



X10DRT-B+

USER'S MANUAL

Revision 1.0c

The information in this user's manual has been carefully reviewed and is believed to be accurate. The vendor assumes no responsibility for any inaccuracies that may be contained in this document, and makes no commitment to update or to keep current the information in this manual, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this manual, please see our website at www.supermicro.com.**

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software and documentation, is the property of Supermicro and/or its licensors, and is supplied only under a license. Any use or reproduction of this product is not allowed, except as expressly permitted by the terms of said license.

IN NO EVENT WILL SUPER MICRO COMPUTER, INC. BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPER MICRO COMPUTER, INC. SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between the manufacturer and the customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Supermicro's total liability for all claims will not exceed the price paid for the hardware product.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in industrial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate".



WARNING: This product can expose you to chemicals including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Manual Revision 1.0c

Release Date: January 31, 2020

Unless you request and receive written permission from Super Micro Computer, Inc., you may not copy any part of this document.

Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2020 by Super Micro Computer, Inc.

All rights reserved.

Printed in the United States of America

Preface

This manual is written for system integrators, IT professionals, and knowledgeable end-users. It provides information for the installation and use of the X10DRT-B+ motherboard.

About This Motherboard

The Super X10DRT-B+ motherboard supports dual Intel® E5-2600 (v3/v4) Series processors (Socket R3) that offer Intel® QPI (Intel QuickPath Interconnect) Technology, providing point-to-point connections with a transfer speed of up to 9.6 GT/s. Built with the PCH C612, the X10DRT-B+ motherboard supports Intel® Manageability Engine, Intel Rapid Storage Technology, Digital Media Interface (DMI), PCI-E Gen. 3.0 slots, DDR4 2400 MHz (max) memory, and a SIOM (PCI-E 3.0 x 16) networking slot. This motherboard is optimized for High Performance Computing, and is ideal for 2U Twin² systems. Please refer to our website (<http://www.supermicro.com>) for processor and memory support updates.

Manual Organization

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

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

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

Appendix A lists software installation instructions.

Appendix B contains UEFI BIOS Recovery instructions.

Conventions Used in the Manual

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

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



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

Contacting Supermicro

Headquarters

Address: Super Micro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.

Tel: +1 (408) 503-8000

Fax: +1 (408) 503-8008

Email: marketing@supermicro.com (General Information)
support@supermicro.com (Technical Support)

Website: www.supermicro.com

Europe

Address: Super Micro Computer B.V.
Het Sterrenbeeld 28, 5215 ML
's-Hertogenbosch, The Netherlands

Tel: +31 (0) 73-6400390

Fax: +31 (0) 73-6416525

Email: sales@supermicro.nl (General Information)
support@supermicro.nl (Technical Support)
rma@supermicro.nl (Customer Support)

Website: www.supermicro.nl

Asia-Pacific

Address: Super Micro Computer, Inc.
3F, No. 150, Jian 1st Rd.
Zhonghe Dist., New Taipei City 235
Taiwan (R.O.C)

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3992

Email: support@supermicro.com.tw

Website: www.supermicro.com.tw

Table of Contents

Preface

About This Motherboard.....	3
Manual Organization	3
Conventions Used in the Manual	4
Contacting Supermicro	5

Chapter 1 Overview

1-1 Overview	1-1
Checklist.....	1-1
Motherboard Features.....	1-7
1-2 Processor and Chipset Overview	1-10
1-3 Special Features	1-11
Recovery from AC Power Loss.....	1-11
1-4 System Health Monitoring.....	1-11
Fan Status Monitor with Firmware Control	1-11
Environmental Temperature Control	1-11
System Resource Alert	1-11
1-5 ACPI Features.....	1-12
1-6 Power Supply	1-12
1-7 Advanced Power Management.....	1-13
Intel® Intelligent Power Node Manager (NM) (Available when the Supermicro Power Manager [SPM] is installed).....	1-13
Management Engine (ME)	1-13

Chapter 2 Installation

2-1 Standardized Warning Statements	2-15
Battery Handling.....	2-15
Product Disposal	2-17
2-2 Static-Sensitive Devices.....	2-18
Precautions	2-18
Unpacking	2-18
2-3 Processor and Heatsink Installation.....	2-19
Installing the LGA2011 Processor	2-19
Installing a Passive CPU Heatsink	2-23
Removing the Passive Heatsink	2-24
2-4 Installing and Removing the Memory Modules.....	2-25
Installing & Removing DIMMs.....	2-25
Removing Memory Modules	2-25
2-5 Motherboard Installation.....	2-28

	Tools Needed	2-28
	Location of Mounting Holes	2-28
2-6	Control Panel Connectors and I/O Ports	2-29
	Back Panel Connectors and I/O Ports.....	2-29
	Back Panel I/O Port Locations and Definitions	2-29
	Universal Serial Bus (USB).....	2-30
	Video Connector.....	2-30
	Dedicated IPMI LAN Ethernet Port.....	2-31
	UID Switch/UID LED	2-32
	Power & Front Control Panel Connector (JF1).....	2-33
2-7	Connecting Cables.....	2-34
	DOM Power Connector	2-34
	TPM Header/Port 80	2-35
	Fan Headers.....	2-36
2-8	Jumper Settings	2-37
	Explanation of Jumpers	2-37
	CMOS Clear	2-37
	Watch Dog Enable/Disable	2-38
	I ² C Bus for VRM.....	2-38
	VGA Enable.....	2-39
	BMC Enable	2-39
	Manufacturing Mode	2-40
2-9	Onboard LED Indicators	2-41
	Dedicated IPMI LAN LED	2-41
	BMC Heartbeat LED	2-41
	Onboard Power LED	2-42
	Unit Identifier LED	2-42
2-10	PCI-E 3.0 Slots and SATA	2-43
	PCI-Express 3.0 x16	2-43
	PCI-Express 3.0 x4	2-43
	PCI-Express 3.0 x24.....	2-43
	Powered SATA DOM (SuperDOM).....	2-44
	SIOM Networking Slot.....	2-44

Chapter 3 Troubleshooting

3-1	Troubleshooting Procedures	3-1
	Before Power On	3-1
	No Power	3-1
	No Video	3-2

	System Boot Failure.....	3-2
	Losing the System's Setup Configuration.....	3-2
	Memory Errors	3-3
	When the System Becomes Unstable	3-3
3-2	Technical Support Procedures	3-5
3-3	Battery Removal and Installation.....	3-6
	Battery Removal.....	3-6
	Proper Battery Disposal	3-6
	Battery Installation.....	3-6
3-4	Frequently Asked Questions	3-7
3-5	Returning Merchandise for Service.....	3-9

Chapter 4 BIOS

4-1	Introduction.....	4-10
	Starting BIOS Setup Utility.....	4-10
	How To Change the Configuration Data.....	4-10
	How to Start the Setup Utility	4-11
4-2	Main Setup.....	4-11
4-3	Advanced Setup Configurations.....	4-13
4-4	Event Logs	4-40
4-5	IPMI	4-42
4-6	Security Settings	4-44
4-7	Boot Settings.....	4-47
4-8	Save & Exit	4-49

Appendix A Software Installation Instructions

A-1	Installing Software Programs	A-1
A-2	Installing SuperDoctor5.....	A-2
A-3	Logging into the BMC (Baseboard Management Controller)	A-3

Appendix B UEFI BIOS Recovery Instructions

B-1	An Overview to the UEFI BIOS	B-1
B-2	How to Recover the UEFI BIOS Image (-the Main BIOS Block).....	B-1
B-3	To Recover the Main BIOS Block Using a USB-Attached Device.....	B-1

