, and the system will automatically reboot in 10 seconds without you pressing any key. BIOS will be updated after the system reboots.
- You can also press <Y> to force an immediate system reboot to shorten the process. During system reboot, press the <F11> key to invoke the boot menu and boot into the build-in UEFI Shell. Your BIOS will be updated automatically.

**b. If the FDT is the same**

- BIOS update will be immediately performed without a system reboot initiated.

**Warning:** Do not shut down or reset the system while updating the BIOS to prevent possible system boot failure!)

5. Perform an A/C power cycle after the message indicating the BIOS update has completed.
6. Go to the BIOS setup utility, and restore the BIOS settings.

### **3-5 Returning Merchandise for Service**

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, You can also request a RMA authorization online (<http://www.supermicro.com/RmaForm/>).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.



# Chapter 4


## BIOS

### 4-1 Introduction


This chapter describes the AMI BIOS setup utility for the X10QRH+ motherboard. It also provides the instructions on how to navigate the AMI BIOS setup utility screens. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated.

#### Starting BIOS Setup Utility


To enter the AMI BIOS setup utility screens, press the <Del> key while the system is booting up.

 **Note:** In most cases, the <Del> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F3>, <F4>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for informational text. When an option is selected in the left frame, it is highlighted in white. Often informational text will accompany it.

 **Note:** The AMI BIOS has default informational messages built in. The manufacturer retains the option to include, omit, or change any of these informational messages.


The AMI BIOS setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

 **Note 1:** Options printed in **Bold** are default settings.

**Note 2:** <F3> is used to load optimal default settings. <F4> is used to save the settings and exit the setup utility.

## How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS setup utility. This setup utility can be accessed by pressing <Delete> at the appropriate time during system boot.

 **Note:** For AMI UEFI BIOS Recovery, please refer to the UEFI BIOS Recovery User Guide posted @ <http://www.supermicro.com/support/manuals/>.

## Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

**Warning:** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall the manufacturer be liable for direct, indirect, special, incidental, or consequential damage arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is being updated to avoid possible boot failure.

## 4-2 Main Setup

When you first enter the AMI BIOS setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.



The AMI BIOS Main menu displays the following information:

**System Date/System Time**

Use this item to change the system date and time using the arrow keys. Enter new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in Day MM/DD/YYYY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.).

**Supermicro X10QRH+****BIOS Version**

This item displays the SMC version of the BIOS ROM used in this system.

**Build Date**

This item displays the date that the BIOS setup utility was built.

**CPLD Version**

This item displays the version of 'Complex Programmable Logic Device' (CPLD) used in this system.

**Memory Information****Total Memory**

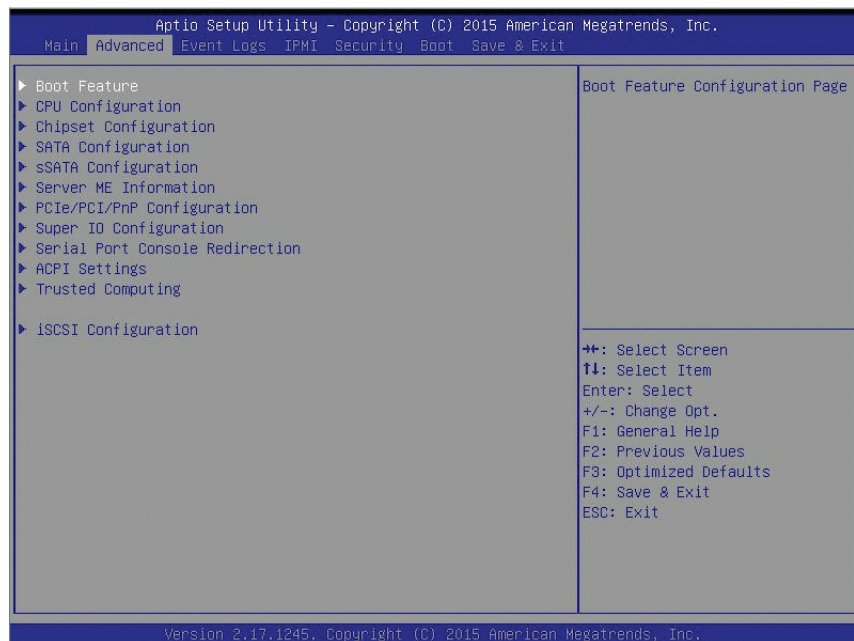
This item displays the amount of memory that is available in the system.

**Memory Speed**

This item displays the speed of memory modules installed in the system.

## 4-3 Advanced Setup Configurations

Select the Advanced tab to access the following submenu items.



### ► Boot Features

#### Boot Configuration

##### Quiet Boot

Use this item to select bootup screen display between POST messages and the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

##### AddOn ROM Display Mode

Use this item to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM Display setting. Select Force BIOS to use the Option ROM display set by the system BIOS. The options are **Force BIOS** and Keep Current.

##### Bootup Num-Lock

Use this item to set the power-on state for the Numlock key. The options are Off and **On**.

##### Wait For 'F1' If Error

Select Enabled to force the system to wait until the 'F1' key is pressed when an error occurs. The options are Disabled and **Enabled**.

### **Interrupt 19 Capture**

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Immediate, the BIOS ROM of the host adaptors will immediately capture Interrupt 19 at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Postponed, the BIOS ROM of the host adaptors will only capture Interrupt 19 during bootup from a legacy device. The options are **Immediate** and Postponed.

### **Re-try Boot**

If this item is set to Enabled, the system BIOS will continuously try to boot from the selected boot drive. The options are **Disabled**, Legacy Boot, and EFI Boot.

## **Power Configuration**

### **Watch Dog Function**

If enabled, the Watch Dog timer will allow the system to automatically reboot when a non-recoverable error that lasts for more than five minutes occurs. The options are Enabled and **Disabled**.

### **Power Button Function**

If this item is set to Instant Off, the system will power off immediately as soon as the user presses the power button. If this item is set to 4 Seconds Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant Off** and 4 Seconds Override.

### **Restore on AC Power Loss**

Use this item to set the power state after a power outage. Select Stay Off for the system power to remain off after a power outage. Select Power On to turn on the system power after a power outage. Select Last State to allow the system to resume its last power state before a power outage. The options are Power On, Stay Off, and **Last State**.

## **►CPU Configuration**

This submenu displays the following CPU information as detected by the BIOS. It also allows the user to configure CPU settings.

### **►Processor 0/Processor 1/Processor 2/Processor 3**

This submenu displays the following information of the CPU installed in Socket 0, Socket 1, Socket 2, and Socket 3.

- Processor Socket

- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 0 Version
- Processor 1 Version
- Processor 2 Version
- Processor 3 Version

### **Clock Spread Spectrum**

Select Enable to allow the BIOS to attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disable** and Enable.

### **Hyper-Threading (All)**

Select Enable to support Intel's Hyper-threading Technology to enhance CPU performance. The options are **Enable** and Disable.

### **Cores Enabled**

Use this item to set the number of CPU cores to be enabled in your system. Enter "0" to enable all cores. There are 22 cores available in the system. The default setting is **0**.

### **Execute-Disable Bit (Available if supported by the OS & the CPU)**

Select Enable for Execute Disable Bit Technology support, which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack.

The options are **Enable** and Disable. (Refer to Intel and Microsoft websites for more information.)

### **PPIN Control**


Select Unlock/Enable to use the Protected-Processor Inventory Number (PPIN) in the system. The options are **Unlock/Enable** and Unlock/Disable.

### **Hardware Prefetcher (Available when supported by the CPU)**

If set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disable and **Enable**.

### **Adjacent Cache Line Prefetch (Available when supported by the CPU)**

Select Enable for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disable for the CPU to prefetch both cache lines for 64 bytes. The options are Disable and **Enable**.

 **Note:** Please reboot the system for changes on this setting to take effect. Please refer to Intel's web site for detailed information.

### **DCU (Data Cache Unit) Streamer Prefetcher (Available when supported by the CPU)**

If set to Enable, the DCU Streamer Prefetcher will prefetch data streams from the cache memory to the DCU to speed up data accessing and processing to enhance CPU performance. The options are Disable and **Enable**.

### **DCU IP Prefetcher**

If set to Enable, the IP prefetcher in the DCU (Data Cache Unit) will prefetch IP addresses to improve network connectivity and system performance. The options are **Enable** and Disable.

### **Direct Cache Access (DCA)**

Select Enable to use Intel DCA (Direct Cache Access) Technology to improve the efficiency of data transferring and accessing. The options are **Enable** and Disable.

### **X2 APIC (Advanced Programmable Interrupt Controller)**

Based on Intel's Hyper-Threading architecture, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will expand from 8 bits (X2) to 16 bits to provide 512 APIDs to each thread for CPU performance enhancement. The options are **Disable** and Enable.


### **AES-NI**

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are **Enable** and Disable.

---

### **Intel® Virtualization Technology (Available when supported by the CPU)**

Select **Enable** to support Intel Virtualization Technology, which will allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enable** and **Disable**.

 **Note:** If there is a change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's website for detailed information.)

## **► Advanced Power Management Configuration**

### **Advanced Power Management Configuration**

#### **Power Technology**

Select **Energy Efficient** to support power-saving mode. Select **Custom** to customize system power settings. Select **Disable** to disable power-saving settings. The options are **Disable**, **Energy Efficient**, and **Custom**.

*\*If the option is set to Custom or Energy Efficient, the following items will display:*

#### **Energy Performance Tuning (Available when Power Technology is set to Custom or Energy Efficient)**

Select **Enable** for energy-performance tuning support to enhance energy efficiency, which might compromise system performance. The options are **Enable** and **Disable**.

