SUPERMICRO®

X10DRS-2U
X10DRS-3U
X10DRS-4U

USER'S MANUAL

Revision 1.0b

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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 X10DRS-2U/3U/4U motherboard.

About This Motherboard

The Super X10DRS-2U/3U/4U motherboard supports dual Intel E5-2600v3 series processors (Socket R3) that offer the new Intel 22nm-microarchitecture processing technology, delivering the most balanced solution of performance, power efficiency, and features optimized for next-generation storage applications. With the PCH C612 built in, the X10DRS-2U/3U/4U motherboard supports the MCTP protocol, the Intel Management Engine, and the Intel® Node Manager 3.0. This motherboard is ideal for storage platforms. Please refer to our website (http://www.supermicro.com) for CPU and memory support updates.

> **Note**: The X10DRS-2U motherboard was designed to be used in 2U chassis, while the X10DRS-3U and X10DRS-4U were designed to be used in 3U and 4U chassis, respectively. Please refer to the Model Differentiation table on Page 1-3 in Chapter 1 for more information.

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.

Chapter 3 describes troubleshooting procedures for video, memory, and system setup stored in the CMOS. If you encounter any problems, please refer to this chapter for helpful information.

Chapter 4 includes an introduction to the BIOS and provides detailed information on running the CMOS 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:

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

Note: Additional information given to differentiate between models or instructions provided for proper system setup

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Table of Contents

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.

The X10DRS-2U/3U/4U motherboard was designed to be used with a Supermicro-proprietary chassis as an integrated solution. It is not to be used as a standalone product and will not be shipped independently in a retail box. No motherboard shipping package will be provided in the shipment.

> **Note 1:** 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

> **Note 2:** For safety considerations, please refer to the complete list of safety warnings posted on the Supermicro website at http://www.supermicro.com/about/policies/safety_information.cfm.

If you have any questions, please contact our support team at support@supermicro.com.

SUPER●X10DRS-2U/3U/4U Motherboard Image
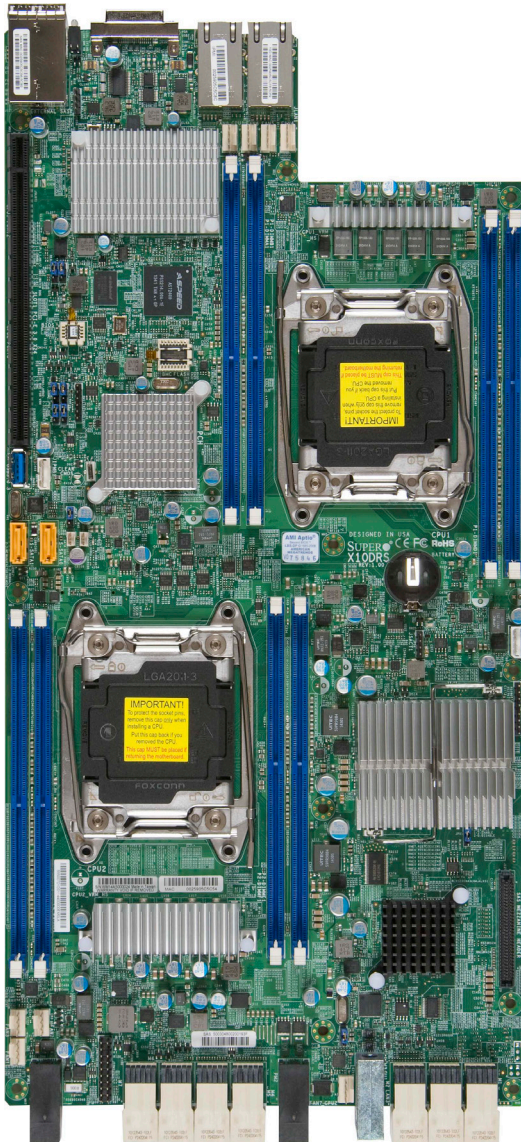
📝 **Note:** All graphics shown in this manual were based upon the latest PCB revision available at the time of publishing of the manual. The motherboard you've received may or may not look exactly the same as the graphics shown in this manual.

Motherboard Layout
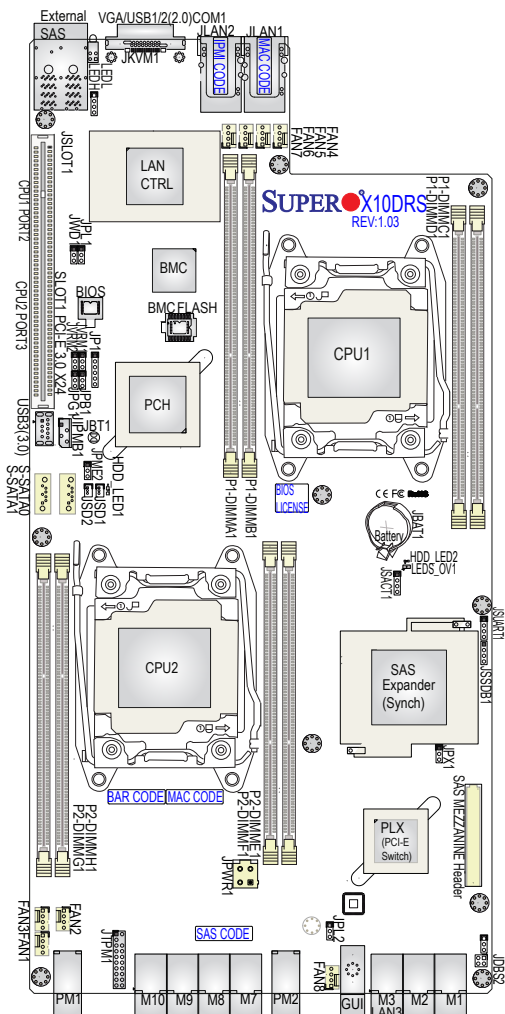
X10DRS-2U/3U/4U Model Differentiation Table

SBB MB	SBB System	Chassis Support	HDD Support
X10DRS-2U	SSG-2028R-DE2CR24L	2U Chassis	24 x 2.5" HDDs
X10DRS-3U	SSG-6038R-DE2CR16L	3U Chassis	16 x 3.5" HDDs
X10DRS-4U	SSG-6048R-DE2CR24L	4U Chassis	24 x 3.5" HDDs

Note: For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard/ for details.

X10DRS-2U/3U/4U Quick Reference

External SAS

VGA/USB1/2(2.0) COM1 JLAN2 LAN1

JKVM1

IPMI CODE MAC CODE

FAN4 FAN6 FAN5 FAN7

LAN CTRL

SUPER● X10DRS
REV:1.03

P1-DIMMC1 P1-DIMMD1

BMC

BMC FLASH

BIOS

CPU1

PCH

BIOS LICENSE

HDD_LED1

Battery JBAT1

HDD_LED2 LEDS_0V1

JSACT1

CPU2

SAS Expander (Synch)

JSDB1 JUART1

BAR CODE MAC CODE

P2-DIMMF1 P2-DIMME1

JPY1

SAS MEZZANINE Header

P2-DIMMH1 P2-DIMMG1

PLX (PCI-E Switch)

JPWR1

FAN3 FAN1 FAN2

SAS CODE

JTPM1

JP2

FAN8

PM1 M10 M9 M8 M7 PM2 GUI M3 M2 M1
LAN3

JDBS2

Notes:

- See chapter 2 for detailed information on jumpers, I/O ports, and JF1 front panel connections.

- "▪" indicates the location of pin 1.

- Jumpers/LED indicators not indicated are for testing only.

- 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.

X10DRS-2U/3U/4U Jumpers

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Chapter 2
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	10G(T)_LAN1/2 Enable/Disable	Pins 1-2 (Enabled)
JPME2	Manufacture (ME) Mode Select	Pins 1-2 (Normal)
JWD1	Watch Dog Timer Enable/Disable	Open (Disabled)
JPX1	PCI-E Switch (PLX) Enable/Disable	Pins 1-2 (Enabled)

X10DRS-2U/3U/4U Connectors

Connectors	Description
Battery(JBAT1)	Onboard CMOS battery (See Chpt. 3 for Used Battery Disposal)
External SAS	SAS 3.0 port on the IO backplane supported by Supermicro AOM-S3008-L8-SB add-on module (AOM-S3008-L8-SB is required for SAS support. See Note 1 P. 1-6)
FAN1-8	System/CPU fan headers (Fan1-Fan8)
JIPMB1	4-pin External BMC I^{2}C header (for an IPMI card)
JKVM1	VGA/COM1/USB 0/1 (2.0) connector on the IO backplane (SMCI-proprietary cable: CBL-0218L required. See Note 2 P. 1-6)
JPWR1	4-pin power header
JSD1/JSD2	SATA DOM (Device on Module) power connectors 1/2
JSLOT1	Slot1 PCI-E CPI-E 3.0 x24 (x8 + x16) (CPU1 Port2 + CPU2 Port3)
JTPM1	TPM (Trusted Platform Module)/Port 80 header
LAN1/2	10G(T)_LAN Ethernet ports 1/2 (LAN1: also used as IPMI LAN) (JLAN1/2)
PM1/PM2	System power connectors
S-SATA 0/1	SATA 3.0 connectors supported by Intel SCU (S-SATA 0/1)
SAS Mezzanine Header	SMC-proprietary PCI-E 3.0 x8 Mezzanine slot w/SAS support (See Note 1 on Page 1-6.)
USB 2.0 1/2	USB (2.0) 1/2 (JKVM1) on the IO backplane (See Note 2 Pg. 1-6)
USB 3.0 3	USB (3.0) 3 header onboard

X10DRS-2U/3U/4U LED Indicators

LED	Description	State	Status
HDD_LED1	(PCH) HDD Activity LED	Green: Blinking	(PCH) HDD Active
HDD_LED2	(SAS) HDD Activity LED	Green: Blinking	(SAS) HDD Active
LEDH (Upper)	BMC Heartbeat LED	Green: Blinking	BMC Normal
LEDL (Lower)	System Heartbeat LED	Green: Blinking	System/Power Normal
LEDSOV1	SAS Overheat LED	Red	SAS Overheating

Note 1: For SAS support, be sure to use an SMC-proprietary mezzanine card. Install the mezzanine card on the AOM PCIE 3.0 x8 slot (SAS mezzanine header) for SAS 3.0 support. Refer to sections 1-8 and 2-6 for more information.

Note 2: Please connect the SMCI-proprietary cable (CBL-0218L) to the connector JKVM1 to provide video display/COM port/USB 2.0 support for your system. Please refer to our website at www.supermicro.com for more cable info.