Chapter 1

Overview

1-1 Overview

Checklist

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

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



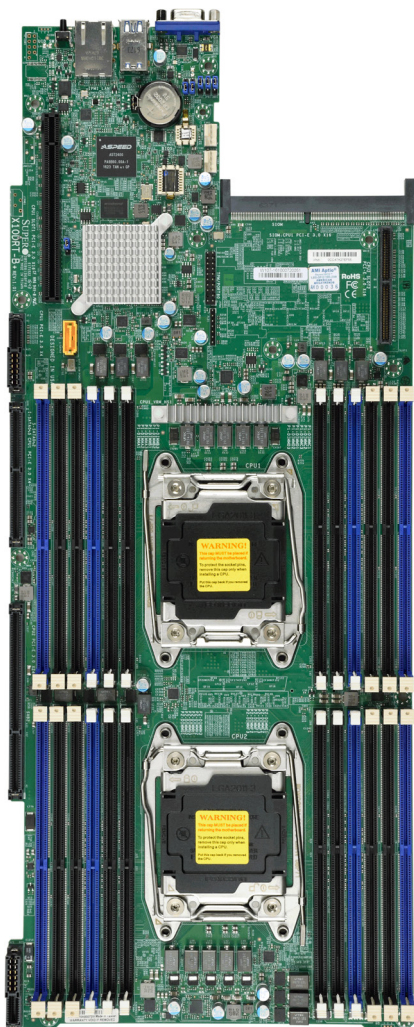
Note: For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your motherboard.

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

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

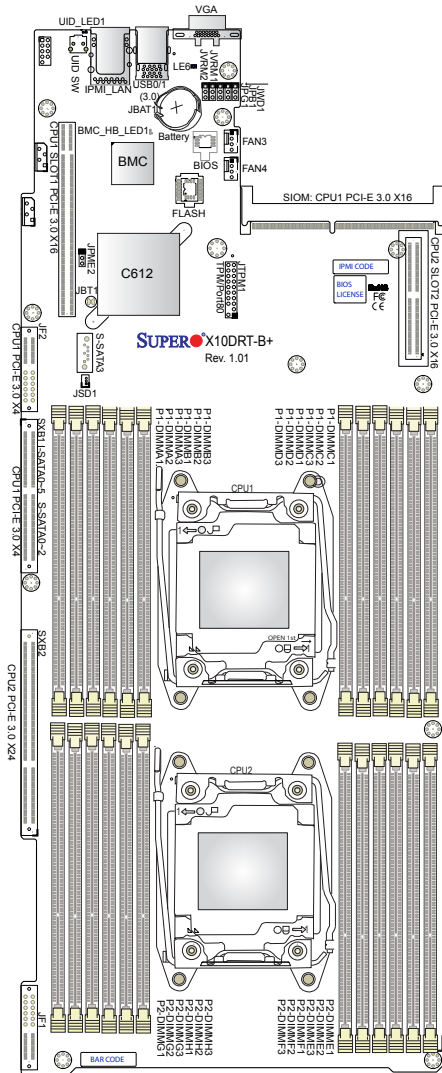
If you have any questions, please contact our support team at support@supermicro.com.

Motherboard Image



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

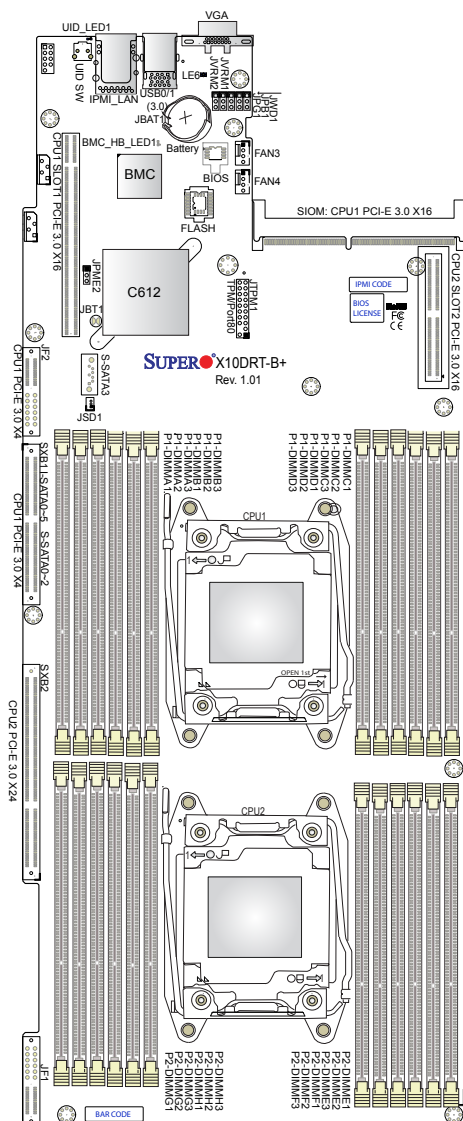
Motherboard Layout



 Notes:

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

Motherboard Quick Reference



Notes:

- See Chapter 2 for detailed information jumpers, I/O ports, connectors and expansion slots. "■" indicates the location of "Pin 1".
- Components/Jumpers/LED Indicators that are not documented in this manual are reserved for internal testing only.

X10DRT-B+ Motherboard Jumpers

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Chapter 2
JPB1	Baseboard Management Controller (BMC) Enable	Pins 1-2 (Enabled)
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPME2	Manufacturing Mode	Pins 1-2 (Normal)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Reset)
JVRM1/2	I ² C Bus for VRM	Pins 1-2 (BMC: Normal)

X10DRT-B+ Motherboard Connectors

Connectors	Description
Battery (JBAT1)	Onboard CMOS battery (See more info in Chapter 3)
FAN3, FAN4	System fan headers
IPMI_LAN	Dedicated IPMI LAN port
JF1	Power and front control panel connector
JF2	PCI-E 3.0 x4 slot supported by CPU1
JSD1	SATA DOM (Disk-On-Module) power connector
JTPM1	TPM (Trusted Platform Module)/Port 80 header
SIOM	CPU1 PCI-E 3.0 x16 slot for proprietary add-on module use
SLOT1	PCI-E 3.0 x16 slot supported by CPU1
SLOT2	PCI-E 3.0 x16 slot supported by CPU2
S-SATA3	SATA DOM with power-pin connector
SXB1	PCI-E 3.0 x4 slot (supported by CPU1) and SATA connections (I-SATA0~5 & S-SATA0~2)
SXB2	PCI-E 3.0 x24 slot supported by CPU2
UID SW	UID (Unit Identifier) switch
USB0/1 (3.0)	Back panel USB 3.0 ports
VGA	Back panel VGA port