#### **Energy Performance Bias Setting (Available when Power Technology is set to Custom or Energy Efficient)**

Use this feature to select an appropriate fan setting to achieve maximum system performance (with maximum cooling) or maximum energy efficiency with maximum power saving). The fan speeds are controlled by the firmware management via IPMI 2.0. The options are **Performance**, **Balanced Performance**, **Balanced Power**, and **Power**.

#### **Energy Efficiency Turbo (Available when Power Technology is set to Custom or Energy Efficient)**

Select **Enable** for the system to operate at turbo mode with reduced power consumption so that your machine can achieve maximum system performance with the maximum power efficiency possible. The options are **Enable** and **Disable**.



*\*If the option is set to Custom, the following items will display:*

## ► CPU P State Control (Available when Power Technology is set to Custom)

### EIST (P-states)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disable and **Enable**.

### Turbo Mode

Select Enable to use the Turbo Mode to boost system performance. The options are **Enable** and Disable.

### P-state Coordination

This item is used to change the P-state (Power-Performance State) coordination type. P-state is also known as "SpeedStep" for Intel processors. Select HW\_ALL to change the P-state coordination type for hardware components only. Select SW\_ALL to change the P-state coordination type for all software installed in the system. Select SW\_ANY to change the P-state coordination type for a software program in the system. The options are **HW\_All**, SW\_ALL, and SW\_ANY.

## ► CPU C State Control (Available when Power Technology is set to Custom)

### Package C State limit

Use this item to set the limit on the C-State package register. The options are C0/1 state, C2 state, **C6 (non-Retention) state**, and C6 (Retention) state.

### CPU C3 Report

Select Enable to allow the BIOS to report the CPU C3 state (ACPI C2) to the operating system. During the CPU C3 state, the CPU clock generator is turned off. The options are Enable and **Disable**.

### CPU C6 Report (Available when Power Technology is set to Custom)

Select Enable to allow the BIOS to report the CPU C6 state (ACPI C3) to the operating system. During the CPU C6 state, power to all cache is turned off. The options are **Enable** and Disable.

### **Enhanced Halt State (C1E)**

Select Enable to use the "Enhanced Halt State" feature, which will significantly reduce the CPU's power consumption by reducing the CPU's clock cycle and voltage during a "Halt State." The options are Disable and **Enable**.

## **► Chipset Configuration**

### **► North Bridge**

This feature is used to configure Intel North Bridge settings.

### **► IIO (Integrated IO) Configuration**

#### **EV DFX (Device Function On-Hide) Features**

When this item is set to Enable, the EV\_DFX Lock Bits that are located on a processor will always remain clear during electric tuning. The options are **Disable** and Enable.

### **► IIO0 Configuration**

#### **IOU2 (IIO PCIe Port 1)**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port specified above. The options are x4x4, x8, and **Auto**.

#### **IOU0 (IIO PCIE Port 2)**

This feature allows the user to set the bus speed between the IOU0 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

#### **IOU1 (IIO PCIE Port 3)**

This feature allows the user to set the bus speed between the IOU1 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

#### **No PCIe Port Active ECO**

Use this feature to select a workaround setting to implement the engineering-change order (ECO) on the system when the PCI ports specified by the user are not active. The options are **PCU Squelch exit ignore option** and Reset the SQ FLOP by CSR option.

## ►Socket 0 PCIeD00F0-Port 0/DMI

Use the items below to configure the PCI-E settings for a PCI-E port specified by the user.

### Link Speed

Use this item to select the PCI-E link speed for the PCI-E port specified by the user. The options for CPU-PCH DMI port and are GEN1 (2.5 GT/s), GEN2 (5 GT/s), and **Auto**. The options for Onboard LAN port, CPU1 Slot1 x8 port, and CPU1 Slot2 x16 port are GEN1 (2.5 GT/s), GEN2 (5 GT/s), GEN3 (8 GT/s), and **Auto**.

### PCI-E Port DeEmphasis

Use this item to select the De-Emphasis control setting for a PCI-E port specified by the user. The options are **-6.0 dB** and **-3.5 dB**.

\*The following items will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

### PCI-E Port L0s Exit Latency

Use this feature to set the length of time required for the port specified by the user to complete the transition from L0s to L0. The default setting is **4uS - 8uS**.

### PCI-E Port L1 Exit Latency

Use this feature to set the length of time required for the port specified by the user to complete the transition from L1 to L0. The default setting is <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, and >64uS.

### Fatal Err (Error) Over

Select Enable to force fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### Non-Fatal Err (Error) Over

Select Enable to force non-fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### Corr Err (Correctable Error) Over

Select Enable to force correctable error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **L0s Support**

When this item is set to Disable, IIO will not put its transmitter in the L0s state. The default setting is **Disable**.

### **► Socket 0 PCIeD01F0 - Port 1A/Socket 0 PCIeD02F0 - Port 2A/Socket 0 PCIeD02F2 - Port 2C/Socket 0 PCIeD03F2 - Port 3A/Socket 0 PCIeD03F2 - Port 3C**

#### **PCI-E Port**

Select Enable to enable the PCI-E port specified by the user. The options are **Auto**, Enable, and Disable.

#### **Hot Plug Capable**

Select Enable to enable hot-plugging support for the PCI-E port specified by the user to allow the user to replace the device installed on the port without shutting down the system. The options are **Disable** and Enable.

#### **PCI-E Port Link**

Select Disable to disable the link that is not involved in training activities, but its CFG is still active. The options are **Enable** and Disable.

#### **Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are GEN1 (2.5 GT/s), GEN2 (5 GT/s), GEN3 (8 GT/s), and **Auto**.

#### **PCI-E Port DeEmphasis**

Use this item to select the De-Emphasis control setting for a PCI-E port specified by the user. The options are **-6.0 dB** and -3.5 dB.

\*The following items will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

#### **PCI-E Port L0s Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L0s to L0. The default setting is **4uS - 8uS**.

**PCI-E Port L1 Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L1 to L0. The default setting is <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, and >64uS.

**Fatal Err (Error) Over**

Select Enable to force fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**Non-Fatal Err (Error) Over**

Select Enable to force non-fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**Corr Err (Correctable Error) Over**

Select Enable to force correctable error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**L0s Support**

When this item is set to Disable, IIO will not put its transmitter in the L0s state. The options are **Disable** and Enable.

**PM ACPI Support**

Select Enable to generate an \_HPGPE message on a PM ACPI event. Select Disable to generate an MSI message. The options are **Disable** and Enable.

**Gen3 (Generation 3) Eq (Equalization) Mode**

Use this item to set the "Adaptive Equalization" mode for PCI-E Generation 3 devices. The options are **Auto**, Enable Phase 0, 1, 2, 3; Disable Phase 0, 1, 2, 3; Enable Phase 1 Only, Enable Phase 0, 1 Only, Advanced, and Enable MMM Offset West.

**Gen3 (Generation 3) Spec (Specifics) Mode**

Use this item to set the Specifics mode for PCI-E Generation 3 devices. The options are **Auto**, 0.70 July, 0.70 Sept and 071 Sept.

**Gen3 (Generation 3) Phase2 Mode**

Use this item to set the PCI-E Generation 3 Phase 2 mode. The options are **Hardware Adaptive** and Manual.

### **Gen3 (Generation 3) DN TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 downstream transactions (from the master device to a slave device). The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0 /3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

### **Gen3 (Generation 3) DN RX Preset Hint**

Use this item to set the Preset Hint mode for PCI-E Gen3 downstream reception (from a slave device to the master device). The options are **Auto**, P0 (-6.0 dB), P1 (-7.0 dB), P2 (-8.0 dB), P3 (-9.0 dB), P4 (-10.0 dB) P5 (-11.0 dB), and P6 (-12.0 dB).

### **Gen3 (Generation 3) Up TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 upstream transactions (from a slave device to the master device).The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0/3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

### **Hide Port?**

Select Yes to hide the PCI-E port specified from the OS. The options are **No** and Yes.

## **► IIO1 Configuration**

### **IOU2 (IIO PCIe Port 1)**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port specified above. The options are x4x4, x8, and **Auto**.

### **IOU0 (IIO PCIE Port 2)**

This feature allows the user to set the bus speed between the IOU0 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### **IOU1 (IIO PCIE Port 3)**

This feature allows the user to set the bus speed between the IOU1 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### **No PCIe Port Active ECO**

Use this feature to select a workaround setting to implement the engineering-change order (ECO) on the system when the PCI ports specified by the user

are not active. The options are **PCU Squelch exit ignore option** and Reset the SQ FLOP by CSR option.

### ► **Socket 1 PCIeD00F0-Port 0/DMI/Socket 1 PCIeD01F0 - Port 1A/Socket 1 PCIeD02F0 - Port 2A/Socket 1 PCIeD03F0 - Port 3A**

#### **PCI-E Port**

Select Enable to enable the PCI-E port specified by the user. The options are **Auto**, Enable, and Disable.

#### **Hot Plug Capable**

Select Enable to enable hot-plugging support for the PCI-E port specified by the user to allow the user to replace the device installed on the port without shutting down the system. The options are **Disable** and Enable.

#### **PCI-E Port Link**

Select Disable to disable the link that is not involved in training activities, but its CFG is still active. The options are **Enable** and Disable.

#### **Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are GEN1 (2.5 GT/s), GEN2 (5 GT/s), GEN3 (8 GT/s), and **Auto**.

#### **PCI-E Port DeEmphasis**

Use this item to select the De-Emphasis control setting for a PCI-E port specified by the user. The options are **-6.0 dB** and -3.5 dB.

\*The following items will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

#### **PCI-E Port L0s Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L0s to L0. The default setting is **4uS - 8uS**.

#### **PCI-E Port L1 Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L1 to L0. The default setting is <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, and >64uS.