Motherboard Features

CPU	• Dual Intel® E5-2600v3 series processors (Socket R3-LGA 2011); each processor supports dual full-width Intel QuickPath Interconnect (QPI) links (of up to 9.6 GT/s one direction per QPI)
Memory	• Integrated memory controller supports: up to 512 GB of Load-Reduced (LRDIMM) or up to 256 GB of Registered (RDIMM) DDR4 (288-pin) ECC modules 2133/1866/1600 MHz in 8 slots 🖉 **Note:** Memory speed support depends on the CPUs used in the motherboard. For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard.
	DIMM sizes
	• DIMM Up to 64 GB (per DIMM) @ 1.2V
Chipset	• Intel® PCH C612
Expansion Slots	• One (1) PCI-Express 3.0 x24 (x8 + x16) slot (Slot1 PCI-E 3.0x24) • One (1) PCI-E 3.0 x8 mezzanine slot w/SAS support (SAS mezzanine header) (See note 1 on page 1-6.)
Graphics	• Graphics Controller via ASpeed AST 2400 BMC
Network	• Dual Intel X540 10GBase-T (100/1000/10000 Mb/s) Ethernet controllers for 10GbE LAN1/10GbE LAN2 ports (**Note:** LAN 1 also works as IPMI LAN) • ASpeed 2400 Baseboard Controller (BMC) supports IPMI_LAN 2.0 (IPMI LAN: shared with LAN 1)
	• Internal 1G Private Ethernet LAN support
I/O Devices	**SATA Connections**
	• SATA 3.0 Two (2) SATA 3.0 ports supported by Intel SCU (S-SATA 0/1)
	• RAID 0, 1, 10 (from Intel PCH)
	IPMI 2.0
	• IPMI 2.0 supported by ASpeed AST 2400 (IPMI LAN: shared w/LAN 1)

	KVM (JKVM1) Support on the IO Back Panel
	The JKVM1 port supports the following via IPMI 2.0:
	• Two (2) USB 2.0 connections (USB 2.0 1/2)
	• One (1) COM port
	• One (1) VGA port
	✎ **Note:** An SMCI-proprietary backplane (BPN-SAS3-937 or BPN-SAS3-927-N4 for 2U/3U, BPN-SAS3-947 for 4U) and cable (CBL-0218L) are required.
Peripheral Devices	**USB Devices**
	• Two (2) USB 2.0 ports on the rear I/O panel (USB 0/1) via IPMI 2.0
	✎ **Note:** An SMCI-proprietary backplane (BPN-SAS3-937 or BPN-SAS3-927-N4 for 2U/3U, BPN-SAS3-947 for 4U) and cable (CBL-0218L) are required.
	• One (1) USB 3.0 port (USB 3) onboard
BIOS	• 16 MB SPI AMI BIOS® SM Flash UEFI BIOS
	• APM 1.2, APCI 2.3, ACPI 3.0/4.0, USB Keyboard/Video/Mouse support via IPMI (JKVMB1), Plug & Play (PnP), SCM, SPM, SUM-Inband, SUM-OOB, IPMIView, SMCIPMITOOL, PCI Firmware 3.0, RTC (Real-Time-Clock) wakeup, and SMBIOS 2.7 & later
Power Management	• ACPI/ACPM power management
	• Server platform service
	• Main switch override mechanism
	• Riser-card auto detection
	• S5 support
	• Power-on mode for AC power recovery
	• Intel® Intelligent Power Node Manager 3.0 (Available when the Supermicro Power Manager [SPM] is installed and special power supply used. See the note on page 1-14.)
	• Management Engine (ME)
CPU Monitoring	**CPU Monitoring**
	• Onboard voltage monitoring for +3.3V, 3.3V Standby, +5V, +5V Standby, +12V, CPU core, memory, chipset, BMC, and battery voltages

	• CPU/System overheat LED and control
	• CPU Thermal Trip support
	• Status monitor for speed control
	• Status monitor for on/off control
	• CPU Thermal Design Power (TDP): support up to 145W (See note 1 below.)
	Fan Control
	• Fan status monitoring via IPMI connections
	• Dual cooling zone
	• Multi-speed fan control via onboard BMC
	• Pulse Width Modulation (PWM) fan control
System Management	• PECI (Platform Environment Configuration Interface) 2.0 support
	• UID (Unit Identification)/Remote UID
	• System resource alert via SuperDoctor® 5
	• SuperDoctor 5, Watch Dog, NMI
	• Chassis intrusion header and detection
Dimensions	• 16.72" (L) x 8.10" (W) (424.69 mm x 205.74 mm)

Note 1: CPU maximum Thermal Design Power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications for proper CPU TDP sizing.

Note 2: Both CPUs need to be installed for full access to the PCI-E slots, DIMM slots, and onboard controllers. Refer to the block diagram on page 1-10 to determine which slots or devices may be affected.

Note 3: It is strongly recommended that you change BMC login information when you first power on the system. The manufacturer's default username is ADMIN and password is ADMIN. For proper BMC configuration, please refer to http://www.supermicro.com/products/info/files/IPMI/Best_Practices_ BMC_Security.pdf.

Note 4: To avoid causing interference with other components, please be sure to use an add-on card that is fully compliant with the PCI-standard on a PCI slot.

Note 5: For IPMI configuration instructions, please refer to the Embedded IPMI Configuration User's Guide available @ http://www.supermicro.com/support/manuals/.
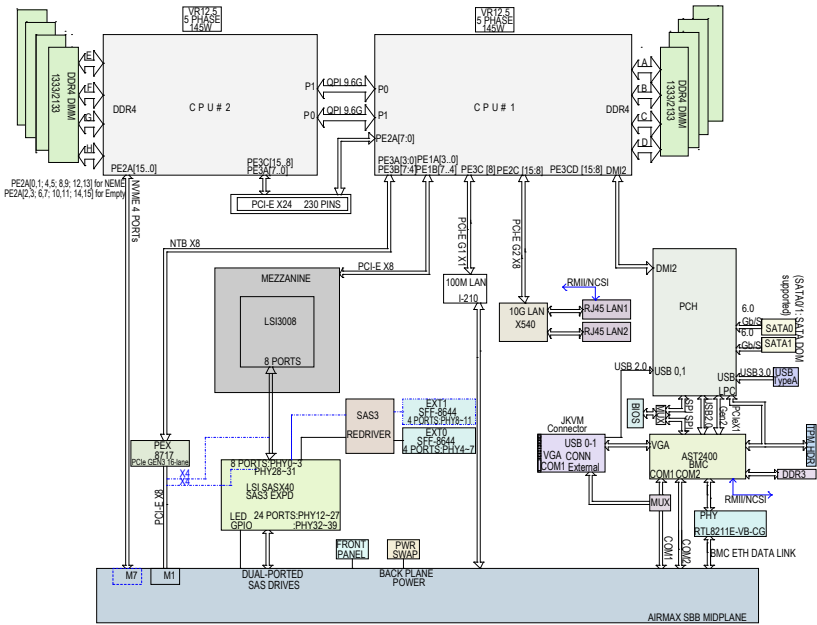
System Block Diagram

📝 **Note 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.

Note 2: Both CPUs need to be installed for full access to the PCI-E slots, DIMM slots, and onboard controllers. Refer to the block diagram above to determine which slots or devices may be affected.

1-2   Processor and Chipset Overview

Built upon the functionality and capability of the Intel E5-2600v3 series processors (Socket R3) and the Intel C612 PCH, the X10DRS-2U/3U/4U motherboard provides the best balanced solution of performance, power efficiency, and features to address the diverse needs of next-generation storage server platforms.

With support of new Intel 22nm-microarchitecture process technology, the X10DRS-2U/3U/4U dramatically increases system performance for a multitude of storage applications.

The PCH C612 chip provides Enterprise SMbus and MCTP support, along with the following features:

- 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

- GSX capable of GPIO expansion

- Improved I/O capabilities to configurations requiring high storage capacity

- SPI enhancements

- Intel® Node Manager 3.0 support (See note below.)

- BMC supports remote management, virtualization, and the security package for enterprise platforms

✎ **Note:** Node Manager 3.0 support depends 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) that supports system health monitoring. An onboard voltage monitor will scan the following onboard voltages continuously: +3.3V, 3.3V Standby, +5V, +5V Standby, +12V, CPU core, memory, chipset, BMC, and battery voltages. Once a voltage becomes unstable, a warning or error message is given. The user can adjust the voltage thresholds inside the BMC Web GUI to define the sensitivity of the voltage monitor.

Fan Status Monitor with Firmware Control

System health monitoring support provided by the BMC controller can check the RPM status of a cooling fan. The onboard CPU and chassis fans are controlled by IPMI Thermal Management.

Environmental Temperature Control

The system health sensors 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 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 operating-system-directed power management, the ACPI also provides a generic system event mechanism for Plug-and-Play and an operating-system-independent interface for configuration control. The ACPI leverages the Plug-and-Play BIOS data structures, while providing an implementation that is compatible with the Windows 2012 R2 operating system and independent of the processor architecture.

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.

The X10DRS-2U/3U/4U motherboard supports two SMCI-proprietary power connectors located at PM1/PM2 on the I/O front panel and a 4-pin power connector on the motherboard. To provide adequate power to the system, be sure to connect these three connectors (PM1/PM2) to the power supply. Additionally, 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.

Warning! To avoid damaging the power supply or the motherboard, be sure to connect the power connectors (PM1/PM2) to the power supply. Failure to do so may void the manufacturer warranty on your power supply and motherboard.

1-7   Advanced Power Management

The following new advanced power management features are supported by this motherboard:

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

The Intel® Intelligent Power Node Manager 3.0 (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:** IPNM 2.0/3.0 support depends on the power supply used in the system.

Management Engine (ME)

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

1-8 Introduction to the AOM-S3008-L8-SB Mezzanine Card (Optional)

The Supermicro AOM-S3008-L8-SB is a standard low-profile SAS mezzanine card that offers integrated RAID solutions for complex storage platforms. Built upon the Avago 3008 SAS controller, this mezzanine card supports SATA/SAS connections with data transfer rates of up to 12Gb/s. It supports 1024 devices with IT mode or 112 devices with IR mode. Featuring the MegaRAID Storage Manager, the AOM-S3008-L8-SB supports RAID 0, RAID 1, RAID IE and RAID 10, and is optimized for Windows 12 R2 storage server platforms.
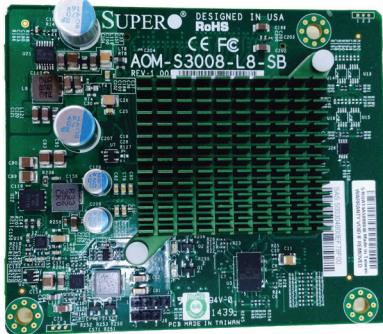
AOM-S3008-L8-SB Image

Notes

Chapter 2

Installation

2-1 Standardized Warning Statements

The following statements are industry-standard warnings provided to warn the user of situations where bodily injury may occur. 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

电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

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. Re-emplazar la batería exclusivamente con el mismo tipo o el equivalente recomen-dado 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 동일 하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사 의 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 aan-bevolen 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.

סילוק המוצר

! אזהרה
סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

2-2   Static-Sensitive Devices

Electrostatic discharge (ESD) can damage electronic components. To avoid dam-aging 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 motherboard by its edges only; do not touch its components, periph-eral 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 excel-lent conductivity between the power supply, case, mounting fasteners, and motherboard.

Unpacking

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

2-3   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 (8 pieces)

- Standoffs (8 pieces, if needed)
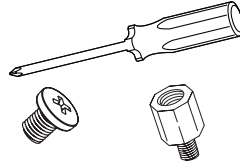
Location of Mounting Holes

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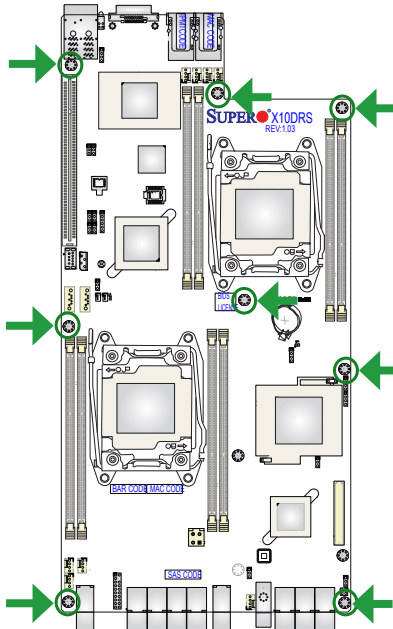
Caution: 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to prevent damage to these components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

Installing the Motherboard

📝 **Note:** Always connect the power cord last, and always remove it before adding, removing, or changing any hardware components.

1. Locate the mounting holes on the motherboard.

2. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.

3. Install standoffs in the chassis as needed.
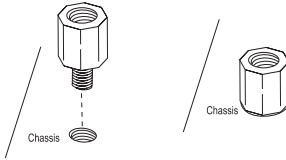
4. Install the motherboard into the chassis carefully to avoid damaging motherboard components.