X10DRT-B+ Motherboard LED Indicators

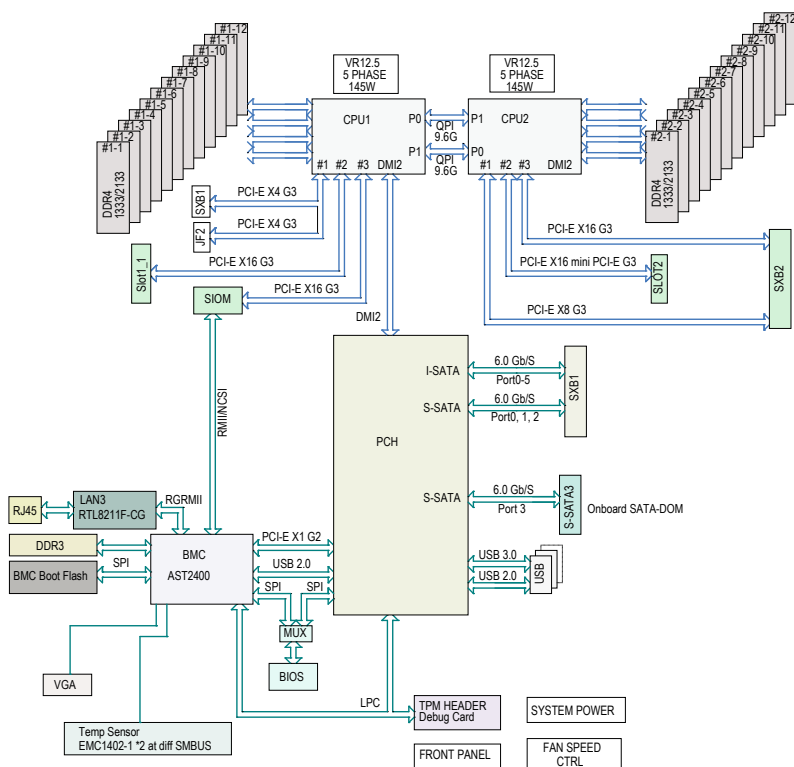
LED	State
BMC_HB_LED1 (BMC Heartbeat LED)	Green (Blinking): BMC normal
	Orange: Standby power ready
LE6 (Onboard Power LED)	Green: All power RAMP normal
	Red: One or more power regulators failed
UID_LED1 (Rear Unit Identifier LED)	Blue: (On/Blinking): Unit identified

Motherboard Features

CPU	Dual Intel® E5-2600 (v3/v4) Series processors (Socket R3 LGA 2011); each processor supports two full-width Intel QuickPath Interconnect (QPI) links (with Data Transfer Rate of up to 9.6 GT/s per QPI)  Notes: 1. E5-2600v4 requires Revision 2.0 BIOS (or higher). 2. E5-2600v3 is fully backward compatible with all BIOS revisions.
Memory	Integrated memory controller supports up to 3072GB of Load Reduced (LRDIMM), Non-Volatile (NVDIMM), and Registered (RDIMM) ECC DDR4 (288-pin) memory of up to 2400 MHz in 24 slots  Note: Memory speed support is pending on the processors installed in the system. For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard.
	DIMM Sizes
	Up to 128GB at 1.2V
Chipset	Intel® PCH C612
Expansion Slots	- Two (2) PCI-E 3.0 x16 slots (supported by CPU1 & CPU2) (SLOT1 & SLOT2) - One (1) PCI-E 3.0 x4 slot (supported by CPU1) and SATA connections (I-SATA0-5 & S-SATA 0-2) (SXB1) - One (1) PCI-Exp 3.0 x24 slot (supported by CPU2) (SXB2)
Graphics	ASpeed AST2400 Baseboard Management Controller (BMC) with integrated graphics controller
Network	One dedicated IPMI LAN supported by the ASpeed 2400 BMC located on the rear I/O panel
I/O Devices	IPMI 2.0
	IPMI 2.0 supported by the ASpeed 2400 BMC
	VGA
	Rear VGA Port
Peripheral Devices	USB Devices
	Two (2) USB 3.0 ports on the rear I/O panel (USB0/1)

BIOS	• 128MB SPI AMI BIOS Flash ROM
	• ACPI 3.0 or later, Riser Card auto detection support, and SMBIOS 2.7 or later,
	• S4, S5
Power	• ACPI Power Management
	• Power-on mode for AC power recovery
	• Intel® Intelligent Power Node Manager (available when the NMView utility is installed)
	• Management Engine
	• Riser Card auto-detection
System Health Monitoring	System Health Monitoring
	• Onboard system health monitors for +1.8V, +3.3V, +5V, +/-12V, +3.3V Standby, +5V Standby, +12V Standby, VBAT, PCH, memory, PCH temperature, system temperature, and memory temperature
	• CPU 5-phase switching voltage regulator
	• CPU thermal trip support
	Fan Control
	• Two 4-pin fan headers
	• Fan speed control
	LED Indicators
	• CPU/system overheat LED • Power/suspend-state indicator LED • Fan failed LED • UID/remote UID LED • LAN activity LED
System Management	• PECI (Platform Environment Configuration Interface) 2.0 support
	• System resource alert via SuperDoctor® 5
	• Power supply monitoring
	• Redundant power supply unit detection sensor
	• Thermal Monitor 2 (TM2) support
	• SuperDoctor® 5, Watch Dog, NMI, RoHS
Dimensions	• 18.64" (L) x 7.20" (W) (473.46 mm x 182.88 mm)

System Block Diagram



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

1-2 Processor and Chipset Overview

Built upon the functionality and capability of the Intel® E5-2600 (v3/v4) Series processors (Socket R3) and the Intel C612 PCH, the X10DRT-B+ motherboard provides the best balanced solution of performance, power efficiency, and features to address the diverse needs of next-generation 2U Twin² server platforms.

With support of new Intel Microarchitecture 22nm (E5-2600v3)/14nm (E5-2600v4) Process Technology, the X10DRT-B+ motherboard dramatically increases system performance for a multitude of server applications.

The PCH C612 chip in conjunction with the E5-2600 (v3/v4) processors support the following features:

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

**Notes:**

1. E5-2600v4 requires Revision 2.0 BIOS (or higher).
2. E5-2600v3 is fully backward compatible with all BIOS revisions.

1-3 Special Features

Recovery from AC Power Loss

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

1-4 System Health Monitoring

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

Fan Status Monitor with Firmware Control

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

Environmental Temperature Control

System Health sensors in the BMC monitor temperatures and voltage settings of onboard processors and the system in real time via the IPMI interface. Whenever the temperature of the CPU or the system exceeds a user-defined threshold, the system cooling fan will be turned on to prevent 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, which is used to notify the user of certain system events. For example, you can configure SuperDoctor 5 to provide you with warnings when the system temperature, CPU temperatures, voltages and fan speeds go beyond a predefined range.

1-5 ACPI Features

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

In addition to enabling operating-system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with Windows 8/R2, and Windows 2012/R2 operating systems.

1-6 Power Supply

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

1-7 Advanced Power Management

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

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

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



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

Management Engine (ME)

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

Notes

Chapter 2

Installation

2-1 Standardized Warning Statements

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

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

Battery Handling



Warning!

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

電池の取り扱い

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

警告

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

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה !

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

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

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

경고!

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

Waarschuwing

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

Product Disposal



Warning!

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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

2-2 Static-Sensitive Devices

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

Precautions

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

Unpacking

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

2-3 Processor and Heatsink Installation

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



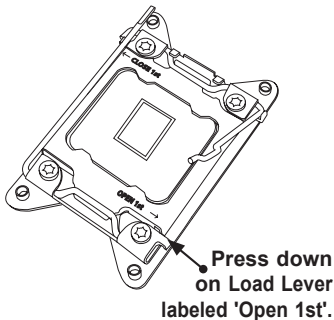
Notes:

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

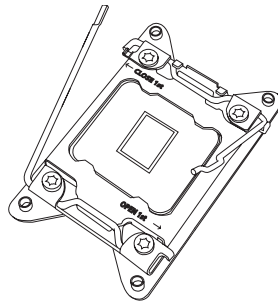
Installing the LGA2011 Processor

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

1

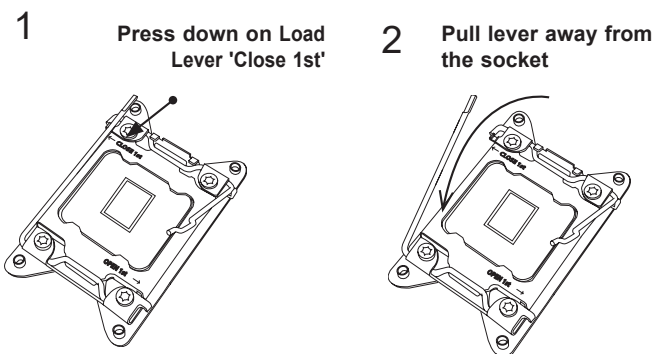


2

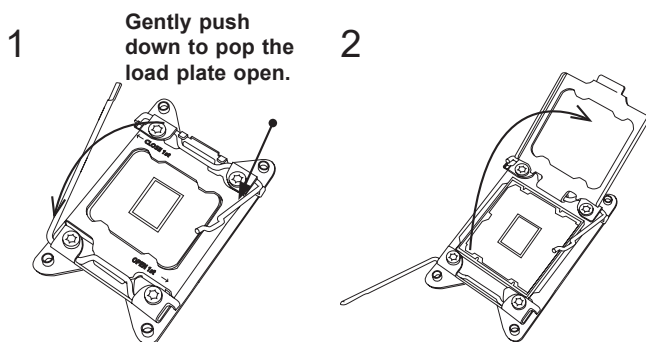


Note: Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.