### **Fatal Err (Error) Over**

Select Enable to force fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **Non-Fatal Err (Error) Over**

Select Enable to force non-fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **Corr Err (Correctable Error) Over**

Select Enable to force correctable error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **L0s Support**

When this item is set to Disable, IIO will not put its transmitter in the L0s state. The options are **Disable** and Enable.

### **PM ACPI Support**

Select Enable to generate an \_HPGPE message on a PM ACPI event. Select Disable to generate an MSI message. The options are **Disable** and Enable.

### **Gen3 (Generation 3) Eq (Equalization) Mode**

Use this item to set the "Adaptive Equalization" mode for PCI-E Generation 3 devices. The options are **Auto**, Enable Phase 0, 1, 2, 3; Disable Phase 0, 1, 2, 3; Enable Phase 1 Only, Enable Phase 0, 1 Only, Advanced, and Enable MMM Offset West.

### **Gen3 (Generation 3) Spec (Specifics) Mode**

Use this item to set the Specifics mode for PCI-E Generation 3 devices. The options are **Auto**, 0.70 July, 0.70 Sept and 071 Sept.

### **Gen3 (Generation 3) Phase2 Mode**

Use this item to set the PCI-E Generation 3 Phase 2 mode. The options are **Hardware Adaptive** and Manual.

### **Gen3 (Generation 3) DN TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 downstream transactions (from the master device to a slave device). The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0 /3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).



**Gen3 (Generation 3) DN RX Preset Hint**

Use this item to set the Preset Hint mode for PCI-E Gen3 downstream reception (from a slave device to the master device). The options are **Auto**, P0 (-6.0 dB), P1 (-7.0 dB), P2 (-8.0 dB), P3 (-9.0 dB), P4 (-10.0 dB) P5 (-11.0 dB), and P6 (-12.0 dB).

**Gen3 (Generation 3) Up TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 upstream transactions (from a slave device to the master device).The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0/3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

**Hide Port?**

Select Yes to hide the PCI-E port specified from the OS. The options are **No** and Yes.

**► IIO2 Configuration****IOU2 (IIO PCIe Port 1)**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port specified above. The options are x4x4, x8, and **Auto**.

**IOU0 (IIO PCIE Port 2)**

This feature allows the user to set the bus speed between the IOU0 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

**IOU1 (IIO PCIE Port 3)**

This feature allows the user to set the bus speed between the IOU1 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

**No PCIe Port Active ECO**

Use this feature to select a workaround setting to implement the engineering-change order (ECO) on the system when the PCI ports specified by the user are not active. The options are **PCU Squelch exit ignore option** and Reset the SQ FLOP by CSR option.

► **Socket 2 PCIeD00F0-Port 0/DMI/Socket 2 PCIeD01F0  
- Port 1A/Socket 2 PCIeD02F0 - Port 2A/Socket 2  
PCIeD02F2 - Port 2C/Socket 2 PCIeD03F0 - Port 3A**

**PCI-E Port**

Select Enable to enable the PCI-E port specified by the user. The options are **Auto**, Enable, and Disable.

**Hot Plug Capable**

Select Enable to enable hot-plugging support for the PCI-E port specified by the user to allow the user to replace the device installed on the port without shutting down the system. The options are **Disable** and Enable.

**PCI-E Port Link**

Select Disable to disable the link that is not involved in training activities, but its CFG is still active. The options are **Enable** and Disable.

**Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are GEN1 (2.5 GT/s), GEN2 (5 GT/s), GEN3 (8 GT/s), and **Auto**.

**PCI-E Port DeEmphasis**

Use this item to select the De-Emphasis control setting for a PCI-E port specified by the user. The options are **-6.0 dB** and -3.5 dB.

\*The following items will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

**PCI-E Port L0s Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L0s to L0. The default setting is **4uS - 8uS**.

**PCI-E Port L1 Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L1 to L0. The default setting is <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, and >64uS.

**Fatal Err (Error) Over**

Select Enable to force fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**Non-Fatal Err (Error) Over**

Select Enable to force non-fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**Corr Err (Correctable Error) Over**

Select Enable to force correctable error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

**L0s Support**

When this item is set to Disable, IIO will not put its transmitter in the L0s state. The options are **Disable** and Enable.

**PM ACPI Support**

Select Enable to generate an \_HPGPE message on a PM ACPI event. Select Disable to generate an MSI message. The options are **Disable** and Enable.

**Gen3 (Generation 3) Eq (Equalization) Mode**

Use this item to set the "Adaptive Equalization" mode for PCI-E Generation 3 devices. The options are **Auto**, Enable Phase 0, 1, 2, 3; Disable Phase 0, 1, 2, 3; Enable Phase 1 Only, Enable Phase 0, 1 Only, Advanced, and Enable MMM Offset West.

**Gen3 (Generation 3) Spec (Specifics) Mode**

Use this item to set the Specifics mode for PCI-E Generation 3 devices. The options are **Auto**, 0.70 July, 0.70 Sept and 071 Sept.

**Gen3 (Generation 3) Phase2 Mode**

Use this item to set the PCI-E Generation 3 Phase 2 mode. The options are **Hardware Adaptive** and Manual.

**Gen3 (Generation 3) DN TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 downstream transactions (from the master device to a slave device). The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0 /3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

### **Gen3 (Generation 3) DN RX Preset Hint**

Use this item to set the Preset Hint mode for PCI-E Gen3 downstream reception (from a slave device to the master device). The options are **Auto**, P0 (-6.0 dB), P1 (-7.0 dB), P2 (-8.0 dB), P3 (-9.0 dB), P4 (-10.0 dB) P5 (-11.0 dB), and P6 (-12.0 dB).

### **Gen3 (Generation 3) Up TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 upstream transactions (from a slave device to the master device).The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0/3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

### **Hide Port?**

Select Yes to hide the PCI-E port specified from the OS. The options are **No** and Yes.

## **► IIO3 Configuration**

### **IOU2 (IIO PCIe Port 1)**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port specified above. The options are x4x4, x8, and **Auto**.

### **IOU0 (IIO PCIE Port 2)**

This feature allows the user to set the bus speed between the IOU0 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### **IOU1 (IIO PCIE Port 3)**

This feature allows the user to set the bus speed between the IOU1 and the PCI-Exp port specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### **No PCIe Port Active ECO**

Use this feature to select a workaround setting to implement the engineering-change order (ECO) on the system when the PCI ports specified by the user are not active. The options are **PCU Squelch exit ignore option** and Reset the SQ FLOP by CSR option.

**► Socket 3 PCIeD00F0-Port 0/DMI/Socket 3 PCIeD01F0  
- Port 1A/Socket 3 PCIeD02F0 - Port 2A/Socket 3  
PCIeD02F2 - Port 2C/Socket 3 PCIeD03F0 - Port 3A**

**PCI-E Port**

Select Enable to enable the PCI-E port specified by the user. The options are **Auto**, Enable, and Disable.

**Hot Plug Capable**

Select Enable to enable hot-plugging support for the PCI-E port specified by the user to allow the user to replace the device installed on the port without shutting down the system. The options are **Disable** and Enable.

**PCI-E Port Link**

Select Disable to disable the link that is not involved in training activities, but its CFG is still active. The options are **Enable** and Disable.

**Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are GEN1 (2.5 GT/s), GEN2 (5 GT/s), GEN3 (8 GT/s), and **Auto**.

**PCI-E Port DeEmphasis**

Use this item to select the De-Emphasis control setting for a PCI-E port specified by the user. The options are **-6.0 dB** and -3.5 dB.

\*The following items will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

**PCI-E Port L0s Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L0s to L0. The default setting is **4uS - 8uS**.

**PCI-E Port L1 Exit Latency**

Use this feature to set the length of time required for the port specified by the user to complete the transition from L1 to L0. The default setting is <1uS, 1uS - 2uS, 2uS - 4uS, 4uS - 8uS, **8uS - 16uS**, 16uS - 32uS, 32uS - 64uS, and >64uS.

### **Fatal Err (Error) Over**

Select Enable to force fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **Non-Fatal Err (Error) Over**

Select Enable to force non-fatal error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **Corr Err (Correctable Error) Over**

Select Enable to force correctable error prorogation to the IIO core error logic for the port specified by the user. The options are **Disable** and Enable.

### **L0s Support**

When this item is set to Disable, IIO will not put its transmitter in the L0s state. The options are **Disable** and Enable.

### **PM ACPI Support**

Select Enable to generate an \_HPGPE message on a PM ACPI event. Select Disable to generate an MSI message. The options are **Disable** and Enable.

### **Gen3 (Generation 3) Eq (Equalization) Mode**

Use this item to set the "Adaptive Equalization" mode for PCI-E Generation 3 devices. The options are **Auto**, Enable Phase 0, 1, 2, 3; Disable Phase 0, 1, 2, 3; Enable Phase 1 Only, Enable Phase 0, 1 Only, Advanced, and Enable MMM Offset West.

### **Gen3 (Generation 3) Spec (Specifics) Mode**

Use this item to set the Specifics mode for PCI-E Generation 3 devices. The options are **Auto**, 0.70 July, 0.70 Sept and 071 Sept.

### **Gen3 (Generation 3) Phase2 Mode**

Use this item to set the PCI-E Generation 3 Phase 2 mode. The options are **Hardware Adaptive** and Manual.

### **Gen3 (Generation 3) DN TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 downstream transactions (from the master device to a slave device). The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0 /3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

**Gen3 (Generation 3) DN RX Preset Hint**

Use this item to set the Preset Hint mode for PCI-E Gen3 downstream reception (from a slave device to the master device). The options are **Auto**, P0 (-6.0 dB), P1 (-7.0 dB), P2 (-8.0 dB), P3 (-9.0 dB), P4 (-10.0 dB) P5 (-11.0 dB), and P6 (-12.0 dB).