5. Using the Phillips screwdriver, insert a pan-head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.
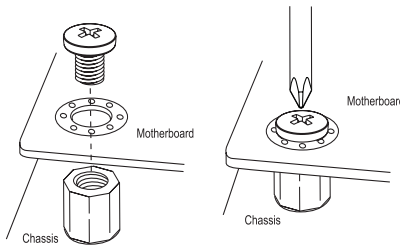
6. Repeat step 5 to insert #6 screws into all mounting holes.

7. Make sure that the motherboard is securely placed in the chassis.

📝 **Note:** Images displayed are for illustration only. Your chassis or components might look different from those shown in this manual.

2-4   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, re-moving, 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 motherboard into the chassis before you install the CPU heatsink.

* When receiving a motherboard without a processor preinstalled, make sure that the plastic CPU socket cap is in place and that 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."
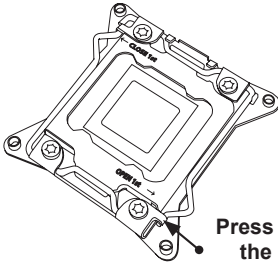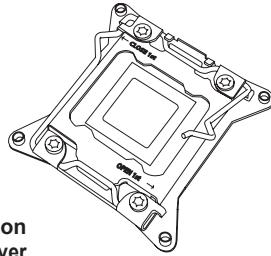
Press down on the load lever labeled "Open 1st."

🖉 **Note:** All graphics, drawings, and pictures shown in this manual are for illustration only. The components that came with your machine may or may not look exactly the same as those shown in this manual.

2. Press the second load lever labeled "Close 1st" to release the load plate that covers the CPU socket from its locking position.
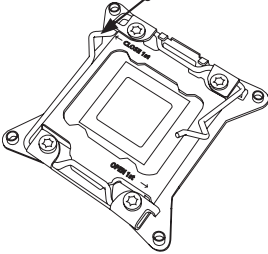
1 Press down on the load lever labeled "Close 1st."   **2** Pull the lever away from the socket.
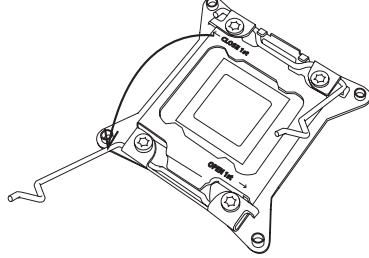
3. With the lever labeled "Close 1st" fully retracted, gently push down on the lever labeled "Open 1st" to open the load plate. Lift the load plate to open it completely.

1 Gently push the lever down to pop the load plate open.   **2**
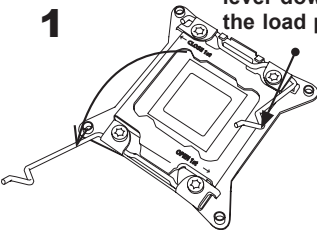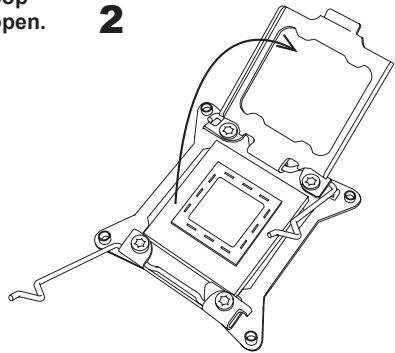
🖉 **Note:** All graphics, drawings, and pictures shown in this manual are for illustration only. The components that came with your machine may or may not look exactly the same as those shown in this manual.

4. Use your thumb and the index finger to loosen the lever and open the load plate.
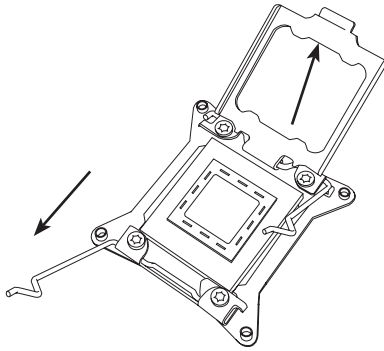
5. Using your thumb and index finger, hold the CPU on its edges. Align the CPU keys, which are semicircle cutouts, against the socket keys.

Socket Keys

CPU Keys
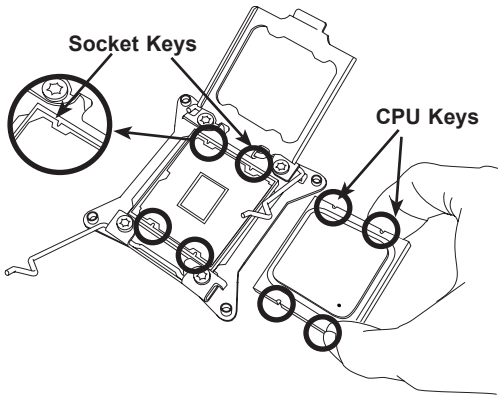
6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU onto the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any socket pins to avoid damaging the CPU or the socket.)
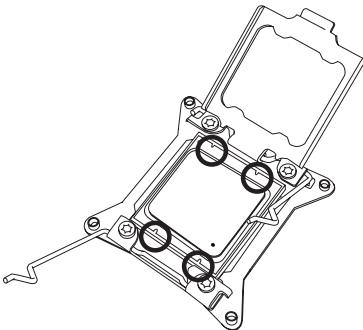
Warning: You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again to make sure that the CPU is 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.

1   **Gently close the load plate.**
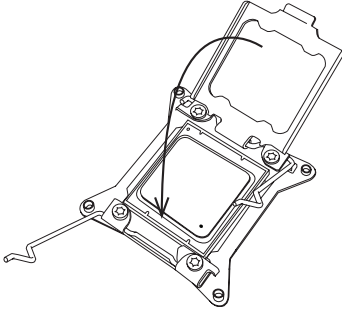
2   **Push down and lock the lever labeled "Close 1st."**
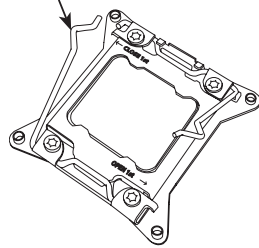
8. Close the load plate with the CPU inside the socket. Lock the lever labeled "Close 1st" first, then lock the lever labeled "Open 1st" second. Using your thumb, gently push the load levers down to the lever locks.

3

Lever Lock   **Push down and lock the lever labeled "Open 1st."**

4

Lever Lock
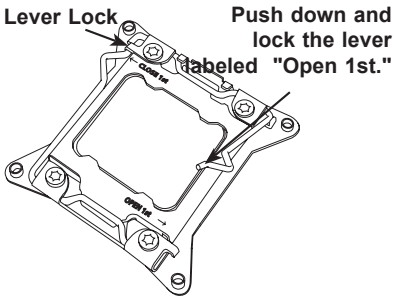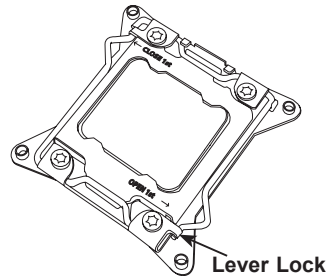
Installing a Passive CPU Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die -- the required amount has already been applied.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the motherboard and the heatsink bracket underneath.

3. Screw in two diagonal screws (i.e., the #1 and the #2 screws) until just snug. (Do not over-tighten the screws to avoid possible damage to the CPU.)

4. Finish the installation by fully tightening all four screws.
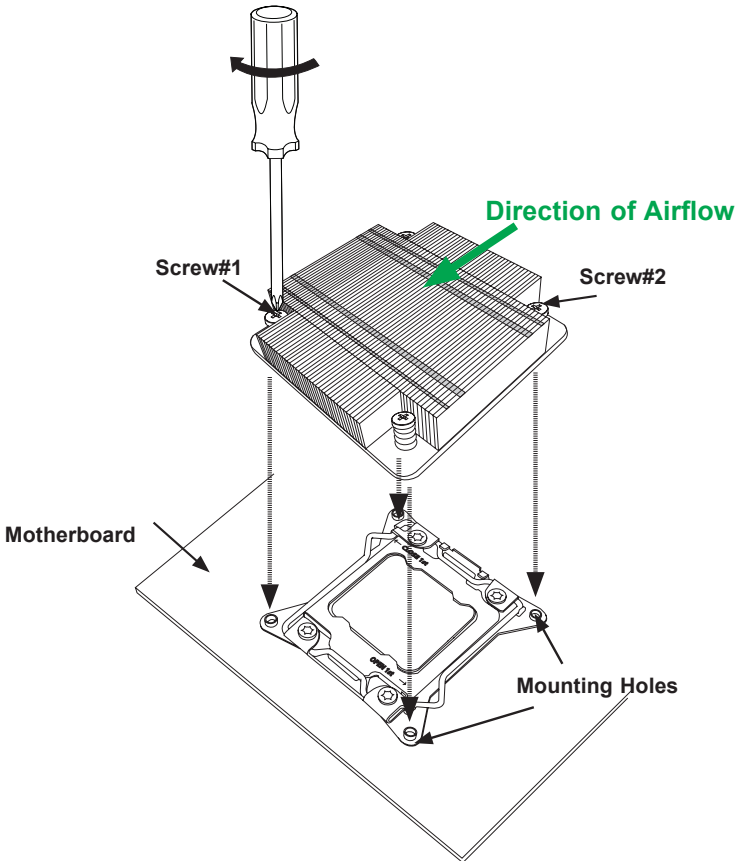
Note: For optimized airflow, please follow your chassis airflow direction to properly install the heatsink. Graphics and drawings included in this manual are for reference only. They might look different from the components installed in your system.

Removing the Heatsink

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

1. Unscrew the heatsink screws from the motherboard in the sequence as shown in the illustration below.

2. Gently wriggle the heatsink to loosen it from the CPU and the CPU socket. (Do not use excessive force when wriggling the heatsink!)

3. Once the heatsink is loosened from the socket, remove it from the CPU socket.

4. Remove the used thermal grease and clean the surface of the CPU and the heatsink, reapply the proper amount of thermal grease on the surface before reinstalling the CPU and the heatsink.
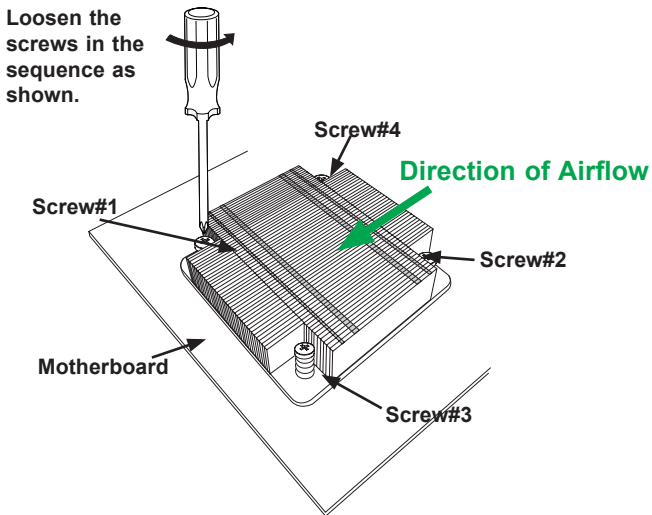
Note: For optimized airflow, please follow your chassis airflow direction to properly install the heatsink. Graphics and drawings included in this manual are for reference only. They might look different from the components installed in your system.

2-5   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 memory modules of the same type and speed in the same channel.)

2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.

Notches

Release Tabs
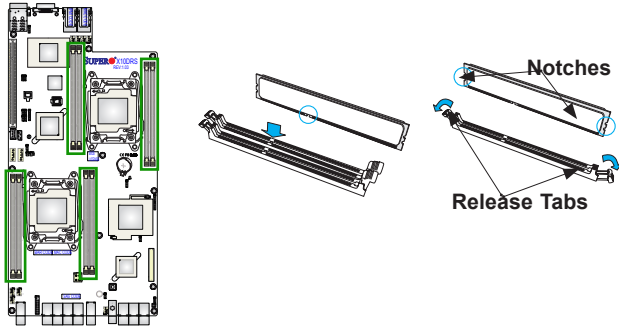
3. Align the key of the DIMM module with the receptive point on the memory slot.