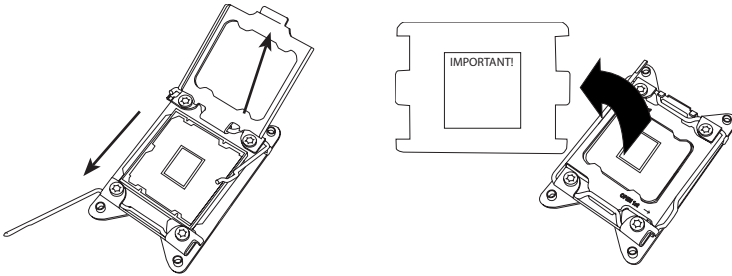
2. Press the second load lever labeled 'Close 1st' to release the load plate that covers the CPU socket from its locking position.



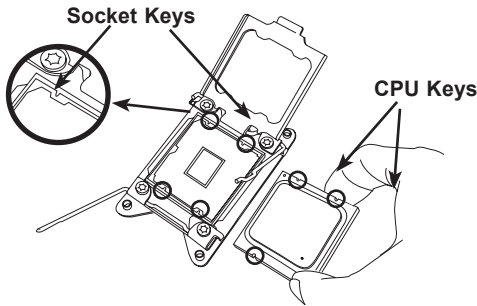
3. With the 'Close 1st' lever fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.



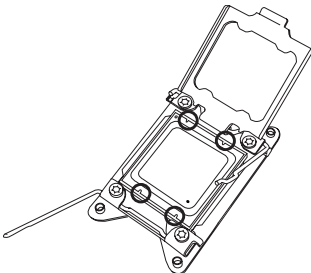
4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.



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



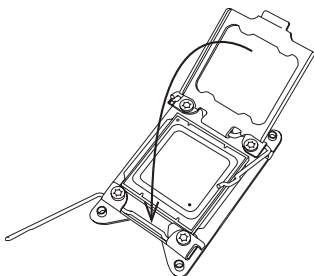
6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.)



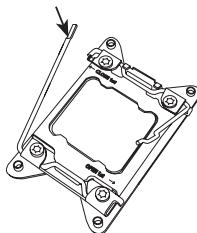
Warning: You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check to ensure that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

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

- 1** Gently close the load plate.

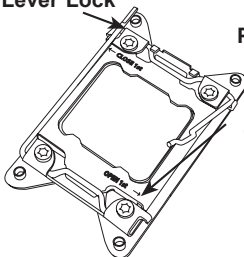


- 2** Push down and lock 'Close 1st' lever.



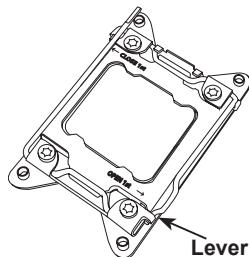
3

Lever Lock



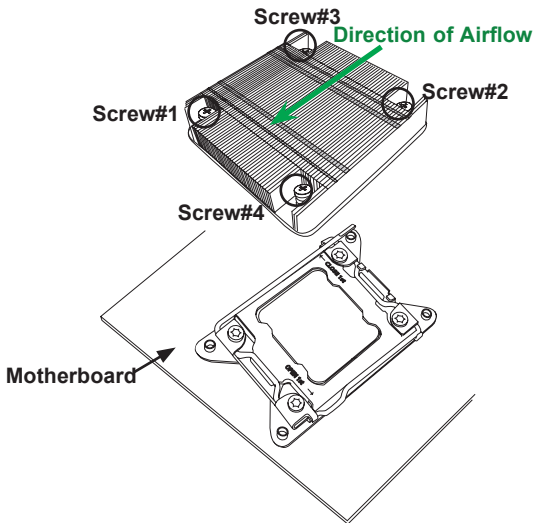
Push down and lock the lever labelled 'Open 1st'.

4



Installing a Passive CPU Heatsink

1. Apply the proper amount of thermal grease to the heatsink if needed.
2. Place the heatsink on top of the CPU so that the two mounting holes on the heatsink are aligned with those on the retention mechanism.
3. Using a screw driver, install four screws on the sides of the heatsink through the mounting holes on the motherboard in the sequence as shown below, and turn the screws clockwise to lock them.

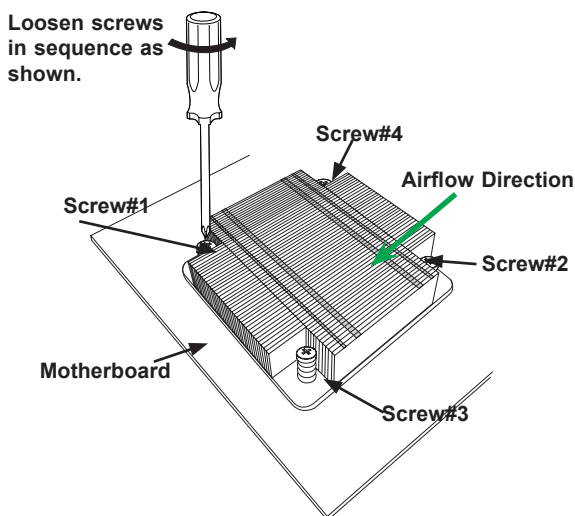


 **Note:** For optimized airflow, please follow your chassis airflow direction to properly install the CPU heatsink. Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.

Removing the Passive Heatsink

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

1. Unplug the power cord from the power supply.
2. Use a screw driver to loosen the screw from the motherboard by turning it counter-clock-wise. Repeat the same step to remove all screws from the motherboard in the sequence as shown below.
3. Hold the heatsink as shown in the picture below, and gently wriggle the heatsink to loosen it. (Do not use excessive force when wriggling the heatsink.)



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



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

2-4 Installing and Removing the Memory Modules



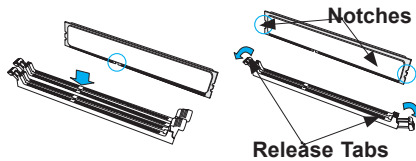
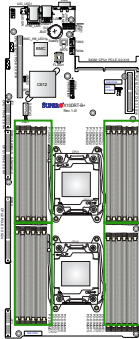
Note: Check Supermicro's website for recommended memory modules.

CAUTION

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

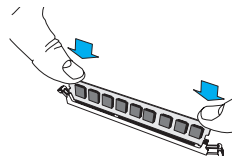
Installing & Removing DIMMs

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



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

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



Removing Memory Modules

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

Memory Support for the X10DRT-B+ Motherboard

The X10DRT-B+ motherboard supports up to 3072GB of Load Reduced (LRDIMM), Non-Volatile (NV-DIMM), and Registered (RDIMM) ECC DDR4 (288-pin) memory at up to 2400 MHz in 24 slots.