**Gen3 (Generation 3) Up TX Preset**

Use this item to set the Preset mode for PCI-E Gen3 upstream transactions (from a slave device to the master device).The options are **Auto**, P0 (-6.0/0.0 dB), P1 (-3.5/0.0 dB), P2 (-4.5/0.0 dB), P3 (-2.5/0.0 dB), P4 (0.0/0.0 dB), P5 (0.0/2.0 dB), P6 (0.0/2.5 dB), P7 (-6.0/3.5 dB), P8 (-3.5/3.5 dB), and P9 (0.0/3.5 dB).

**Hide Port?**

Select Yes to hide the PCI-E port specified from the OS. The options are **No** and Yes.

**► IOAT Configuration****Enable IOAT**

Select Enable to enable Intel I/OAT (I/O Acceleration Technology), which significantly reduces CPU overhead by leveraging CPU architectural improvements and freeing the system resource for other tasks. The options are **Enable** and Disable.

**No Snoop**

Select Enable to support no-snoop mode for each CB device. The options are **Disable** and Enable.

**Relaxed Ordering**

Select Enable for relaxed ordering support, which will allow certain transactions to be processed and completed prior to other transactions that have already been queued and that violate the strict ordering rules of PCI processing. The options are **Disable** and Enable.

**► Intel VT for Directed I/O (VT-d)****Intel® VT for Directed I/O (VT-d)**

Select Enable to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and Disable.

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### **Interrupt Remapping**

Select Enable to support Interrupt Remapping to enhance system performance. The options are **Enable** and Disable.

## **► QPI (Quick Path Interconnect) Configuration**

### **QPI Status**

The following information will display:

- Number of CPU
- Number of IIO
- Current QPI Link Speed
- Current QPI Link Frequency
- QPI Global MMIO Low Base/Limit
- QPI Global MMIO High Base/Limit
- QPI PCI-E Configuration Base/Siz (Size)

### **Link Frequency Select**

Use this feature to select the desired frequency for QPI Link connections. The options are 6.4GB/s, 8.0GB/s, 9.6GB/s, **Auto**, and Auto Limited.

### **Link L0p Enable**

Select Enable for Link L0p support. The options are **Enable** and Disable.

### **Link L1 Enable**

Select Enable for Link L1 support. The options are **Enable** and Disable.

### **COD Enable (Available when the OS and the CPU support this feature)**

Select Enable for Cluster-On-Die support to enhance system performance in cloud computing. The options are Enable and **Disable**.

### **Early Snoop**

Select Enable to support Early Snoop mode for the QPI link. The options are **Disable** and Enable.



**Isoc**

Select Enable to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enable and **Disable**. COD Enable (Available when the OS and the CPU support this feature)

Select Enabled for Cluster-On-Die support to enhance system performance in cloud computing. The options are Enable and **Disable**.

**Early Snoop (Available when the OS and the CPU support this feature)**

Select Enable for Early Snoop support to enhance system performance. The options are Enable, Disable, and **Auto**.

**Isoc Mode**

Select Enable for Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for Virtualization Technology. The options are Enable and **Disable**.

**► Memory Configuration****Enforce POR**

Select Enable to enforce POR restrictions on DDR4 frequency and voltage programming. The options are **Enabled** and Disabled.

**Memory Frequency**

Use this item to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, 2400, 2600, 2667, 2800, 2993, 3000, 3200, and Reversed.

**Data Scrambling**

Select Enabled to enable data scrambling to enhance system performance and data integrity. The options are **Auto**, Disabled and Enabled.

**Enable ADR**

Use this item to configure Automatic Diagnostic Repository (ADR) settings to enhance memory performance. The options are **Disabled**, and Enabled.

**DRAM RAPL (Running Average Power Limit) Baseline**

Use this item to set the run-time power-limit baseline for the DRAM modules. The options are Disable, DRAM RAPL Mode 0, and **DRAM RAPL Mode 1**.

### Set Throttling Mode

Throttling improves reliability and reduces power consumption in processors via automatic voltage control during processor idle states. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

### Socket Interleave Below 4GB

Select Enabled for the memory above the 4G Address space to be split between two sockets. The options are Enable and **Disable**.

### A7 Mode

Select Enabled to support the A7 (Addressing) mode to improve memory performance. The options are **Enable** and Disable.

## ► DIMM Information

This item displays the status of a DIMM module as detected by the BIOS.

P1-DIMMA1-A3/P1-DIMMB1-B3/P1-DIMMC1-C3/P1-DIMMD1-D3/P2-DIMME1-E3/P2-DIMMF1-F3/P2-DIMMG1-G3/P2-DIMMH1-H3

## ► Memory RAS (Reliability\_Availability\_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

### RAS Mode

When Disable is selected, RAS is not supported. When Mirror is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lockstep is selected, the motherboard uses two areas of memory to run the same set of operations in parallel to boost performance. The options are **Disable**, Mirror, and Lockstep Mode.

### Memory Rank Sparing

Select Enable to enable memory-sparing support for memory ranks to improve memory performance. The options are **Disabled** and Enabled.

### Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enable, the PCH (Platform Control Hub) will read and write-back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the PCH will be scrubbed every day. The options are **Enable** and Disable.

### **Patrol Scrub Interval**

This feature allows you to decide how many hours the system should wait before the next complete patrol scrub is performed. Use the keyboard to enter a value from 0-24. The Default setting is **24**.

### **Demand Scrub**

Demand Scrubbing is a process that allows the CPU to correct correctable memory errors found on a memory module. When the CPU or I/O issues a demand-read command, and the read data from memory turns out to be a correctable error, the error is corrected and sent to the requestor (the original source). Memory is updated as well. Select Enable to use Demand Scrubbing for ECC memory correction. The options are **Enable** and Disable.

### **Device Tagging**

Select Enable to support device tagging. The options are **Disable** and Enable.

## **►South Bridge Configuration**

The following South Bridge information will display:

### **►USB Configuration**

- USB Module Version
- USB Devices

### **Legacy USB Support**

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there are no legacy USB devices present. Select Disable to have all USB devices available for EFI applications only. The options are **Enabled**, Disabled and Auto.

### **XHCI (Extensible Host Controller Interface) Hand-Off**

This is a work-around solution for operating systems that do not support XHCI (Extensible Host Controller Interface) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The settings are **Enabled** and Disabled.

### **EHCI Hand-Off**

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) hand-off. When this item is enabled, EHCI ownership change will be claimed by the EHCI driver. The settings are Enabled and **Disabled**.

### **Port 60/64 Emulation**

Select Enabled for I/O port 60h/64h emulation support which will provide complete USB keyboard legacy support for the operating system that does not support Legacy USB devices. The options are Disabled and **Enabled**.

### **USB 3.0 Support**

Select Enabled for USB 3.0 support. The options are Smart Auto, **Auto**, Enabled, and Disabled.

### **EHCI1**

Select Enabled to enable EHCI (Enhanced Host Controller Interface) support on USB 2.0 connector #1 (-at least one USB 2.0 connector should be enabled for EHCI support.) The options are Disabled and **Enabled**.

### **EHCI2**

Select Enabled to enable EHCI (Enhanced Host Controller Interface) support on USB 2.0 connector #2 (-at least one USB 2.0 connector should be enabled for EHCI support.) The options are Disabled and **Enabled**.

### **XHCI (Extensible Host Controller Interface) Pre-Boot Drive**

Select Enabled to enable XHCI (Extensible Host Controller Interface) support on a pre-boot drive specified by the user. The options are **Enabled** and Disabled.

### **XHCI (Extensible Host Controller Interface) Idle L1**

Select Enabled to enable XHCI Idle L1 (Level 1) support. The options are **Enabled** and Disabled.

## **►SATA Configuration**

When this submenu is selected, AMI BIOS automatically detects the presence of the SATA devices and displays the following items:

### **SATA Controller**

This item enables or disables the onboard SATA controller supported by the Intel PCH chip. The options are **Enabled** and Disabled.

### **Configure SATA as**

Select IDE to configure a SATA drive specified by the user as an IDE drive. Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are IDE, **AHCI**, and RAID.

*\*If the item above "Configure SATA as" is set to AHCI, the following items will display:*

### **Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

### **SATA Port 0~ Port 5**

This item displays the information detected on the installed SATA drive on the particular SATA port.

- Model number of drive and capacity
- Software Preserve Support

### **SATA Port 0~ Port 5**

Select Enabled to enable a SATA port specified by the user. The options are Disabled and **Enabled**.

### **SATA Port 0 ~ Port 5 Hot Plug**

Select Enabled to enable hot-plugging support for a port specified by the user, which will allow the user to replace a SATA disk drive installed on this port without shutting down the system. The options are **Enabled** and Disabled.

### **SATA Port 0 ~ Port 5 Spin Up Device**

On an edge detect from 0 to 1, select Enabled to allow the PCH to initialize the device. The options are Enabled and **Disabled**.

### **SATA Port 0 ~ Port 5 SATA Device Type**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

*\*If the item above "Configure SATA as" is set to IDE, the following items will display:*

### **Serial ATA Port 0~ Port 5**

This item indicates that a SATA port specified by the user is installed (present) or not.

### **SATA Port 0 ~ Port 5 SATA Device Type (Available when a SATA port is detected)**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

*\*If the item above "Configure SATA as" is set to RAID, the following items will display:*

### **Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

### **SATA RAID Option ROM/UEFI Driver**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disabled, EFI, and **Legacy**.

### **SATA/sSATA RAID Boot Select**

Select SATA Controller to boot the system from a SATA RAID device. Select sSATA Controller to boot the system from a S-SATA RAID device. Select Both to boot the system either from a SATA RAID device or from an sSATA RAID device. Please note that the option-Both is not supported by the Windows Server 2012/R2 OS. The options are Both, SATA Controller, and **sSATA Controller**.