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.
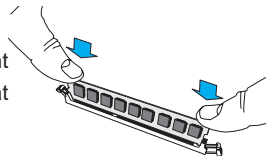
Removing Memory Modules

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

Memory Support for the X10DRS-2U/3U/4U Motherboard

The X10DRS-2U/3U/4U motherboard supports up to 512 GB of Load-Reduced (LRDIMM) or up to 256 GB of Registered (RDIMM) DDR4 (288-pin) ECC modules 2133/1866/1600 MHz in 8 slots. Memory speed support depends on the CPUs installed in your system. For the latest 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-DIMMA1-P1-DIMMD1**		
P1-DIMMs	P1-DIMMA1	P1-DIMMB1	P1-DIMMC1	P1-DIMMD1
CPU2	**P2-DIMME1-H1**		
P2-DIMMs	P2-DIMME1	P2-DIMMF1	P2-DIMMG1	P2-DIMMH1

Processor and Memory Module Population for Optimal Performance	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table** **(For memory to work properly, please follow the instructions below.)**
1 CPU & 2 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & 4 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1
2 CPUs & 8 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1

Populating DDR4 RDIMM/LRDIMM Memory Modules

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Voltage (V) 1 Slot Per Channel 1DPC
		4Gb	8Gb	1.2V
RDIMM	SRx4	8GB	16GB	2133
RDIMM	SRx8	4GB	8GB	2133
RDIMM	DRx8	8GB	16GB	2133
RDIMM	DRx4	16GB	32GB	2133
LRDIMM	QRx4	32GB	64GB	2133

2-6   Mezzanine Card Installation

For SAS 3.0 support, be sure to follow the instructions below to install the optional AOM-S3008-L8-SB mezzanine card on the motherboard.
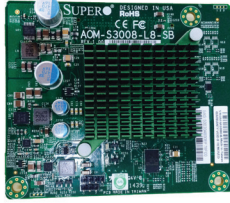
AOM-S3008-L8-SB Image

1. After installing the motherboard into the chassis, align the mezzanine card with the SAS mezzanine header on the motherboard as shown below.

**Mezzanine Card Header
(for AOM-S3008-L8-SB)**
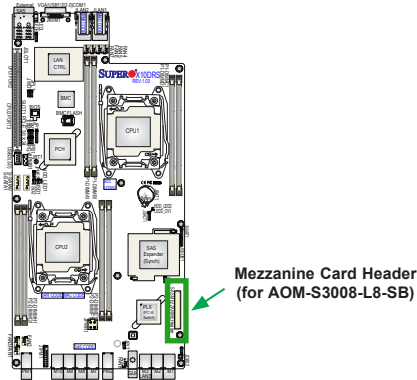
2. With both hands, press the mezzanine card down into the slot.
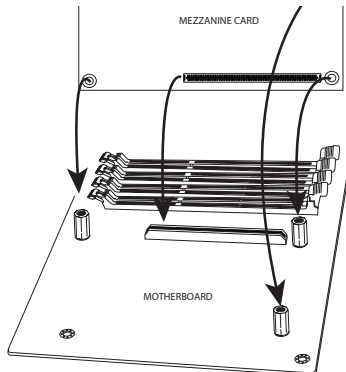
3. With the mezzanine card securely placed in the slot, insert pan-head #6 screws into the three standoff holes and tighten them with a Phillips screwdriver.
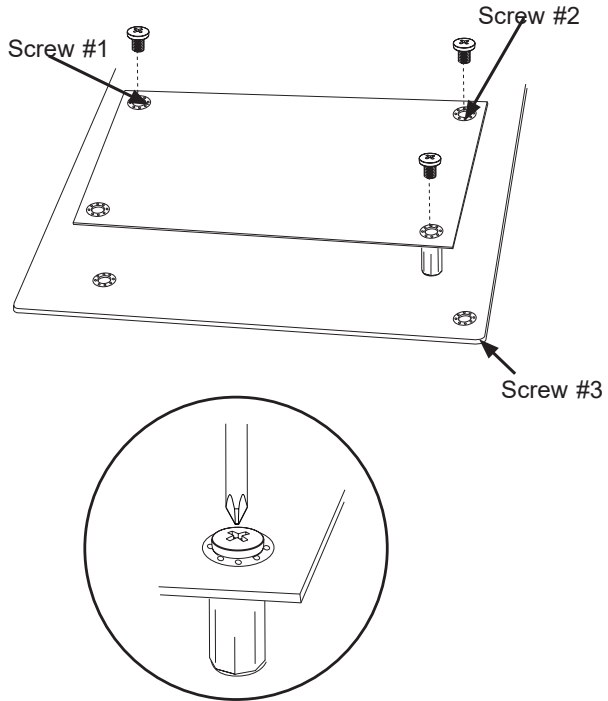
2-7   Control Panel Connectors and I/O Ports

The I/O ports are color-coded in conformance with industry standards. See the picture below for the colors and locations of the various I/O ports. For proper rear I/O support, an SMCI-proprietary backplane (BPN-SAS3-937, or BPN-SAS3-927-N4) is required. See note 1 below.

Back Panel Connectors and I/O Ports (See Note 1 Below.)
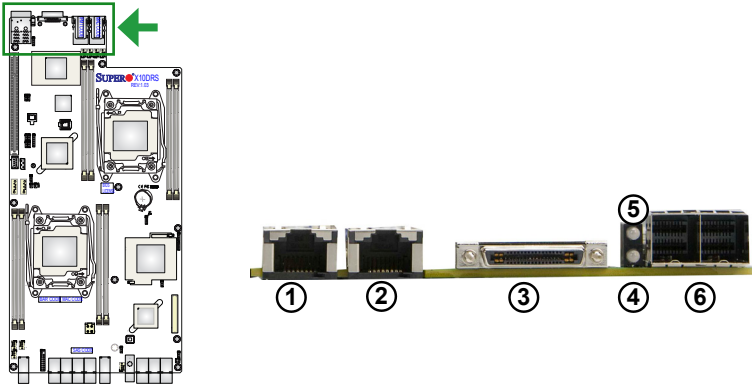
Back Panel I/O Port Locations and Definitions

1. LAN 1 (shared w/IPMI LAN)
2. LAN 2
3. JKVM1: Keyboard/Video/Mouse/USB (2.0) 0/1 Port (SMCI cable: CBL-0218L required. See Note 2 below.)
4. LEDL: System/Power LED (Green: Blinking: System & power normal)
5. LEDH: BMC Heartbeat LED (Green: Blinking: BMC normal)
6.   External SAS supported by AOM-S3008-L8-SB

🖉 **Note 1:** An SMCI-proprietary backplane (BPN-SAS3-937, or BPN-SAS3-927-N4) is required for your I/O back panel. Please install the backplane indicated above on the rear of your chassis to ensure proper I/O backplane setup.

Note 2: Please connect the SMCI-proprietary cable (CBL-0218L) to the connector JKVM1 to provide video display/COM port/USB 2.0 support for your system. Please refer to our website at www.supermicro.com for more cable info.

10GbE LAN (TLAN) Ports & IPMI_LAN Port

Two 10-Gigabit Ethernet LAN ports (LAN1/2) are located on the I/O back panel on the motherboard. LAN Port 1 can also be used as IPMI LAN for Serial-Over-LAN (SOL) support. All these ports accept RJ45-type cables. Please refer to the LED Indicator section for LAN LED information.

VGA/COM1/USB 2.0 Connector (JKVM1)

A VGA/COM1/USB 2.0 connector is located next to 10GbE LAN2 on the I/O back panel. JKVM1 provides video display, serial port, and USB (2.0) 1/2 connections for your system when an SMCI-proprietary cable (CBL-0218L) is connected to the connector JKVM1. Refer to note 2 on the previous page.

External SAS Port

An external SAS 3.0 port, supported by the AOM-S3008-L8-SB add-on module, is located next to the JKVM1 connector on the I/O back panel. Please refer to note 1 on the previous page to ensure proper I/O backplane setup. See the layout below for the location of the external SAS port.
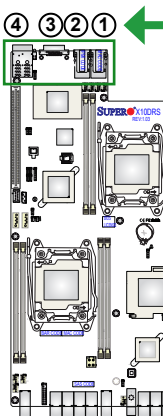
1. 10GbE LAN Port 1 (also used as IPMI LAN)
2. 10GbE LAN Port 2
3. Video/Serial Port/USB 1/2 (2.0) (JKVM1) (CBL-0218L required)
4. External SAS 3.0 port
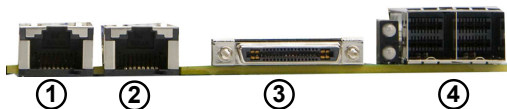
Universal Serial Bus (USB)

In addition to the two USB 2.0 ports (USB 1/2) located on the I/O backplane to pro-
vide rear USB 2.0 support, a Type A connector is also located on the motherboard
to provide USB 3.0 support (USB 3). (Cables are not included. See note below.)
Pin definition tables for USB connectors are below.

Back Panel USB (2.0) 0/1 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

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

🖉 **Note:** Please connect the SMCI-proprietary cable (CBL-0218L) to the
connector JKVM1 to provide video display/COM port/USB 2.0 support
for your system. Please refer to our website at www.supermicro.com for
more cable info.
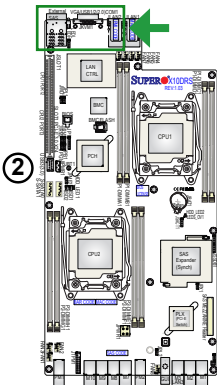
1. USB 1/2 (2.0)
2. Type A USB 3 (3.0)
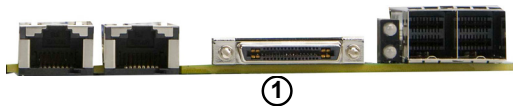
Front Panel Support and Power Connectors

An SMCI-proprietary front panel is used to provide front I/O support and power connections for your system. Refer to the layout below for locations of the I/O front panel and the 4-pin power connector. For more information on the I/O front panel or back panel used in your system, please refer to our website at www.supermicro.com.

Front Panel Support and Power Connectors
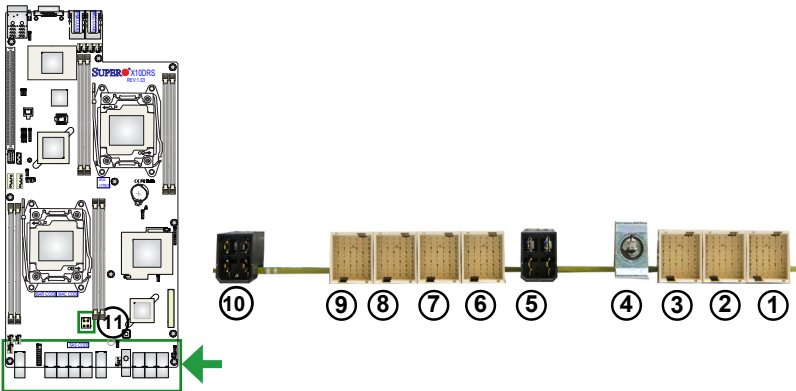
Front Panel Support & Power Connectors	
1. M1	2. M2
3. M3	4. Guide Pin
5. PM1 (Power Connector 1)	6. M4
7. M5	8. M6
9. M7	10. PM2 (Power Connector 2)
11. 4-pin PWR (on the motherboard)	

✎ **Note:** An SMCI-proprietary backplane is required for your front-panel support. Please install the required component on the front of your chassis to ensure proper front-panel setup. Please refer to our website at www. supermicro.com for more product info.