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

Processor & Memory Module Population Configuration

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

Processors and their Corresponding Memory Modules													
CPU#	Corresponding DIMM Modules												
CPU1	P1-DIMMA1-P1-DIMMD3												
P1-DIMM-	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3	
CPU2	P2-DIMME1-P2-DIMMH3												
P2-DIMM-	E1	F1	G1	H1	E2	F2	G2	H2	E3	F3	G3	H3	

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
1 CPU & 5-8 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots
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
2 CPUs & 9-16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots
2 CPUs & 16 DIMMs	PU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1, P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2
2 CPUs & 16-24 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1, P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2, P1-DIMMA3/P1-DIMMB3/P1-DIMMC3/P1-DIMMD3, P2-DIMME3/P2-DIMMF3/P2-DIMMG3/P2-DIMMH3

Memory Support for E5-2600 (v3/v4)-based Motherboards

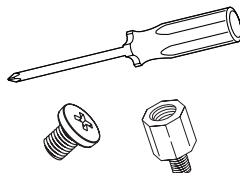
Populating RDIMM/LRDIMM DDR4 Memory Modules									
Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)					
				3 Slots per Channel					
				1 DPC		2 DPC		3 DPC	
				E5-2600 V3	E5-2600 V4	E5-2600 V3	E5-2600 V4	E5-2600 V3	E5-2600 V4
		4 Gb	8 Gb	1.2 V	1.2 V	1.2 V	1.2 V	1.2 V	1.2 V
RDIMM	SRx4	8 GB	16 GB	2133	2400	1866	2133	1600	1600
RDIMM	SRx8	4 GB	8 GB	2133	2400	1866	2133	1600	1600
RDIMM	DRx8	8 GB	16 GB	2133	2400	1866	2133	1600	1600
RDIMM	DRx4	16 GB	32 GB	2133	2400	1866	2133	1600	1600
LRDIMM	QRx4	32 GB	64 GB	2133	2400	2133	2400	1600	1866
LRDIMM 3DS	8Rx4	64 GB	128 GB	2133	2400	2133	2400	1600	1866

2-5 Motherboard Installation

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

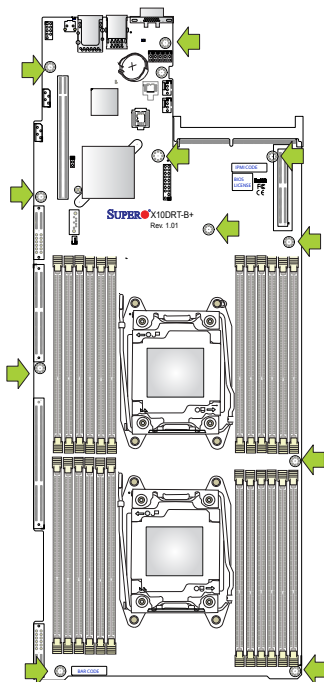
Tools Needed

- Phillips Screwdriver
- Pan head screws (11 pieces)
- Standoffs (11 pieces, if needed)



Location of Mounting Holes

There are eleven (11) mounting holes on this motherboard indicated by the arrows.

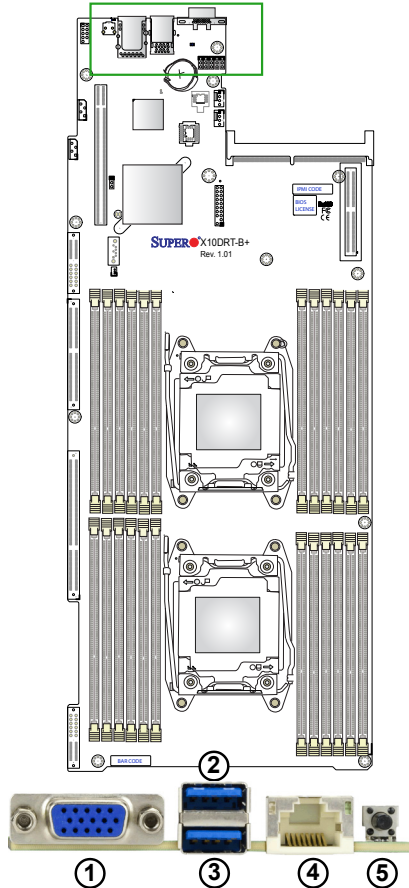


Caution: 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when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

2-6 Control Panel Connectors and I/O Ports

The I/O ports are intended to be used in Supermicro Twin² servers. See the picture below for the locations of I/O ports.

Back Panel Connectors and I/O Ports



Back Panel I/O Port Locations and Definitions

1. VGA port
2. USB1 (3.0)
3. USB0 (3.0)
4. Dedicated IPMI_LAN
5. UID Switch/UID LED

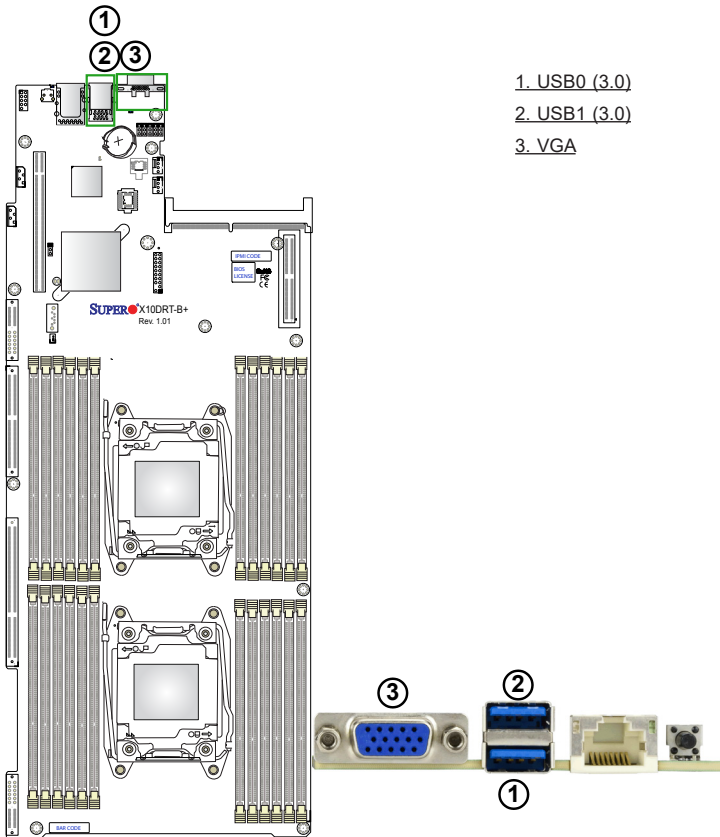
Universal Serial Bus (USB)

Two USB 3.0 ports are located on the back panel (USB 0/1). (Cables are not included.) See the table on the right for pin definitions.