### **Serial ATA Port 0~ Port 5**

This item displays the information detected on the installed SATA drives on the particular SATA port.

- Model number of drive and capacity
- Software Preserve Support

### **Serial ATA Port 0~ Port 5**

Select Enabled to enable a SATA port specified by the user. The options are Disabled and **Enabled**.

### **Serial ATA Port 0 ~ Port 5 Hot Plug**

Select Enabled to enable hot-plugging support for a port specified by the user, which will allow the user to replace a SATA disk drive installed on this port without shutting down the system. The options are **Enabled** and Disabled.

**Serial ATA Port 0 ~ Port 5 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

**Serial ATA Port 0 ~ Port 5 SATA Device Type**

Use this item to specify if the SATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**►sSATA Configuration**

When this submenu is selected, AMI BIOS automatically detects the presence of the SATA devices that are supported by the PCH-sSATA controller and displays the following items:

**sSATA Controller**

This item enables or disables the onboard SATA controller supported by the Intel PCH-sSATA controller. The options are **Enabled** and Disabled.

**Configure sSATA as**

Select IDE to configure an sSATA drive specified by the user as an IDE drive. Select AHCI to configure an sSATA drive specified by the user as an AHCI drive. Select RAID to configure an sSATA drive specified by the user as a RAID drive. The options are IDE, **AHCI**, and RAID.

*\*If the item above "Configure sSATA as" is set to AHCI, the following items will display:*

**Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

**sSATA Port 0~ Port 3**

This item displays the information detected on the installed on the sSATA port. specified by the user.

- Model number of drive and capacity
- Software Preserve Support

### **sSATA Port 0~ Port 3**

Select Enabled to enable an sSATA port specified by the user. The options are Disabled and Enabled.

### **sSATA Port 0 ~ Port 3 Hot Plug**

Select Enabled to enable hot-plugging support for a port specified by the user, which will allow the user to replace a sSATA disk drive installed on this port without shutting down the system. The options are **Enabled** and Disabled.

### **sSATA Port 0 ~ Port 3 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

### **sSATA Port 0 ~ Port 3 sSATA Device Type**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

*\*If the item above "Configure sSATA as" is set to IDE, the following items will display:*

### **sSATA Port 0~ Port 3**

This item indicates that an sSATA port specified by the user is installed (present) or not.

### **sSATA Port 0 ~ Port 3 sSATA Device Type (Available when a SATA port is detected)**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

*\*If the item above "Configure sSATA as" is set to RAID, the following items will display:*

### **Support Aggressive Link Power Management**

When this item is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link to a low power state when the I/O is inactive for an extended period of time, and the power state will return to normal when the I/O becomes active. The options are **Enabled** and Disabled.

### **sSATA RAID Option ROM/UEFI Driver**

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disabled, EFI, and **Legacy**.



**SATA/sSATA RAID Boot Select**

Select SATA Controller to use a device supported by the SATA connector for system boot. Select sSATA Controller to use a device supported by the sSATA connector for system boot. The options are SATA Controller, **sSATA Controller**, and Both.

**sSATA Port 0~ Port 3**

This item displays the information detected on the installed sSATA drives on the particular sSATA port.

- Model number of drive and capacity
- Software Preserve Support

**sSATA Port 0~ Port 3**

Select Enabled to enable an sSATA port specified by the user. The options are Disabled and Enabled.

**sSATA Port 0 ~ Port 3 Hot Plug**

This feature designates this port for hot plugging. Set this item to Enabled for hot-plugging support, which will allow the user to replace an sSATA drive without shutting down the system. The options are **Enabled** and Disabled.

**sSATA Port 0 ~ Port 3 Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the PCH to start a COMRESET initialization to the device. The options are Enabled and **Disabled**.

**sSATA Port 0 ~ Port 3 sSATA Device Type**

Use this item to specify if the sSATA port specified by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

**► Server ME (Management Engine) Configuration**

This feature displays the following system ME configuration settings.

- General ME Configuration
- Operational Firmware Version
- Recovery Firmware Version
- ME Firmware Features

- ME Firmware Status #1
- ME Firmware Status #2
  - Current State
  - Error Code

### **Altitude**

This feature indicates the altitude of the platform this machine is located above the sea level. The value is shown in meters. If the value is unknown, enter the number "80000000."

### **MCTP (Management Component Transport Protocol) Bus Owner**

This feature indicates the location of the MCTP Bus owner. Enter 0s to all fields to disable the MCTP Bus owner.

## **►PCIe/PCI/PnP Configuration**

The following PCI information will be displayed:

### **PCI Latency Timer**

Use this item to configure the PCI latency timer for a device installed on a PCI bus. Select 32 to set the PCI latency timer to 32 PCI clock cycles. The options are **32**, 64, 96, 128, 160, 192, 224, and 248 (PCI Bus Clocks).

### **PERR# Generation**

Select Enabled to allow a PCI device to generate a PERR (PCI/PCI-E Parity Error) number for a PCI bus error event. The options are Enabled and **Disabled**.

### **SERR# Generation**

Select Enabled to allow a PCI device to generate an SERR (System Error) number for a PCI bus error event. The options are Enabled and **Disabled**.

### **PCI PERR/SERR Support**

Select Enabled to allow a PCI device to generate a PERR (PCI/PCI-E Parity Error) or an SERR (System Error) number for a PCI bus error event. The options are Enabled and **Disabled**.

### **Above 4G Decoding (Available if the system supports 64-bit PCI decoding)**

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are Enabled and **Disabled**.

**SR-IOV (Available if the system supports Single-Root Virtualization)**

Select Enabled for Single-Root IO Virtualization support. The options are Enabled and **Disabled**.

**Maximum Payload**

Select Auto for the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**Maximum Read Request**

Select Auto for the system BIOS to automatically set the maximum size for a read request for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**ASPM Support**

Use this item to set the Active State Power Management (ASPM) level for a PCI-E device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are **Disabled** and Auto.

**Warning:** Enabling ASPM support may cause some PCI-E devices to fail!

**MMIOHBase**

Use this item to select the base memory size according to memory-address mapping for the PCH. The base memory size must be between 4032G to 4078G. The options are **56T**, 48T, 24T, 2T, 512G, and 256G.

**MMIO High Size**

Use this item to select the high memory size according to memory-address mapping for the PCH. The options are **256G**, 128G, 512G, and 1024G.

**PCI-E Hot Plug**

Select Enabled to support Hot-plugging for the device installed on a PCI-E slot specified by the user which will allow the user to replace a device without shutting down the system. The options are **Enabled** and Disabled.

**PC Devices Option ROM Settings****AOC-2UR66-14G Slot1 PCIE x16 OPROM/ AOC-2UR66-14G Slot2 PCIE x16 OPROM**

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified by the user. The options are Disabled, **Legacy** and EFI.

### **Onboard Video Option ROM**

Use this option to select the type of device installed in the onboard video device used for system boot. The options are Disabled, **Legacy** and EFI.

### **VGA Priority**

Use this item to select the graphics device to be used as the primary video display for system boot. The options are **Onboard** and Offboard.

### **Onboard LAN Option ROM Type**

Select Legacy to boot the computer using a Legacy device installed on the motherboard. The options are **Legacy** and EFI.

### **AOC-2UR66-14G Intel® I350 LAN1 (Option ROM Type)**

Select Legacy to boot the computer using a Legacy device installed on the motherboard. The options are Disabled, **PXE**, and iSCSI.

### **Network Stack**

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Enabled and **Disabled**.

## **► Super IO Configuration**

### **Super IO Chip AST2400**

### **► Serial Port 1 Configuration/Serial Port 2 Configuration**

#### **Serial Port 1/Serial Port 2**

Select Enabled to enable the onboard serial port specified by the user. The options are **Enabled** and Disabled.

### **Device Settings**

This item displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.

### **Change Port 1 Settings/Change Port 2 Settings**

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1 or Serial Port 2. Select **Auto** for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

The options for Serial Port 2 are **Auto**, (IO=2F8h; IRQ=3), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

### **Device Mode**

Use this feature to configure SUART clock source settings. The options are **24MHz/13** and 24MHz.

### **Serial Port 2 Attribute**

Select SOL to use COM Port 2 as a Serial\_Over\_LAN (SOL) port for console redirection. The options are COM and **SOL**.

## **►Serial Port Console Redirection**

### **COM 1 Console Redirection (Available when COM1 port is detected)**

Select Enabled to enable COM Port 1 Console Redirection, which will allow a client machine to be connected to a host machine at a remote site for networking. The options are **Disabled** and Enabled.

*\*If the item above set to Enabled, the following items will become available for configuration:*

### **►COM1 Console Redirection Settings (Available when COM1 port is detected)**

#### **Terminal Type**

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

#### **Bits Per second**

Use this item to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

#### **Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

### **Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark and Space.

### **Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and **2**.

### **Flow Control**

Use this item to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

### **VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled.

### **Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

### **Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

### **Legacy OS Redirection Resolution**

Use this item to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

### **Putty KeyPad**

This item selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

### Redirection After BIOS Post

Use this item to enable or disable legacy Console Redirection after BIOS POST. When the option-Bootloader is selected, legacy Console Redirection is disabled before booting the OS. When Always Enable is selected, legacy Console Redirection remains enabled upon OS bootup. The options are **Always Enable** and Bootloader.

## COM2/SOL

### COM2/SOL Console Redirection

Select Enabled to use the SOL/COM2 port for Console Redirection. The options are **Enabled** and Disabled.

*\*If the item above set to Enabled, the following items will become available for user's configuration:*

### ►SOL/Console Redirection Settings

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

#### Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

#### Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

#### Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

#### Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with

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the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark and Space.