2-8   Connecting Cables

Fan Headers

This motherboard has eight system/CPU fan headers (Fan1-Fan8) on the motherboard. All these 4-pin fans headers are backward compatible with traditional 3-pin fans. However, fan speed control is available for 4-pin fans only. The fan speeds are controlled by Thermal Management via the 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
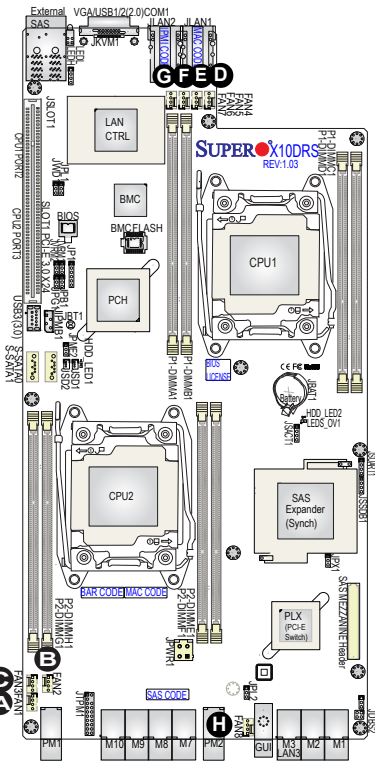
A. Fan 1
B. Fan 2
C. Fan 3
D. Fan 4
E. Fan 5
F. Fan 6
G. Fan 7
H. Fan 8

DOM Power Connectors

Two power connectors for SATA DOM (Disk-on-Module) devices are located at JSD1/JSD2. Connect appropriate cables here to provide power support for your serial-link DOM devices.

DOM PWR Pin Definitions	
Pin#	Definition
1	+5V
2	Ground
3	Ground

IPMB

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect an appropriate cable here to use the IPMB I2C connection on your system.

IPMB Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection
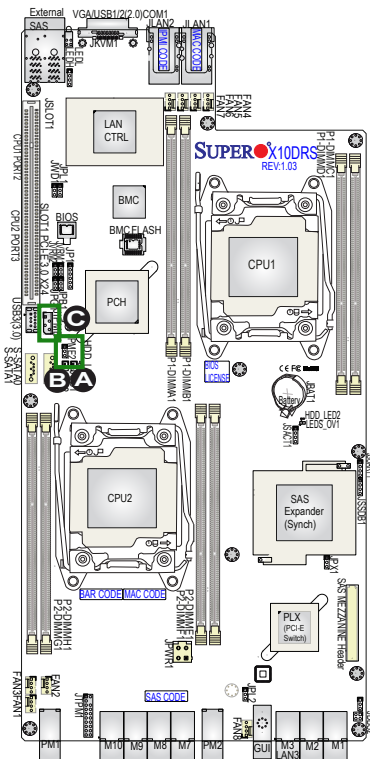
A. SATA DOM PWR (JSD1)
B. SATA DOM PWR (JSD2)
C. JIPMB1

TPM/Port 80 Header

A Trusted Platform Module/Port 80 header is located at JTPM1 to provide TPM support and a 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)

A. TPM/Port 80 Header
B. IPMB
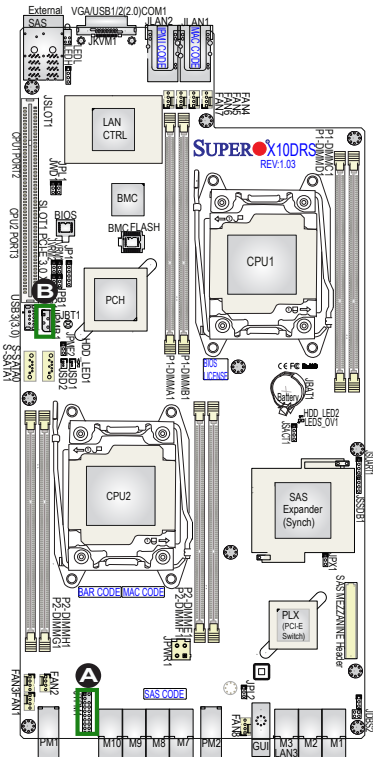
2-9   Jumper Settings

Explanation of Jumpers

To modify the operation of the mother-
board, 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.

Connector
Pins

Jumper
Cap

Setting

3 2 1

3 2 1

Pin 1-2 short

> ✎ **Note:** On two-pin jumpers,
> "Closed" means the jumper is on,
> and "Open" means the jumper is
> off, the pins.
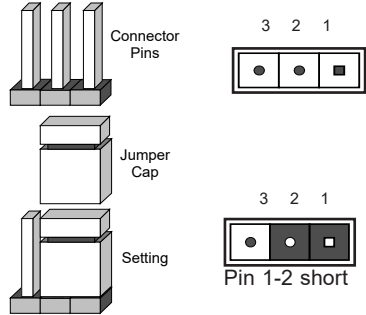
LAN Enable/Disable

Use JPL1 to enable 10GbE LAN ports 1/2 and
IPMI LAN (shared with LAN 1) on the I/O back-
plane. See the table on the right for jumper
settings. The default setting is Enabled.

LAN Enable Jumper Settings	
Jumper Setting	Definition
1-2	Enabled (default)
2-3	Disabled
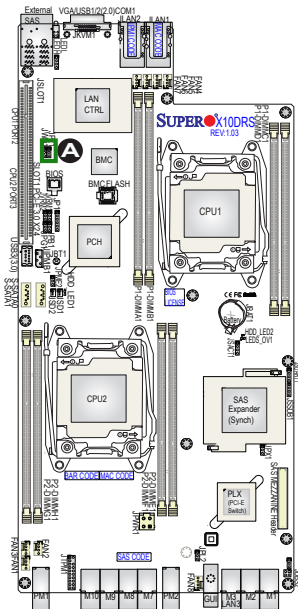
A. LAN1 (IPMI LAN)/LAN2 Enable

CMOS Clear

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

✏ **Note:** Please completely shut down the system, and then short JBT1 to clear the CMOS.

Watch Dog Enable/Disable

Watch Dog (JWD1) is a system monitor that will 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 a non-maskable interrupt signal 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
Pins 2-3	NMI
Open	Disabled (Default)

A. Clear CMOS
B. Watch Dog Enable
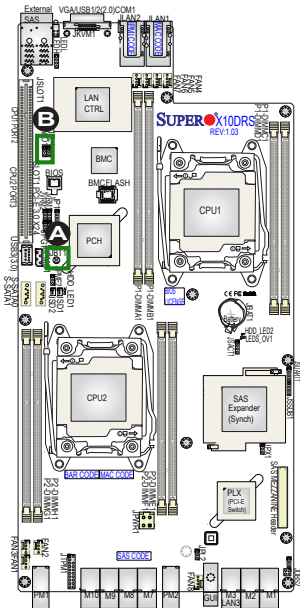
VGA Enable

Jumper JPG1 allows the user to enable the onboard VGA connector. The default setting is on pins 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

BMC Enable

Close pins 1/2 of jumper JPB1 to enable the ASpeed AST 2400 BMC (Baseboard Management Controller) to provide IPMI 2.0/KVM support on the motherboard. Please install an SMCI-proprietary cable (CBL-218L) on the connector JKVM1 on the I/O backplane for KVM support. See the table on the right for jumper settings.

BMC Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	BMC Enable (Default)
Pins 2-3	Disabled
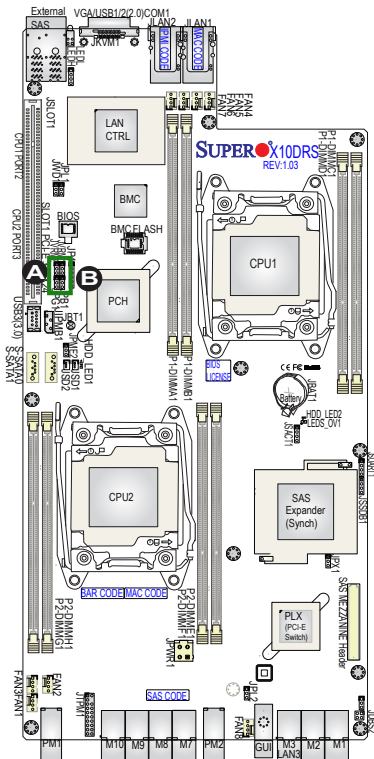
A. VGA Enabled

B. BMC Enabled

Manufacturer Mode Select

Close pins 2-3 of jumper JPME2 to bypass SPI flash security and force the system to operate in manufacturer mode, allowing the user to flash the system firmware from a host server for system setting modifications. See the table on the right for jumper settings.

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

PCI-E Switch Enable

Close pins 1-2 of JPX1 to enable the on-board PCI-E switch on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

PCI-E Switch Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	SAS Enable (Default)
Pins 2-3	Disabled
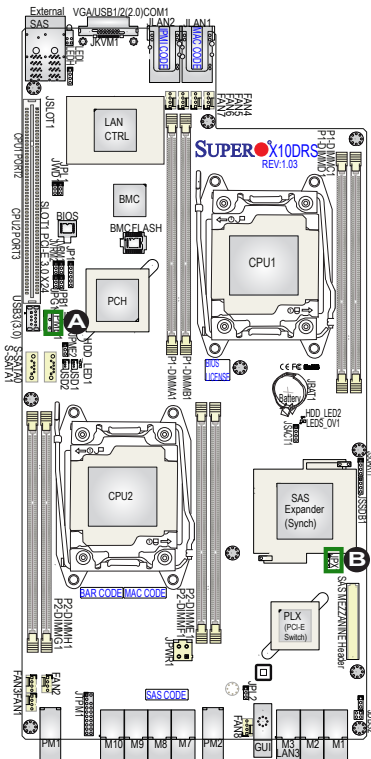
A. ME Mode Select
B. PCI-E Switch Enable

2-10 LED Indicators

LAN Port LEDs

Two LAN ports (LAN 1/2) are located on the I/O back panel of the motherboard. Please note that LAN1 also functions as an IPMI LAN. Each Ethernet LAN port has two LEDs. The orange LED on the left indicates activity, while the other link LED may be green, amber, or off to indicate the speed of the connections. See the tables at right for more information.

LAN Port LEDs

Activity LED → ← Link LED
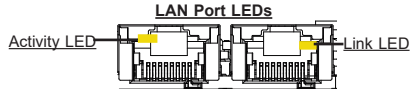
Rear View (when facing the rear side of the chassis)

LAN Port Activity LED (Left) LED State		
Color	Status	Definition
Orange	Flashing	Active

LAN Port Link LED Setting	
Color	Definition
Off	No Connection, 10 or 100 Mbps
Green	10 Gbps
Amber	1 Gbps
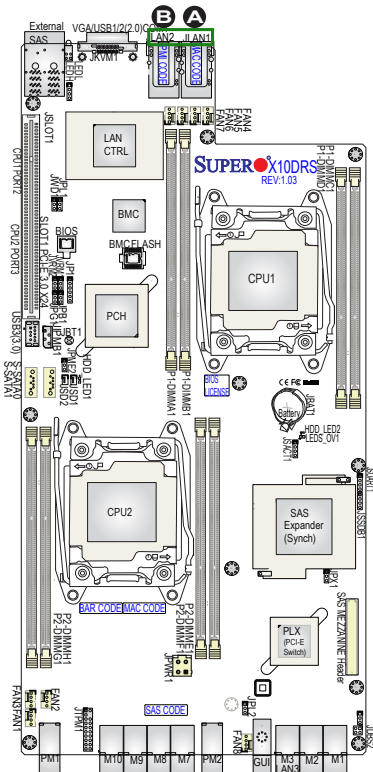
A. LAN1/IPMI LAN LEDs

B. LAN2 LEDs

(PCH) HDD LED

The (PCH) HDD LED is located at HDD LED1 on the motherboard. When this LED is blinking, HDD supported by the Intel PCH is active. See the table at right for more information.