USB (3.0) 0/1 Pin Definitions	
Pin#	Definition
1	+5V
2	D-
3	D+
4	Ground
5	RX-
6	RX+
7	Ground
8	TX-
9	TX+

Video Connector

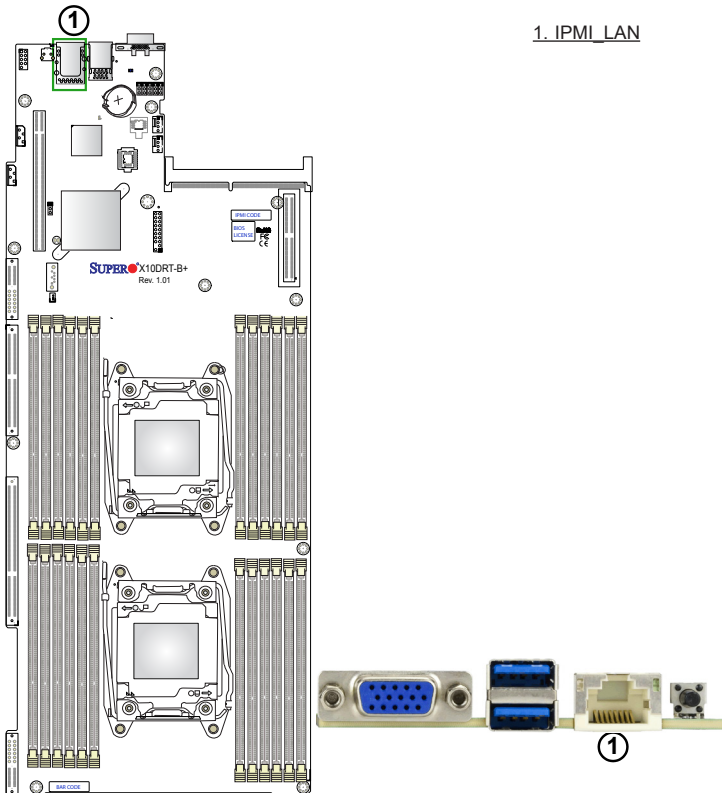
A Video (VGA) connector is located on the back panel. This connector is supported by the ASpeed BMC and is used to provide video display. Refer to the layout below for the location.



- 1. USB0 (3.0)
- 2. USB1 (3.0)
- 3. VGA

Dedicated IPMI LAN Ethernet Port

A dedicated IPMI LAN port, located next to the USB0/1 ports on the back panel, provides KVM support for IPMI 2.0 interface. This LAN port is supported by the ASpeed AST2400 Baseboard Management Controller (BMC), and accepts an RJ45 type cable. (**Note:** Please refer to the LED Indicator section for LAN LED information.)



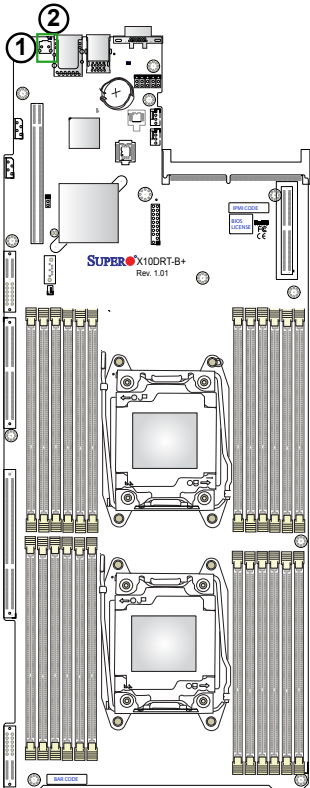
1. IPMI_LAN

UID Switch/UID LED

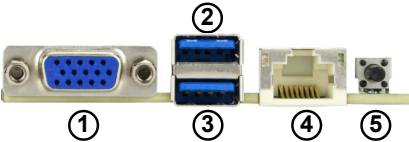
A Unit Identifier switch (UID SW) and a UID LED (UID_LED1) indicator are located on the back panel of your system. When the user presses the UID switch, the UID LED Indicator will be turned on. Press the UID switch again to turn off the UID LED. The UID indicator provides easy identification of a system unit that may be in need of service. See the tables on the right for pin definitions.

UID Switch	
Pin#	Definition
G1, G2	Ground
Pins 1-2	Button in

UID LED Status	
Color/State	Status
Blue: On or Blinking	Unit Identified

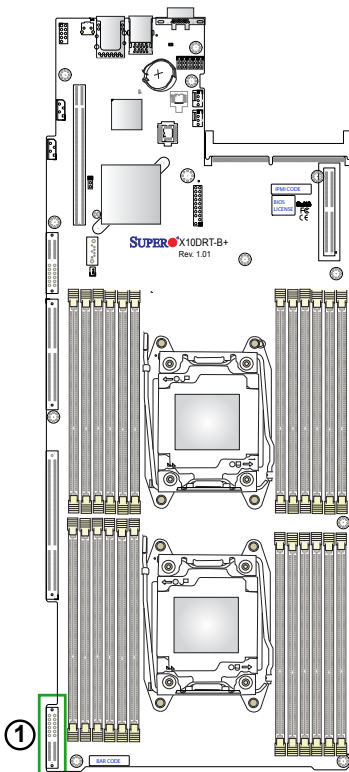


- 1. UID Switch
- 2. UID LED



Power & Front Control Panel Connector (JF1)

The JF1 add-on card connector provides front access to the power supply and the front control panel for the X10DRT-B+ motherboard. Insert an add-on card into this connector to use the functions indicated above. This connector is designed specifically for a Supermicro-proprietary add-on card. Refer to the layout below for the location of JF1.



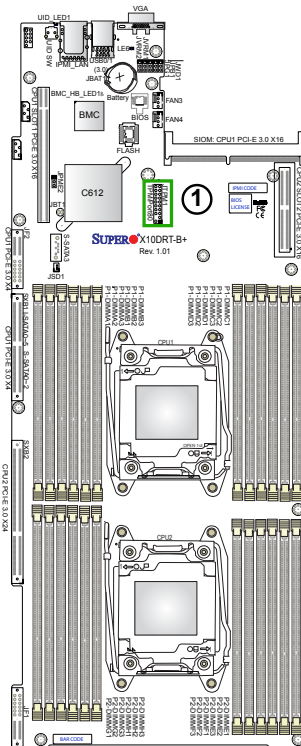
1. JF1

TPM Header/Port 80

A Trusted Platform Module/Port 80 header, located at JTPM1, provides TPM support and Port 80 connection. Use this header to enhance system performance and data security. See the table below 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_CLK	14	SMB_DAT
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)

1. TPM Header/Port 80



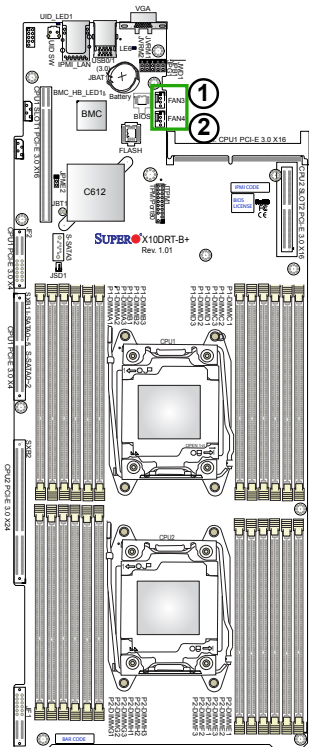
Fan Headers

This motherboard has two system fan headers (FAN3, FAN4) on the motherboard. All these 4-pin fans headers are backward compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only. The fan speeds are controlled by Thermal Management via IPMI 2.0 interface. See the table below for pin definitions.

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

1. FAN3

2. FAN4



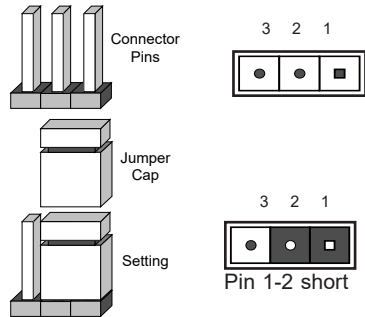
2-8 Jumper Settings

Explanation of Jumpers

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



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



CMOS Clear

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



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



JBT1 contact pads

Watch Dog Enable/Disable

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

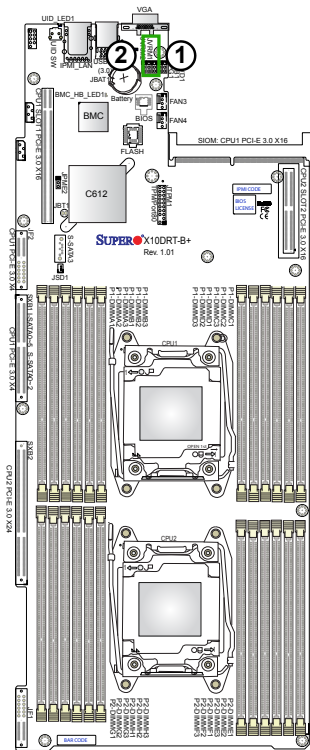
Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset (default)
Pins 2-3	NMI
Open	Disabled

I²C Bus for VRM

Jumpers JVRM1 and JVRM2 allow the BMC or the PCH to access CPU and memory VRM controllers. See the table on the right for jumper settings.