### **Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and **2**.

### **Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

### **VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled.

### **Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

### **Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

### **Legacy OS Redirection Resolution**

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

### **Putty KeyPad**

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

### **Redirection After BIOS Post**

Use this feature to enable or disable legacy Console Redirection after BIOS POST (Power-On Self-Test). When this feature is set to Bootloader, legacy Console Redirection is disabled before booting the OS. When this feature is set to Always Enable, legacy Console Redirection remains enabled upon OS boot. The options are **Always Enable** and Bootloader.



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## Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The submenu allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

### EMS Console Redirection

Select Enabled to use a COM port selected by the user for EMS Console Redirection. The options are Enabled and **Disabled**.

*\*If the item above set to Enabled, the following items will become available for user's configuration:*

## ►EMS Console Redirection Settings (Available when EMS Console Redirection is enabled)

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

### Out-of-Band Management Port

The feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1 (Console Redirection)** and SOL/COM2 (Console Redirection).

### Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, VT100+, and **VT-UTF8**.

### Bits Per Second

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in both host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

### Flow Control

Use this item to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each these features is displayed: Data Bits, Parity, Stop Bits

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## ►ACPI Settings

### WHEA Support

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are **Enabled** and Disabled.

### High Precision Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

### NUMA (Available when the OS supports this feature)

Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

## ►Trusted Computing (Available when a TPM device is installed)

### Configuration

#### Security Device Support

If this feature and the TPM jumper on the motherboard are both set to Enabled, onboard security devices will be enabled for TPM (Trusted Platform Module) support to enhance data integrity and network security. Please reboot the system for a change on this setting to take effect. The options are **Enabled** and Disabled.

#### TPM State

Select Enabled to use TPM (Trusted Platform Module) settings to enhance system data security. Please reboot your system for any change on the TPM state to take effect. The options are **Disabled** and Enabled.

#### Pending Operation

Use this item to schedule a TPM-related operation to be performed by a security device for system data integrity. Your system will reboot to carry out a pending TPM operation. The options are **0**, Enable Take Ownership, Disable Take Ownership, and TPM Clear.



**Note:** Your system will reboot to carry out a pending TPM operation.

**Current Status Information**

This item displays the status of the TPM support on this motherboard.

**TXT Support**

Select Enabled to use Intel Trusted Execution Technology to enhance system security and data integrity. The options are **Enabled** and Disabled.



**Note:** For more information on TPM, please refer to the TPM manual at <http://www.supermicro.com/manuals/other/TPM.pdf>.

**► iSCSI Configuration**

This item displays iSCSI configuration information:

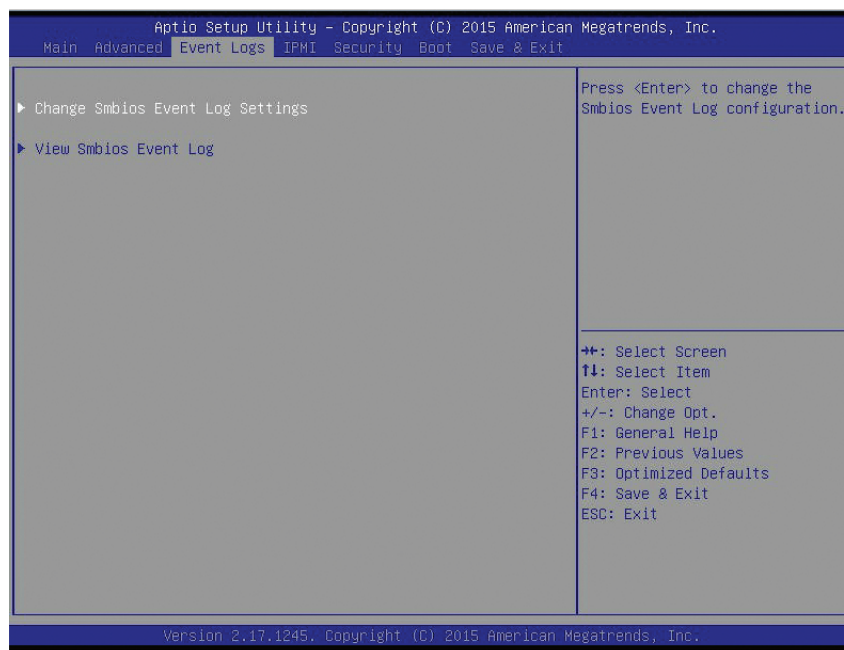
**iSCSI Initiator Name**

This item displays the name of the iSCSI Initiator, which is a unique name used in the world. The name must use the IQN format. The following actions can also be performed:

**► Add an Attempt****► Delete Attempts****► Change Attempt Order**

## 4-4 Event Logs

Use this feature to configure Event Log settings.



### Enabling/Disabling Options

#### SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

#### Runtime Error Logging Support

Select Enabled to support Runtime Error Logging. The options are **Enabled** and Disabled.

#### Erasing Settings

##### Erase Event Log

Select Enabled to erase all error events in the SMBIOS (System Management BIOS) log before an event logging is initialized at bootup. The options are **No** and Yes.

##### When Log is Full

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

#### SMBIOS Event Log Standard Settings

##### Log System Boot Event

Select Enabled to log system boot events. The options are **Disabled** and Enabled.

**MECI (Multiple Event Count Increment)**

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is 1.

**METW (Multiple Event Count Time Window)**

This item is used to determine how long (in minutes) the multiple event counter should wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.



**Note:** Please reboot the system for the changes to take effect.

**►View SMBIOS Event Log**

This item allows the user to view the event in the SMBIOS event log. Select this item and press <Enter> to view the status of an event in the log. The following categories are displayed:

**Date/Time/Error Code/Severity**

## 4-5 IPMI

Use this feature to configure Intelligent Platform Management Interface (IPMI) settings.



### IPMI Firmware Revision

This item indicates the IPMI firmware revision used in your system.

### Status of BMC (Baseboard Management Controller)

This item indicates the status of the BMC installed in your system.

## ► System Event Log

### Enabling/Disabling Options

#### SEL Components

Select Enabled to enable all system event logging support at bootup. The options are **Enabled** and Disabled.

#### Erasing Settings

##### Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot.  
 Select Yes, On every reset to erase all system event logs upon each system reboot.  
 Select No to keep all system event logs after each system reboot. The options are **No**, Yes, On next reset, and Yes, On every reset.

### When SEL is Full

This feature allows the user to determine what the AMI BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

### Custom EFI Logging Options

#### Log EFI Status Codes

Select Error Code to log EFI error codes. Select Progress Code to log EFI progress codes. Select Both to log both error codes and progress codes. The options are Disabled, Both, Error Code, and Progress Code.



**Note:** After making changes on a setting, be sure to reboot the system for the changes to take effect.

### ► BMC Network Configuration

The following items will be displayed:

#### Update IPMI LAN Configuration

Select Yes for the system BIOS to automatically reset the following IPMI settings at the next system boot. The options are Yes and **No**.

#### Configuration Address Source (Available when the item above - Update IPMI LAN Configuration is set to Yes)

Use this item to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached to the network and request the next available IP address for this computer. The options are **DHCP** and Static.

#### Station IP Address

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

#### Subnet Mask

This item displays the sub-network that this computer belongs to. The value of each three-digit number is separated by dots and it should not exceed 255.

#### Station MAC Address

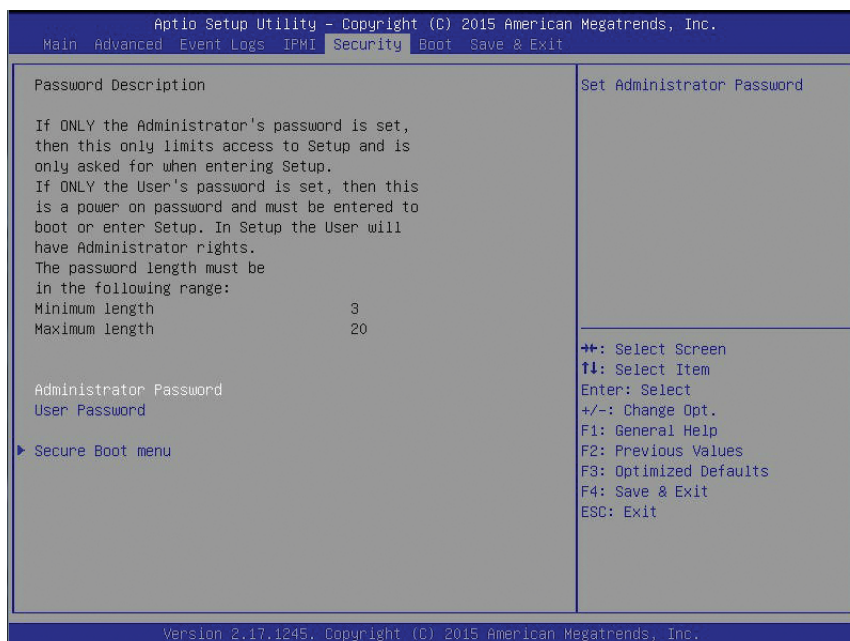
This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

## Router IP Address

This item displays the router IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

## 4-6 Security Settings

This menu allows the user to configure the following security settings for the system.



### Administrator Password

Use this feature to set the administrator password which is required before the user entering the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### User Password

Use this feature to set the user password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### ► Secure Boot Menu

The following items will display:

- System Mode
- Secure Boot



**Secure Boot**

Select Enable for secure boot support to ensure system security at bootup. The options are Enabled and **Disabled**.

**Secure Boot Mode**

This item allows the user to select the desired secure boot mode for the system. The options are Standard and **Custom**.

**►Key Management****Default Keys Provision**

Select Enable to install all manufacturer defaults for the following system security settings. The options are **Disabled** and Enabled.