(PCH) HDD Activity LED LED Settings	
Color/State	Definition
Green: Blinking	PCH HDD: Active

SAS HDD LED

The LED indicator for the SAS HDD is located at HDD LED2 on the motherboard. When this LED is blinking, the SAS HDD supported by the LSI SAS controller is active. See the table at right for more information.

SAS HDD Activity LED LED Settings	
Color/State	Definition
Green: Blinking	SAS HDD: Active
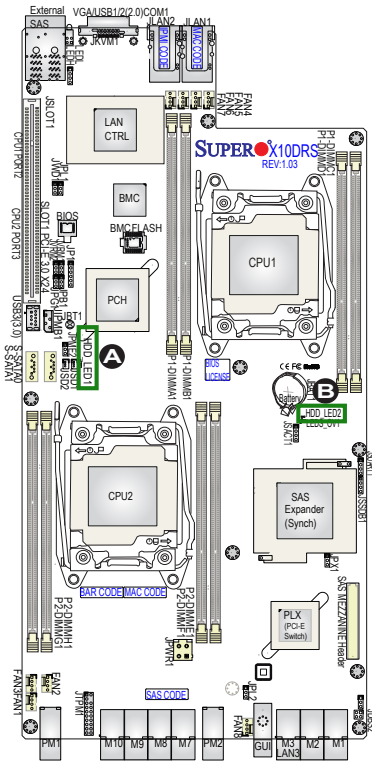
A. (PCH) HDD LED
B. SAS HDD LED

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDH, the upper LED on I/O back panel. When LEDH is blinking, the BMC is functioning normally. See the layout below for the location.

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

System Heartbeat/Power LED

A System Heartbeat/Power LED (LEDL) is located below the BMC Heartbeat LED on I/O back panel. When LEDL is blinking, your system and its power supply are working properly. See the table on the right for more information.

System Heartbeat/Power LED States	
Color/State	Definition
Green: Blinking	System/PWR: Normal
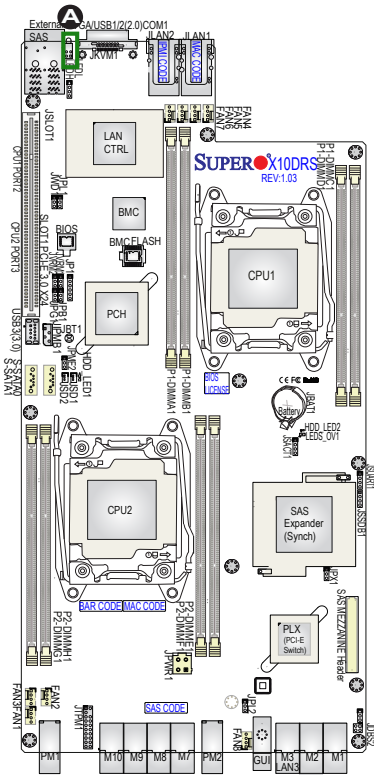
A. BMC Heatbeat LED
B. System Heatbeat/ PWR LED
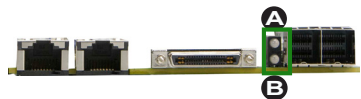
SAS Overheat LED

A SAS Error LED is located at LEDSOV1 on the motherboard. When this LED is on, SAS overheating has occurred.

SAS Overheat LED LED Settings	
Color/State	Definition
Red: On	SAS Overheating

A. SAS Overheat LED

2-11 SATA Connections

S-SATA 3.0 Ports

Two SATA 3.0 ports supported by the Intel SCU are located on the motherboard. S-SATA 0/1, colored in yellow, are used with Supermicro SuperDOM (Disk-on-Module) devices with power-pins built in, and do not require external power cables. SuperDOMs are backward-compatible with regular SATA HDDs and SATA DOMs that require external power cables. All 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 Connectors Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

✏️ **Note:** 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. S-SATA0 (SuperDOM)
B. S-SATA1 (SuperDOM)

Notes

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 it is fully seated) and connect the front panel connectors to the motherboard.

No Power

1. Make sure that there are 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 have no 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 contacting both pads on the CMOS Clear Jumper (JBT1). (Refer to the Jumper section in chapter 2.)

2. Remove all components from the motherboard, especially the DIMM modules. Make sure that system power is on and that 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 1-6 for details on recommended power supplies.

2. The battery on your motherboard may be old. Verify that it still supplies ~3VDC. If it does not, replace it with a new one.

3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

Memory Errors

If 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 different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and 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 DIMM modules 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 2-5 in chapter 2.

6. Please follow the instructions given in the DIMM population tables listed in section 2-5 to install your memory modules.

When the System Becomes Unstable

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

1. CPU/BIOS support: Make sure that your CPU is supported and that 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, and CPU/system fans, etc., work properly. Check the hardware monitoring

settings in the BIOS to make sure that the CPU and system temperatures are within normal range. Also check that the front panel 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 requirements.

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. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as a CD/DVD disc.

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.super-micro.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.

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.

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

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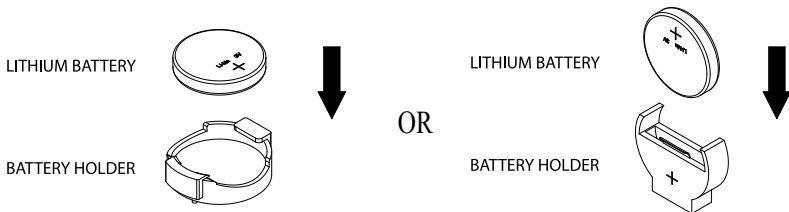
Warning: When replacing a battery, be sure to only replace it with the same type.

3-4   Frequently Asked Questions

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

Answer: The motherboard supports Registered (RDIMM)/Load-Reduced (LRDIMM) ECC DDR4 DIMM modules. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given in section 2-5 in chapter 2.

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.

> **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.co.

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.

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 in this chapter for details.

3-5   Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required be-fore 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 dis-played on the outside of the shipping carton and the shipping package should be 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 in-curred 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 X10DRS-2U/3U/4U. The ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS setup utility screens.

✎ **Note:** For AMI BIOS recovery, please refer to the UEFI BIOS Recovery Instructions in Appendix C.

Starting BIOS Setup Utility

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

✎ **Note**: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen.

Each main BIOS menu option is described in this manual. The AMI 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 a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

✎ **Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text 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 the setup navigation process. These keys include <F1>, <F4>, <Enter>, <Esc>, arrow keys, etc.

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

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 <Del> at the appropriate time during system boot.

How to Start 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 Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating 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 following Main menu items will be displayed:
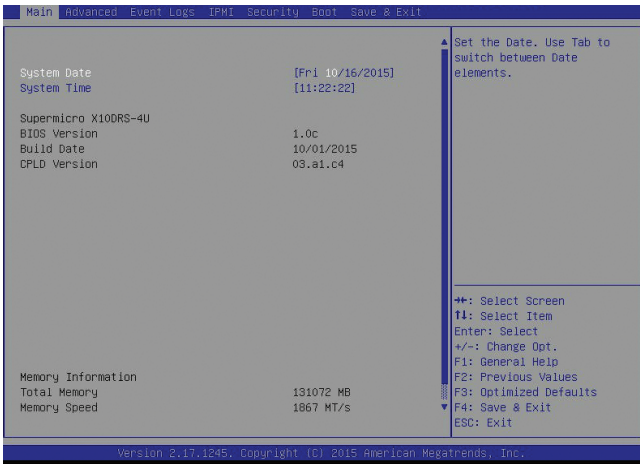
System Date/System Time

Use this option to change the system date and time. Highlight *System Date* or *System Time* using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys 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 X10DRS-4U

BIOS Version: This item displays the version of the BIOS ROM installed in your system.

Build Date: This item displays the date when the version of the BIOS ROM that is used in the system was built.

CPLD Version: This item displays the version of the Complex-Programmable Logic-Device architecture installed in your system.

Memory Information

Total Memory: This item displays the total size of memory available in the system.

Memory Speed: This item displays the default speed of the memory modules installed in the system.

4-3 Advanced Setup Configurations

Use the arrow keys to select Advanced setup and press <Enter> to access the submenu items:

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

   ▶ Boot Feature                                       sSATA Configuration
   ▶ CPU Configuration
   ▶ Chipset Configuration
   ▶ sSATA Configuration
   ▶ Server ME Configuration
   ▶ PCIe/PCI/PnP Configuration
   ▶ Super IO Configuration
   ▶ Serial Port Console Redirection
   ▶ ACPI Settings



   ▶ iSCSI Configuration
                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit
                Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Warning: Take Caution when changing the Advanced settings. An incorrect value, an improper DRAM frequency, or a wrong timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacture default setting.

▶Boot Feature

Boot Configuration

Quiet Boot

Use this item to select the screen display between POST (Power-On Self -Test) messages or the OEM logo at bootup. 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 mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock State

Use this item to set the power-on state for the Numlock key. When this item is set to On, the NumLock key will be enabled at bootup. 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 if 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 ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to the host adaptors to function as bootable disks. If this item is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately to allow the drives attached to the adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

Select EFI Boot to allow the BIOS to automatically reboot the system from an EFI boot device after its initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after its initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

CPLD Watch Dog

Select Power On for the BIOS to turn on the CPLD (Complex Programmable Logic Device) Watch Dog timer at the early stage of POST (Power-on Self-Test) without turning it off. Select POST for the BIOS to turn on the CPLD Watch Dog timer at the early stage of POST and will turn it off upon the completion of POST. Select OS for the BIOS to turn on the CPLD Watch Dog timer when it is ready to boot the OS. The options are **Disabled**, Power On, POST, and OS.

Watch Dog Function

If enabled, the Watch Dog Timer will allow the system to reset or generate NMI based on jumper settings when the system is inactive more than 5 minutes. The options are Enabled and **Disabled**.

Power Button Function

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for the user to power off the system after pressing and holding the power button for 4 seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are 4 Seconds Override and **Instant Off.**

AC Loss Policy Depend On

Select BIOS for the AMI BIOS to set the AC power loss policy. Select IPMI for the IPMI to set the AC power loss policy. The options are IPMI and **BIOS.**

Restore on AC Power Loss

Use this feature to set the power state after an AC power outage. Select Power Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. 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 Socket

- Processor ID

- Processor Frequency

- Processor Max Ratio

- Processor Min Ratio

- Microcode Revision

- L1 Cache RAM

- L2 Cache RAM

- L3 Cache RAM

- CPU1 Version

- CPU2 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 per-formance. The options are **Enable** and Disable.

Cores Enabled

This feature allows the user to determine the number of CPU cores to be enabled. Enter "0" to enable all cores. The default setting is **0**, which enables all CPU cores in the system.

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

Select Enable to support Execute Disable Bit Technology, 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 to damage the system during an attack. The options are **Enable** and Disable. (Refer to Intel's and Microsoft's websites for more information.)

PPIN Control

Select Unlock/Enable to use the Protected-Processor Inventory Number (PPIN) control 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 instruc-tions from the main memory to the L2 cache to improve CPU performance. The options are Disable and **Enable**.

Adjacent Cache 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 website 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 (Data Cache Unit) 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 **Auto**, 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(X2) from 8 bits 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 and integrity. The options are Enable and **Disable**.

Intel Virtualization Technology

Select Enable to use Intel Virtualization Technology support for Direct I/O VT-d support 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.

▶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 Disabled 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 interface. 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 Disable and **Enable**.

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/C1 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 **Disable** and Enable.

CPU C6 Report

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 Disable and **Enable**.

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**.

▶CPU T State Control (Available when Power Technology is set to Custom)

ACPI (Advanced Configuration Power Interface) T-States

If this item is set to Enable, CPU throttling will be supported by the operating system to reduce power consumption. The options are Disable and **Enable**.