VRM Pin Definitions	
Pin #	Definition
1-2	BMC (Default)
2-3	PCH

- 1. JVRM1
- 2. JVRM2



VGA Enable

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

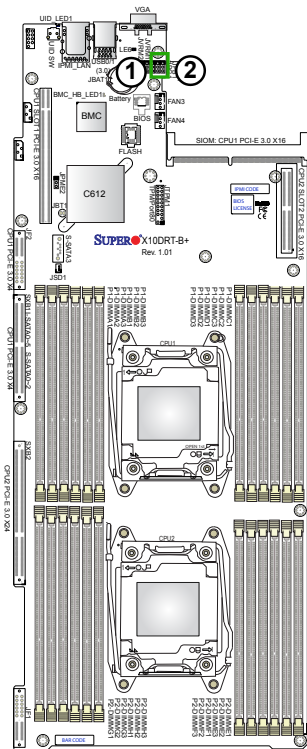
VGA Enable Jumper Settings	
Jumper Setting	Definition
1-2	Enabled (Default)
2-3	Disabled

BMC Enable

Jumpers JPB1 allows you to enable the onboard BMC (Baseboard Management) Controller) to provide IPMI 2.0/KVM support on the motherboard. Be sure to remove the power cord before closing pins 2-3 to disable the BMC. 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	BMC Disable

- 1. [VGA Enable](#)
- 2. [BMC Enable](#)

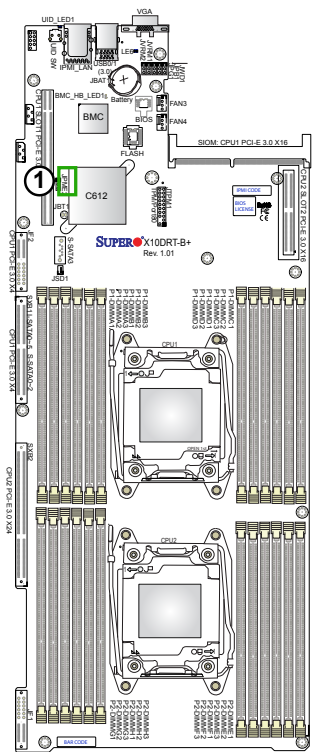


Manufacturing Mode

Close pin 2 and pin 3 of Jumper JPME2 to bypass SPI flash security and force the system to operate in the 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	Manufacture Mode

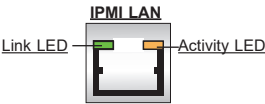
1. Manufacturing Mode



2-9 Onboard LED Indicators

Dedicated IPMI LAN LED

An IPMI_LAN port, supported by the ASpeed AST 2400 Baseboard Management Controller (BMC), is located on the back panel. This LAN port has two LED indicators. The amber LED on the right indicates activity, while the link LED on the left indicates the speed of the connection. See the tables on the right for more information.

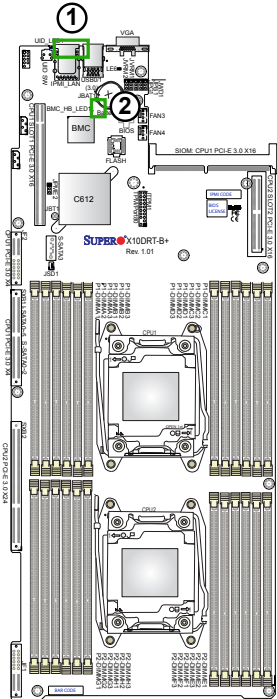


IPMI LAN Link LED (Left) & Activity LED (Right)		
	Color/State	Definition
Link (Left)	Green	100 Mbps
	Amber	1 Gbps
Activity (Right)	Amber: Blinking	Active

BMC Heartbeat LED

A BMC Heartbeat LED is located at BMC_HB_LED1 on the motherboard. When this LED is blinking, BMC functions normally. See the table on the right for more information.

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



- 1. IPMI LAN LED
- 2. BMC Heartbeat LED

Onboard Power LED

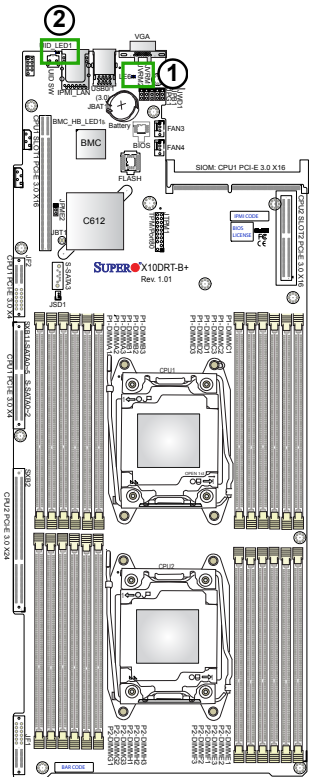
The Onboard Power LED is located at LE6 on the motherboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components. See the table at right for more information.

Onboard PWR LED Indicator LED States	
Color/State	Definition
Off	System PWR Off (PWR cable not connected)
Orange	Standby PWR Ready
Green	All PWR RAMP Normal
Red	One or more PWR Regulators: Failed

Unit Identifier LED

A rear UID LED indicator at UID_LED1 is located next to the I/O back panel. The UID indicator provides easy identification of a system unit that may be in need of service. Refer to the table for the LED status.

UID LED Indicator	
LED Color	Definition
Blue: On	Unit Identified



- 1. Onboard Power LED
- 2. UID LED

2-10 PCI-E 3.0 Slots and SATA

PCI-Express 3.0 x16

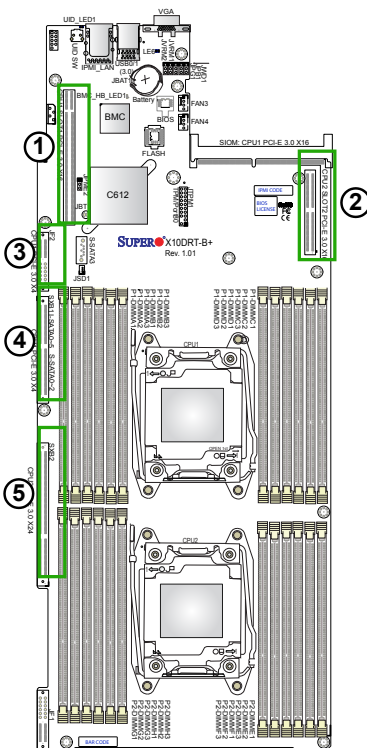
There are two PCI-E 3.0 x16 slots on the motherboard. Slot 1 is supported by CPU1 and Slot 2 is supported by CPU2. Refer to the layout below for their location

PCI-Express 3.0 x4

There are two PCI-E 3.0 x4 slots supported by CPU1. They are located at JF2 and SXB1. SXB1 is used for I-SATA0~5 and S-SATA0~2. Refer to the layout below for their location.

PCI-Express 3.0 x24

A PCI-E 3.0 x24 slot supported by CPU2 is located at SXB2. Refer to the layout below for the location.