**►Enroll All Factor Default Keys**

Select Enable to install all manufacturer defaults for the following system security settings. The options are **Yes** and No.

**►Save All Secure Boot Variables**

This feature allows the user to save the secure boot settings specified by the user.

**Platform Key (PK)****►Delete PK**

Select <Yes> to confirm deletion of the Platform Key (PK) from the NVRAM (Non-Volatile RAM).

**►Set New Key**

Select <Yes> to load the manufacture\_default platform keys for your system. Select No to load the default settings from other sources.

**Key Exchange Key (KEK)**

Select <Yes> to confirm KEK support to enhance system security.

**►Delete KEK (Key Exchange Key)**

Select <Yes> to confirm deletion of the KEK from the NVRAM (Non-Volatile RAM).

### ► **Set New KEK (Key Exchange Key)**

Select <Yes> to confirm that a new KEK will be set in the NVRAM (Non-Volatile RAM).

### ► **Append KEK (Key Exchange Key)**

Select <Yes> to load the new KEK from the manufacturer defaults. Select <No> to load the new KEK from other sources.

## **Authorized Signatures**

### ► **Delete DB (DataBase)**

Select <Yes> to confirm deletion of a database from the NVRAM (Non-Volatile RAM).

### ► **Set New DB (DataBase)**

Select <Yes> to confirm that a new database will be set in the NVRAM (Non-Volatile RAM).

### ► **Append DB (DataBase)**

Select <Yes> to load the new database from the manufacturer defaults. Select <No> to load the new database from other sources

## **Authorized TimeStamps**

### ► **Delete DBT (DataBase Timer)**

Select <Yes> to confirm deletion of the database timer from the NVRAM (Non-Volatile RAM).

### ► **Set New DBT (DataBase Timer)**

Select <Yes> to confirm that the new database timer will be set in the NVRAM (Non-Volatile RAM).

### ► **Append DBT (DataBase Timer)**

Select <Yes> to load the new database timer from the manufacturer defaults. Select <No> to load the new database timer from other sources

## Forbidden Signatures

### ▶Delete DBX

Select <Yes> to confirm deletion of the DBX files from the Non-Volatile RAM (NVRAM).

### ▶Set New DBX

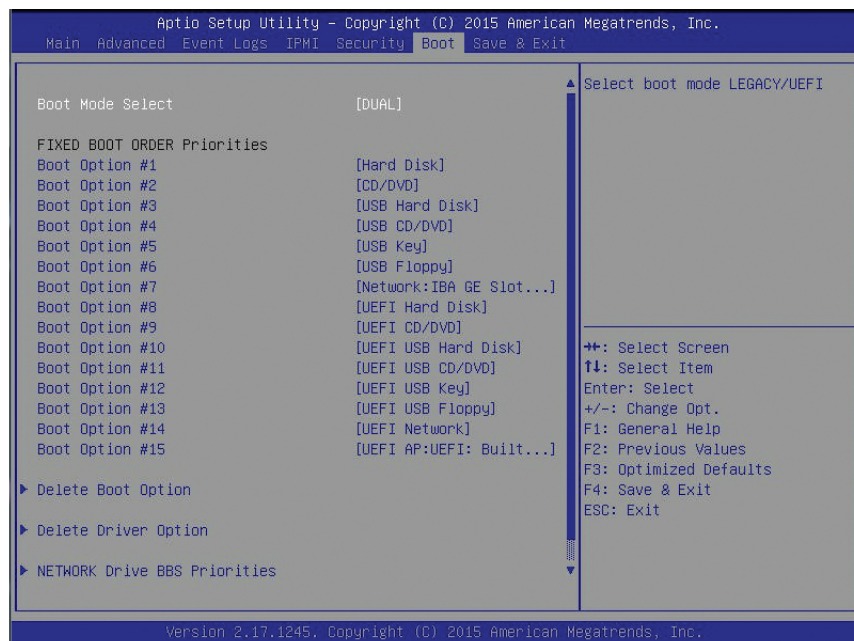
Select <Yes> to confirm that the new DBX files will be downloaded to the Non-Volatile RAM (NVRAM).

### ▶Append DBX (DataBase Timer)

Select <Yes> to load the new DBX files from the manufacturer defaults. Select <No> to load the new DBX files from other sources.

## 4-7 Boot Settings

Use this feature to configure Boot Settings:



### Boot Configuration

#### Boot Mode Select

Use this item to select the type of device to be used for system boot. The options are Legacy, UEFI, and **Dual**.

#### Fixed Boot Order Priorities

This option prioritizes the order of bootable devices from which the system will boot. Press <Enter> on each entry from top to bottom to select devices.

- Boot Option #1
- Boot Option #2
- Boot Option #3
- Boot Option #4
- Boot Option #5
- Boot Option #6

- Boot Option #7
- Boot Option #8
- Boot Option #9
- Boot Option #10
- Boot Option #11
- Boot Option #12
- Boot Option #13
- Boot Option #14
- Boot Option #15

▶ **Delete Boot Option**

Use this item to select a boot device to delete from the boot priority list.

**Delete Boot Option**

Select the target boot device to delete.

▶ **Delete Driver Option**

Use this item to select a boot driver to delete from the boot priority list.

**Delete Driver Option**

Select the target boot driver to delete.

▶ **Hard Disk Drive BBS Priorities**

- Boot Option #1
- Boot Option #2

▶ **Network Drive BBS Priorities**

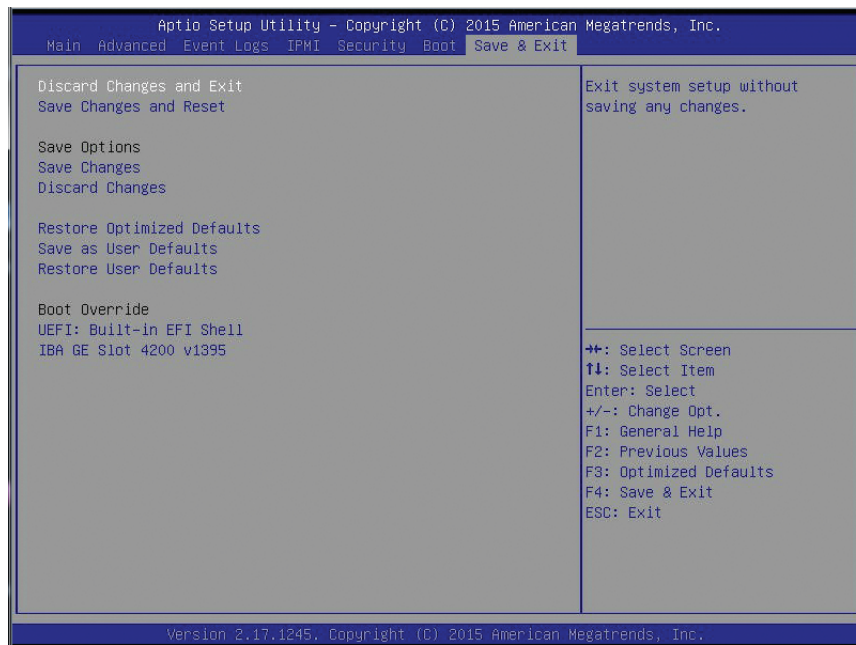
- Boot Option #1

▶ **UEFI Application Boot Priorities**

- Boot Option #1

## 4-8 Save & Exit

Select the Save & Exit tab from the BIOS setup screen to configure the settings below.



### Discard Changes and Exit

Select this option and press <Enter> to quit the BIOS setup without making any permanent changes to the system configuration, and reboot the computer.

### Save Changes and Reset

When you have completed the system configuration changes, select this option and press <Enter> to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to take effect.

### Save Options

### Save Changes

When you have completed the system configuration changes, select this option and press <Enter> to save all changes made. This will not reset (reboot) the system.

### Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS setup utility.

**Restore Optimized Defaults**

To set this feature, select this option and press <Enter> to reload the manufacturer default settings that are designed for maximum system performance but not for maximum stability.

**Save as User Defaults**

To set this feature, select this option and press <Enter> to save current default settings for future use.

**Restore User Defaults**

To set this feature, select this option and press <Enter> to retrieve user-defined settings that were previously saved.

**Boot Override**

This feature allows the user to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a new device specified by the user. This is a one-time override.

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## Appendix A

### BIOS POST Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed at each system boot, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue to boot. The error messages normally appear on the screen.

**Fatal errors** will not allow the system to continue with bootup procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

### BIOS Error Beep Codes

BIOS POST Error Beep Codes		
Beep Code/LED	Error Message	Description
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
5 long beeps + 2 short beeps	Display memory read/write error	Video adapter missing or with faulty memory
1 continuous beep	System OH	System Overheat



## Appendix B

### Software Installation Instructions


#### B-1 Installing Software Programs

The Supermicro website that contains drivers and utilities for your system is located at <http://www.supermicro.com/wftp>. Some of these must be installed, such as the chipset driver.

After accessing the product drivers and utilities page, go into the CDR\_Images directory and locate the ISO file for your motherboard. Download this file to create a DVD of the drivers and utilities it contains. (You may also use a utility to extract the ISO file if preferred.)


After creating a DVD with the ISO files, insert the disk into the DVD drive on your system and the display shown in the picture below should appear.


Another option is to go to the Supermicro website at <http://www.supermicro.com/products/>. Find the product page for your motherboard here, where you may download individual drivers and utilities to your hard drive or a USB flash drive and install from there.

 **Note:** Please refer to the documents posted on our website at <http://www.supermicro.com/support/manuals/> for additional instructions that may be applicable to your system.



**Driver/Tool Installation Display Screen**


 **Note 1:** Click the icons showing a hand writing on the paper to view the readme files for each item. Click a computer icon to the right of an item to install an item (from top to the bottom) one at a time. After installing each item, you must reboot the system before proceeding with the next item on the list. The bottom icon with a CD on it allows you to view the entire contents of the CD.