▶Chipset Configuration

Warning! Please set the correct settings for the items below. A wrong configuration setting may cause the system to become malfunction.

▶North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

▶IIO Configuration

EV DFX (Device Function On-Hide) Features

When this feature 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.

▶IIO1 Configuration

IOU2 (IIO1 PCIe Port 1)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4, x8, and **Auto**.

IOU0 (IIO1 PCIe Port 2)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (IIO1 PCIe Port 3)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

▶IIO2 Configuration

IOU2 (IIO2 PCIe Port 1)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4, x8, and **Auto**.

IOU0 (IIO2 PCIe Port 2)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (IIO2 PCIe Port 3)

This item configures the PCI-E port Bifuraction setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

▶IOAT (Intel® IO Acceleration) Configuration

Enable IOAT

Select Enable to enable Intel I/OAT (I/O Acceleration Technology) support, which significantly reduces CPU overhead by leveraging CPU architectural improve-ments 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 to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to

be completed prior to other transactions that have already been enqueued. 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 use Intel Virtualization Technology for Direct I/O VT-d support 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.

Interrupt Remapping

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

▶QPI (Quick Path Interconnect) Configuration

▶QPI General 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 PCIe Configuration Base/Size

Link Frequency Select

Use this item 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 to reduce power consumption. The options are **Enable** and Disable.

Link L1 Enable

Select Enable for Link L1 support to reduce power consumption. 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) require-ments. This feature is especially important for Intel Virtualization Technology. The options are Enable and **Disable**.

▶Memory Configuration

This submenu allows the user to configure Integrated Memory Controller (IMC) settings.

Enforce POR

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

Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, and 2400.

Data Scrambling

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

Enable ADR

Select Enabled for ADR (Automatic Diagnostic Repository) support to enhance memory performance. The options are Disabled and **ADR + NVDIMMs**.

Erase-Arm NVDIMMs

Select Enabled for NDVIMM Erasing and Arming support to enhance memory performance. The options are Disabled and **Enabled**.

Restore NVDIMMs

Select Enabled for the BIOS to restore onboard NVDIMM memory support automatically to enhance memory performance. The options are Disabled and **Enabled**.

Interleave NVDIMMs

Select Enabled to configure onboard NVDIMM modules for interleaving support to enhance memory performance. The options are **Disabled** and Enabled.

Global Reset

Select Enabled to trigger a global reset instead of the normal reset to allow ADR to save NVDIMM settings. The options are Disabled and **Enabled**.

DRAM RAPL (Running Average Power Limit) Baseline

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

Set Throttling Mode

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

Socket Interleave Below 4GB

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

A7 Mode

Select Enable for A7 (Addressing) mode support 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 AMI BIOS.

- P1-DIMMA1 - P1-DIMMD1

- P2-DIMME1 - P2-DIMMH1

▶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 IO 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 IO hub 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 Disabled to have all USB devices available for EFI applications only. The options are **Enabled**, Disabled, and Auto.

XHCI 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 feature is enabled, EHCI ownership change will be claimed by the EHCI driver. The settings are Enabled and **Disabled**.

Port 60/64 Emulation

Select Enabled to support I/O port 60h/64h emulation, which will provide complete legacy USB keyboard support for the operating systems that do 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 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.

▶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 1

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

- Model number of drive and capacity

sSATA Port 0~ Port 1

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

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.

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 Device Type

Use this item to specify if the sSATA port specified by the user should be con-
nected 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 1

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

sSATA Device Type (Available when a sSATA port is detected)

Use this item to specify if the sSATA port specified by the user should be con-
nected 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 sSATA 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
OPROM 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 sSATA 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 None, Both, SATA Controller, and **sSATA Controller**.

sSATA Port 0~ Port 1

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

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.

Spin Up Device

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

sSATA Device Type

Use this item to specify if the sSATA port specified by the user should be con-nected 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

▶PCIe/PCI/PnP Configuration

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).

PCI PERR/SERR Support

Select Enabled to support PERR (PCI/PCI-E Parity Error Runtime Reporting)/SERR (System Error Runtime Reporting) for a PCI/PCI-E slot. 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, and 256 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 I/O base memory size according to memory-address mapping for the PCH chip. The options are **56T**, 48T, 24T, 2T, 512G, and 256G.

MMIO High Size

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

PCI Devices Option ROM Setting

PCI/PCI X/PCIe Slot 1 OPROM//PCI/PCIX/PCIe Slot 2 OPROM//PCI/PCI X/ PCIe Slot 3 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 SAS Option ROM

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

Onboard LAN Option ROM Type

Select Legacy to enable Legacy support for the LAN controller for system boot. The options are **Legacy** and EFI.

Onboard LAN 1 Option ROM/Onboard LAN 2 Option ROM//Onboard LAN 3 Option ROM/Onboard Video Option ROM

Use this feature to select the type of device to be installed in a LAN port specified by the user for system boot. The default setting for LAN1 Option ROM is **PXE**. The default settings for LAN2 Option ROM, LAN 3 Option ROM and Onboard Video Option ROM are **Disabled**.

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.

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**.

IPv4 PXE Support

Select Enabled to enable IPv4 PXE boot support. The options are Disabled and **Enabled**.

IPv6 PXE Support

Select Enabled to enable IPv6 PXE boot support. The options are **Disabled** and Enabled.

Onboard PLX Device

Select Enabled for onboard PLX device 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 for a serial port specified by the user. The default setting for Serial Port 1 is IO=3F8h IRQ=4; for Serial Port 2 is IO=2F8h, IRQ=3.

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).

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

Console Redirection

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

Terminal Type

Use this item 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 item 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

Use this item to select 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 (Power-On Self-Test). When "BootLoader" is selected, legacy Console Redirection is disabled before booting the OS. When "Always Enable" is selected, legacy Console Redirection remains enabled while the OS boots up. The options are **Always Enable** and BootLoader.

SOL/COM2

SOL/COM2 Console Redirection

Select Enabled to use the SOL 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/COM2 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 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.

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 COM2/SOL (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 following settings will be displayed:

Data Bits, Parity, Stop Bits

▶**Trusting Computing** **(Available when a TPM device is installed)**

If a TPM (Trusted Platform Module) device is detected by the BIOS, the following
screen will display:

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Trusted Computing

  Configuration                                          Enables or Disables BIOS
    Security Device Support        [Enabled]             support for security device.
    TPM State                      [Disabled]            O.S. will not show Security
  Pending Operation                [None]                Device. TCG EFI protocol and
                                                         INT1A interface will not be
                                                         available.
  Current Status Information
    TPM Enabled Status:            [Disabled]
    TPM Active Status:             [Deactivated]
    TPM Owner Status:              [Owned]


  TXT Support                      [Disabled]
                                                         ↔: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


              Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

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
which will enhance data integrity and network security. Please reboot the system
for the change of the 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. Please reboot your system for the BIOS to carry out a pending
TPM operation. The options are **0**, Enable Take Ownership, Disable Take Owner-
ship, and TPM Clear.

Current Status Information

This item displays the following status of Trusting Computing on this motherboard:

• TPM Enabled Status

• TPM Active Status

- TPM Owner Status

TXT Support

Select Enabled to enable Intel Trusted Execution Technology (TXT) support. The options are **Disabled** and Enabled.

Note: If the option for TXT Support is set to Enabled, be sure to disable EV DFX (Device Function On-Hide) support for the system to work properly. (EV DFX is under "IIO Configuration" in the "Chipset/North Bridge" submenu on Page 4-10).

Note: For more information on TPM, please refer to the TPM manual at http://www.supermicro.com/manuals/other/AOM-TPM-9655V_9655H.pdf

▶ACPI Settings

WHEA Support

Select Enabled to support the Windows Hardware Error Architecture (WHEA) plat-form 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 Event 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 de-pendency on other timestamp calculation devices, such as an x86 RDTSC Instruc-tion 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.

▶iSCSi Configuration

iSCSI Initiator Name

This feature allows the user to enter the unique name of the iSCSI Initiator in the IQN format. Once the name of the iSCSI Initiator is entered into the system, configure the proper settings for the following items.

▶**Add an Attempt**

▶**Delete Attempts**

▶**Change Attempt order**

4-4   Event Logs

This submenu allows the user to configure Event Log settings.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
       Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

  ▶ Change SMBIOS Event Log Settings                        Press <Enter> to change the
  ▶ View SMBIOS Event Log                                   SMBIOS Event Log
                                                            configuration.



                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

              Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

►Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event 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 Enable to support Runtime Error logging. The options are **Enable** and Disable.

Erasing Settings

Erase Event Log

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

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. The following categories are displayed:

Date/Time/Error Code/Severity

4-5   IPMI

This submenu allows the user to configure Intelligent Platform Management Interface (IPMI) settings.

```
                  Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
       Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

    BMC Firmware Revision            0.64                    Press <Enter> to change the
    IPMI STATUS                      Working                 SEL event log configuration.

    ▶ System Event Log
    ▶ BMC Network Configuration




                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

              Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

The following items will display:

- BMC Firmware Revision

- IPMI Status

▶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.

> ✎ **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:

- IPMI LAN Selection

- IPMI Network Link Status

Update IPMI LAN Configuration

Select Yes for the system BIOS to automatically reset the following IPMI settings upon 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.
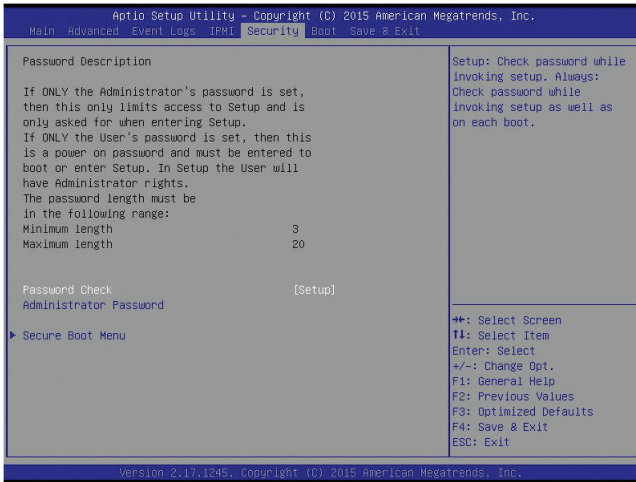
Station MAC Address

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

Gateway IP Address

This item displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.31.0.1).

4-6 Security Settings

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

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

     Password Description                                       Setup: Check password while
                                                                invoking setup. Always:
     If ONLY the Administrator's password is set,               Check password while
     then this only limits access to Setup and is               invoking setup as well as
     only asked for when entering Setup.                        on each boot.
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights.
     The password length must be
     in the following range:
     Minimum length                    3
     Maximum length                    20


     Password Check                  [Setup]
     Administrator Password                                     ↔: Select Screen
                                                                ↑↓: Select Item
   ► Secure Boot Menu                                           Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit

                Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Password Check

Select Setup for the system to prompt for a password upon entering the BIOS setup utility. Select Always for the system to prompt for a password at bootup and upon entering the BIOS Setup utility. The options are **Setup** and Always.

Administrator Password

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

User Password (Available after an Administrator Password is entered)

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 **Disabled** and Enabled.

Secure Boot Mode

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

CSM Support

Select Enabled to enable CSM support to enhance system security. The options are Disabled and **Enabled**.

▶**Key Management**

Default Key Provision

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

▶**Enroll All Factory Default Keys**

This feature allows the user to store security-related boot data in a file of the same named in the system root folder of your computer.

▶**Save All Secure Boot Variables**

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

Platform Key

▶**Delete PK**

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

▶**Set New PK (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)

▶**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 manufacture 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 manufacture 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 manufacture 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).

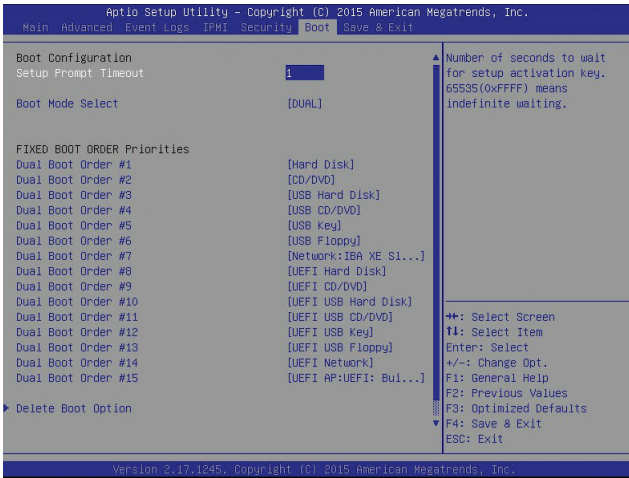▶**Set New DBX**

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

4-7   Boot Settings

This submenu allows the user to configure Boot settings for this system:

Boot Configuration

Setup Prompt Timeout

Use this item to set the number of seconds for the system to wait until the setup key is activated. Enter 65535 (0xFFFF) to wait indefinitely.

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.

- *When the item above -"Boot Mode Select" is set to Dual (default), the following items will be displayed for configuration:*

Boot Option #1 - Boot Option #15

- *When the item above -"Boot Mode Select" is set to Legacy, the following items will be display for configuration:*

Boot Option #1 - Boot Option #7

- *When the item above -"Boot Mode Select" is set to UEFI, the following items will be display for configuration:*

Boot Option #1 - Boot Option #8

▶**Add New Boot Option**

Use this item to select a new boot device to add to the boot priority list.

Add New Boot Option

Use this feature to select a new boot device to add to the boot priority list.

▶**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 from the boot priority list.

▶**Delete Driver Option**

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

Delete Boot Option

Select the target boot drive to delete from the boot priority list.

▶**Hard Disk Drive BBS Priorities**

● Legacy Boot Order #1

▶**Network Drive BBS Priorities**
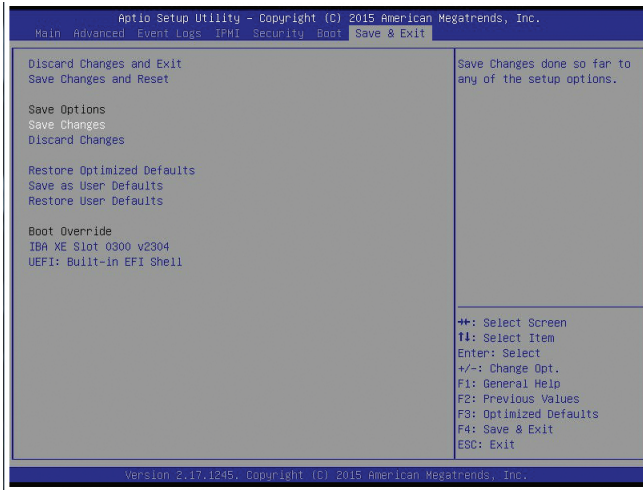
● Legacy Boot Order #1

▶**USB Key Drive BBS Priorities**

● Legacy Boot Order #1

▶**UEFI USB Key Drive BBS Priorities**

● UEFI Boot Order #1

4-8   Save & Exit

This submenu allows the user to configure the following Save & Exit settings:

Discard Changes and Exit

Select this item to exit from the BIOS setup without making any permanent changes to the system configuration, and reboot the computer.

Save Changes and Reset

After you have completed the system configuration changes, select this item to save the changes and reboot the computer for the new system configuration settings to take effect.

Save Options

Save Changes

After you have completed the system configuration changes, select this item to save all changes made. This will not reset (reboot) the system.

Discard Changes

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

Restore Optimized Defaults

Select this item and press <Enter> to load the manufacture default settings which are designed to optimize system performance but not for maximum system stability.

Save as User Defaults

Select this item and press <Enter> to save the current BIOS settings as user's default settings for future use.

Restore User Defaults

Select this item and press <Enter> to retrieve the user-defined default settings that were previously saved to be used as current default settings.

Boot Override

This feature allows the user to override the boot priority sequence in the Boot submenu and immediately boot the system with another device specified by the user. This is a one-time override.

Appendix A

BIOS 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 that, 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.

The fatal errors are usually communicated through repeated patterns of audible beeps. Each pattern of audible beeps listed below corresponds to its respective error.

A-1 BIOS Error Beep Codes

Motherboard BIOS Error Beep Codes		
Beep Code/LED	**Error Message**	**Description**
1 beep	Refresh	Ready to boot
5 short beeps + 1 long beep	Memory error	No memory detected in the system
5 beeps	No Con-In or No Con-Out devices	Con-In includes USB or PS/2 keyboard, PCI or Serial Console Redirection, IPMI KVM or SOL. Con-Out includes Video Controller, PCI or Serial Console Redirection, IPMI SOL.
1 beep per device	Refresh	1 beep for each USB device detected
IPMI Error Codes		
1 Continuous Beep	System OH	System Overheat

Notes

Appendix B

Software Installation Instructions

B-1   Installing Software Programs

The Supermicro ftp site contains drivers and utilities for your system 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 Figure B-1 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 harddrive or a USB flash drive and install from there.
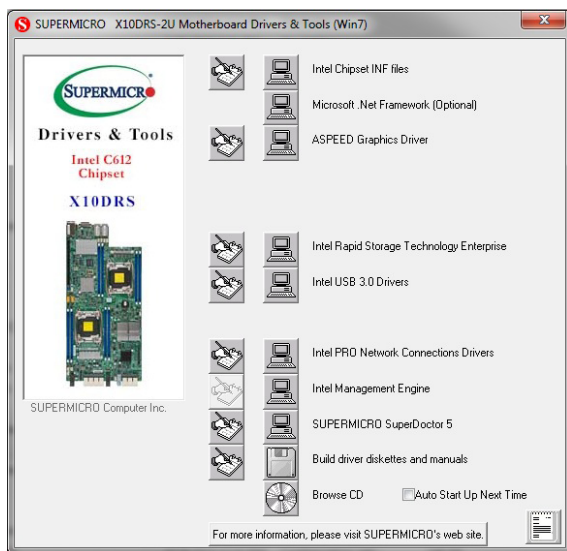
Driver/Tool Installation Display Screen

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

When making a storage driver diskette by booting into a driver CD, please set the SATA configuration to "Compatible Mode" and configure the 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   Installing SuperDoctor5

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, and 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 the 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. The SD5 Management Server monitors HTTP and SMTP services to optimize the efficiency of your operation.

> **Note:** The default username and password for SuperDoctor 5 is admin/admin.

SuperDoctor 5 Interface Display Screen (Health Information)
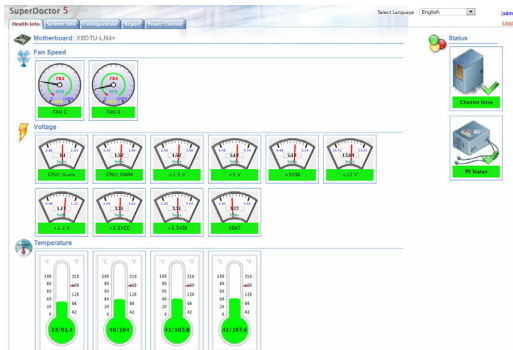
> **Note:** The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro website at http://www.supermicro.com/products/nfo/sms_sd5.cfm.

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 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

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.)
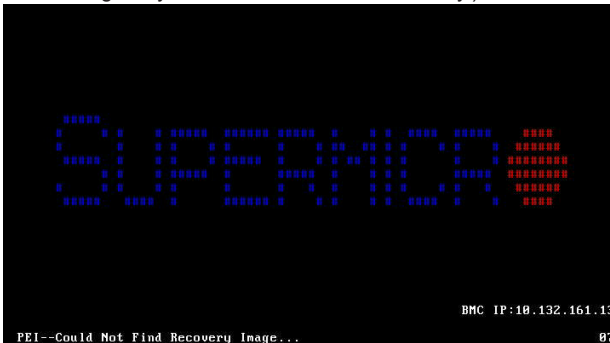
3. While powering on the system, please keep pressing <Ctrl> and <Home> si-
multaneously on your keyboard *until* the following screen (or a screen similar
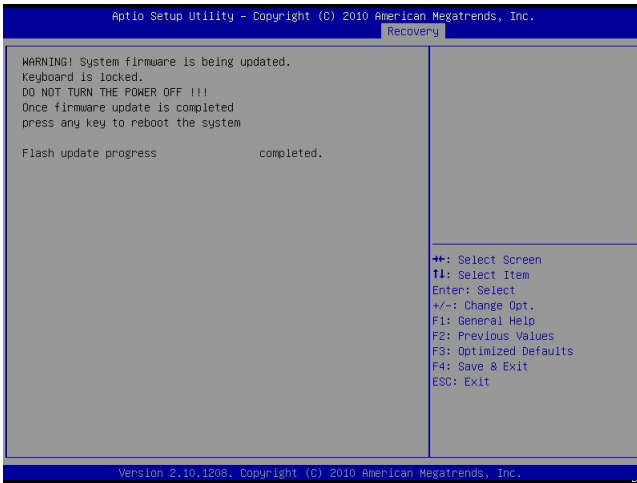to the one below) displays.
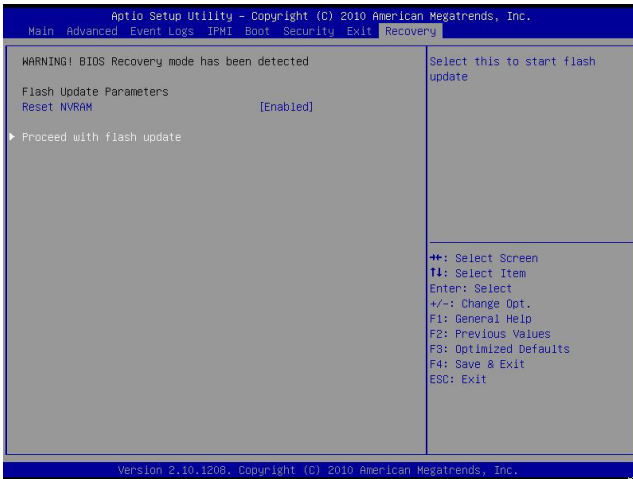
4. After locating the new BIOS binary image, the system will enter the BIOS
Recovery menu as shown below.

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.
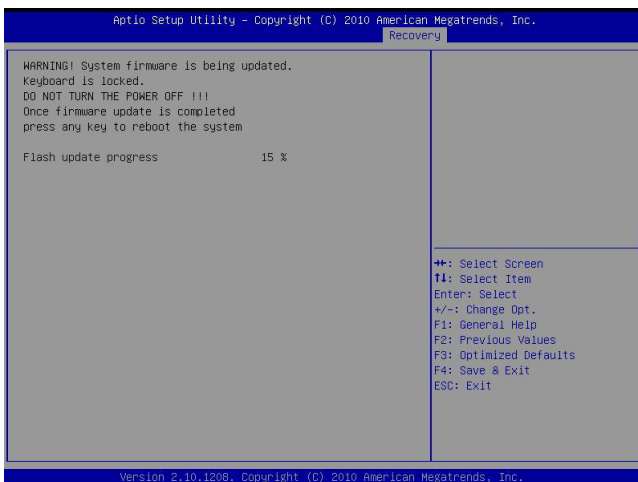
5. When the screen as shown above displays, using the arrow key, select the item "Proceed with flash update" and press the <Enter> key. You will see the

```
              Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
                                                       Recovery

    WARNING! System firmware is being updated.
    Keyboard is locked.
    DO NOT TURN THE POWER OFF !!!
    Once firmware update is completed
    press any key to reboot the system

    Flash update progress            completed.



                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


              Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

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 in 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.