 **Note 2:** When making a storage driver diskette by booting into a Driver CD, please set the SATA Configuration to "Compatible Mode" and configure SATA as IDE in the BIOS Setup. After making the driver diskette, be sure to change the SATA settings back to your original settings.

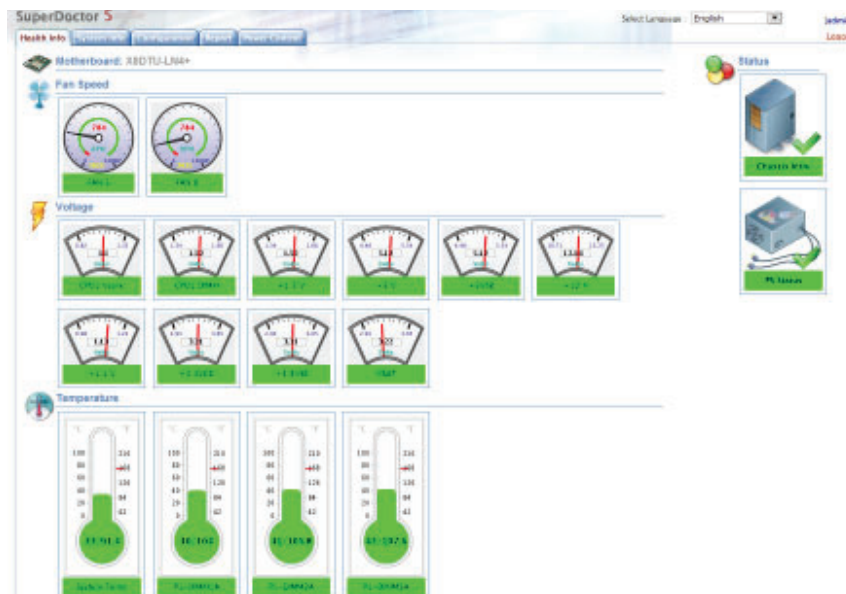
## B-2 Configuring SuperDoctor 5


The Supermicro SuperDoctor® 5 is a hardware monitoring program that functions in a command-line or web-based interface in Windows and Linux operating systems. The program monitors system health information such as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or IPMI. SD5 Management Server monitors HTTP and SMTP services to optimize the efficiency of your operation.

 **Note:** The default User Name and Password for SuperDoctor 5 is admin / admin.

### SuperDoctor 5 Interface Display Screen (Health Information)



 **Note:** The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro web site at [http://www.supermicro.com/products/nfo/sms\\_sd5.cfm](http://www.supermicro.com/products/nfo/sms_sd5.cfm).

## **B-3 Logging into the BMC (Baseboard Management Controller)**

Supermicro ships standard products with a unique password for the BMC user. This password can be found on a label on the motherboard.

When logging in to the BMC for the first time, please use the unique password provided by Supermicro to log in. You can change the unique password to a user name and password of your choice for subsequent logins.

For more information regarding BMC passwords, please visit our website at <http://www.supermicro.com/bmcpassword>.

## Appendix C

### UEFI BIOS Recovery Instructions

**Warning:** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you need to update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

#### C-1 An Overview to the UEFI BIOS

The Unified Extensible Firmware Interface (UEFI) provides a software-based interface between the operating system and the platform firmware in the pre-boot environment. The UEFI specification supports an architecture-independent mechanism for add-on card initialization to allow the UEFI OS loader, which is stored in the add-on card, to boot the system. The UEFI offers a clean, hands-off control to a computer system at bootup.

#### C-2 How to Recover the UEFI BIOS Image (-the Main BIOS Block)

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The boot block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a new BIOS image if the original main BIOS image is corrupted. When the system power is on, the boot block codes execute first. Once it is completed, the main BIOS code will continue with system initialization and bootup.



**Note:** Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS boot crashes. However, when the BIOS boot block crashes, you will need to follow the procedures below for BIOS recovery.


#### C-3 To Recover the Main BIOS Block Using a USB-Attached Device

This feature allows the user to recover a BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB flash drive, or a USB CD/DVD ROM/RW device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

The file system supported by UEFI is FAT (including FAT12, FAT16, and FAT32) installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large because it contains too many folders and files.

To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below.


1. Using a different machine, copy the "Super.ROM" binary image file into the disc root "\" directory of a USB device or a writeable CD/DVD.

 **Note:** If you cannot locate the "Super.ROM" file in your driver disk, visit our website at [www.supermicro.com](http://www.supermicro.com) to download the BIOS image into a USB flash device and rename it "Super.ROM" for BIOS recovery use.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and power on the system
3. While powering on the system, please keep pressing <Ctrl> and <Home> simultaneously on your keyboard *until the following screen (or a screen similar to the one below) displays.*


**Warning!!** Please **stop** pressing the <Ctrl> and <Home> keys immediately when you see the screen (or a similar screen) below; otherwise, it will trigger a system reboot.



 **Note:** On the other hand, if the following screen displays, please load the "Super.ROM" file to the root folder and connect this folder to the system. (You can do so by inserting a USB device that contains the new "Super.ROM" image to your machine for BIOS recovery.)




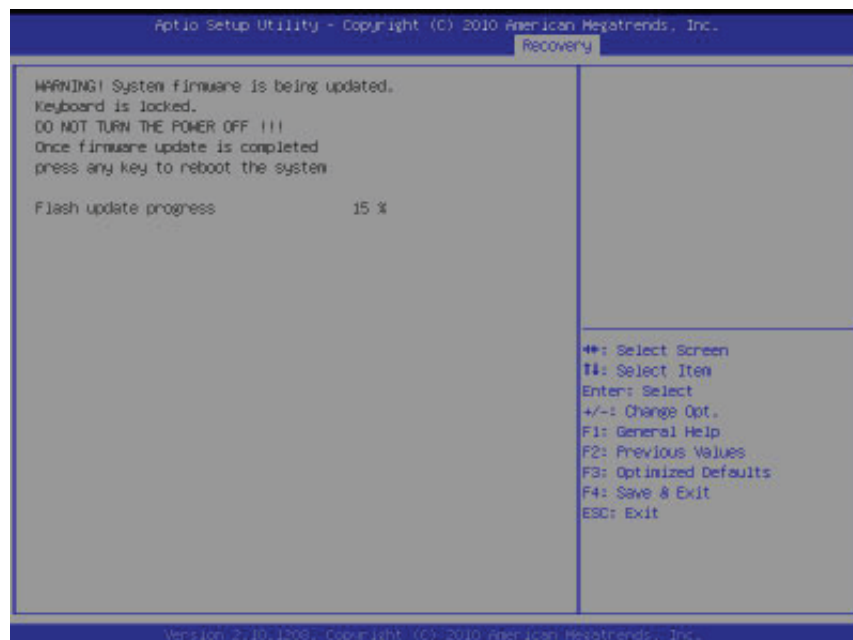
- After locating the new BIOS binary image, the system will enter the BIOS recovery menu as shown below.

 **Note:** At this point, you may decide if you want to start with BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

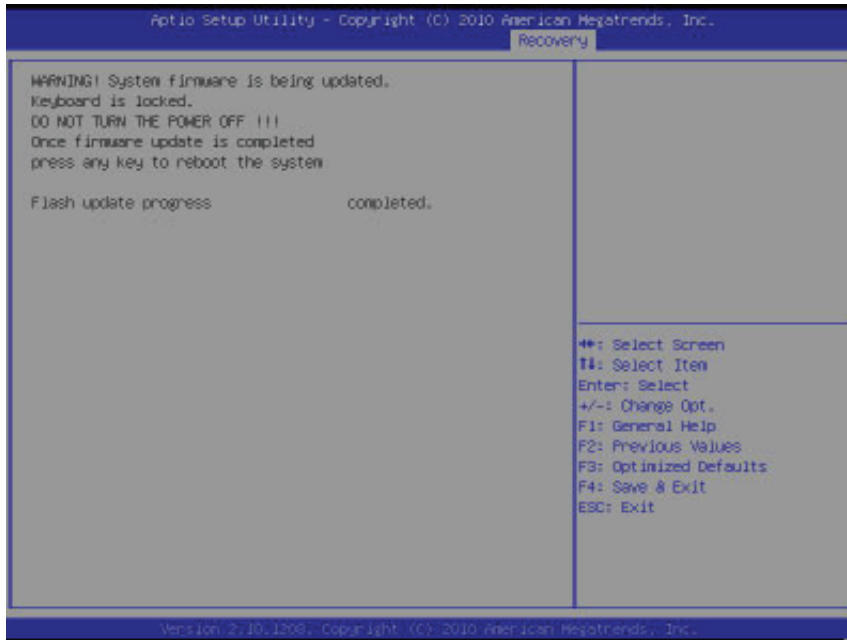


- When the screen as shown above displays, using the arrow key, select the item "Proceed with flash update" and press the <Enter> key. You will see the progress of BIOS recovery as shown in the screen below.

 **Note:** *Do not interrupt* the process of BIOS flashing until it is completed.



6. After the process of BIOS recovery is completed, press any key to reboot the system.



7. Using a different system, extract the BIOS package into a bootable USB flash drive.
8. When a DOS prompt appears, enter FLASH.BAT BIOSname.### at the prompt.

 **Note:** Do not interrupt this process until BIOS flashing is completed.

9. After seeing the message that BIOS update is completed, unplug the AC power cable from the power supply to clear the CMOS, and then plug the AC power cable into the power supply again to power on the system.
10. Press <Del> continuously to enter the BIOS Setup utility.
11. Press <F3> to load default settings.
12. After loading default settings, press <F4> to save the settings and exit the BIOS Setup utility.