1. Slot 1
2. Slot 2
3. JF2
4. SXB1
5. SXB2

Powered SATA DOM (SuperDOM)

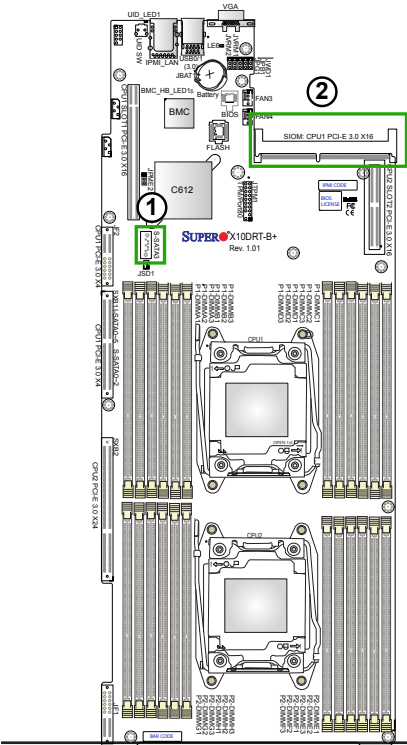
A SATA DOM (Device-on-Disk) is located at S-SATA3 on the motherboard. S-SATA3 is used with a Supermicro SuperDOM, which is a yellow SATA DOM connector with a power pin built in, and no external power supply is needed. Supermicro SuperDOM is backward-compatible with a regular SATA HDD or SATA DOM that requires an external power supply. All SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA.

SATA DOM Power Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground
8	+5V
9	Ground

SIOM Networking Slot

There is one SIOM networking slot (PCI-E 3.0 x16) on the motherboard. See the layout below for the location.

- 1. SATA DOM Power
- 2. SIOM



Chapter 3

Troubleshooting

3-1 Troubleshooting Procedures

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

Before Power On

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

No Power

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

No Video

1. If the power is on, but you do not have video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes. (This option is only available on a motherboard that has an onboard buzzer/internal speaker installed.)

System Boot Failure

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

1. Check for any error beep from the motherboard speaker.
 - If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, try to turn on the system again with only one processor installed in CPU Socket#1. If there is still no error beep, replace the motherboard.
 - If there are error beeps, clear the CMOS settings by unplugging the power cord and contracting both pads on the CMOS Clear Jumper (JBT1). (Refer to Section 2-8 in Chapter 2.) (This option is available only when there is an internal buzzer installed on the motherboard.)
2. Remove all components from the motherboard, especially the DIMM modules. Make sure that the system power is on, and memory error beeps are activated.
3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this chapter.

Losing the System's Setup Configuration

1. Make sure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information. Refer to Section 1-6 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

3. If the steps indicated above do not fix the Setup Configuration problem, contact your vendor for repairs.

Memory Errors

When a No_Memory_Beep_Code is issued by the system, check the following:

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

When the System Becomes Unstable

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

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



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

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.
4. System cooling: Check system cooling to make sure that all heatsink fans, CPU fans and system fans work properly. Check Hardware Monitoring settings in BIOS to make sure that the CPU and System temperatures are within the normal range. Also check the front panel Overheat LED, and make sure that the Overheat LED is not on.
5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on minimum power requirement.
6. Proper software support: Make sure that the correct drivers are used.

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

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

6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

3-2 Technical Support Procedures

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

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

3-3 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

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

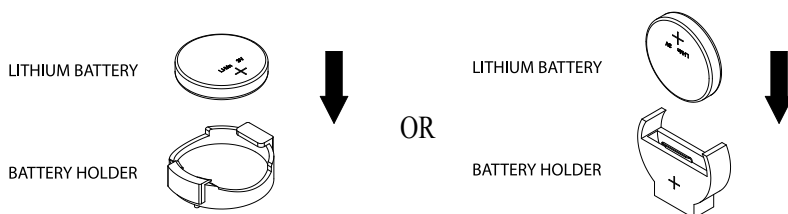
Proper Battery Disposal

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

Battery Installation

To install an onboard battery, follow the steps below:

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



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

3-4 Frequently Asked Questions

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

Answer: The motherboard supports Load Reduced (LRDIMM), Non-Volatile (NV-DIMM), and Registered (RDIMM) DDR4 ECC DIMM modules. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given on Section 2-4 in Chapter 2.

Question: How do I 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.supernmicro.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 Supernmicro for repair. For BIOS Recovery instructions, please refer to the AMI BIOS Recovery Instructions posted at <http://www.supernmicro.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 of this chapter.

3-5 Returning Merchandise for Service

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

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

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

Chapter 4

BIOS

4-1 Introduction

This chapter describes the AMI BIOS setup utility for the X10DRT-B+. 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 <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

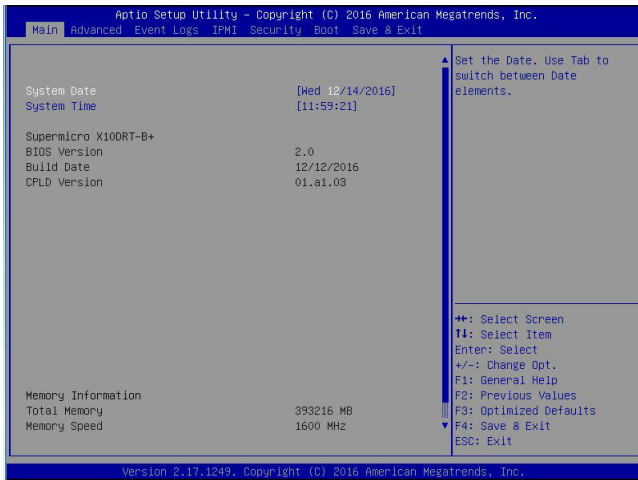
Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the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

Warning: Do not update 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. This is 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 display:



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 X10DRT-B+

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

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

CPLD Version: This item displays when the version of the CPLD (Complex Programmable Logic Device) used in the system was built.

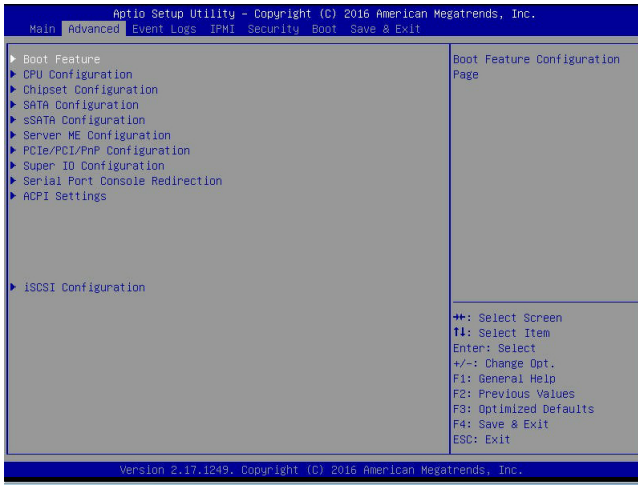
Memory Information

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:



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

► Boot Feature

Quiet Boot

Use this feature to select the screen display between POST 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 BIOS. The options are **Force BIOS** and **Keep Current**.

Bootup NumLock State

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

Wait For 'F1' If Error

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

INT19 (Interrupt 19) Trap Response

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 these 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 and allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

When EFI Boot is selected, the system BIOS will 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

Watch Dog Function

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for 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**.

Restore on AC Power Loss

Use this feature to set the power state after a 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 information regarding the CPU installed in Socket 1 and (or) Socket 2 as detected by the BIOS.

- Processor Socket
- Processor ID
- Processor Frequency
- Processor Maximum Ratio
- Processor Minimum Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- CPU 1 Version
- CPU 2 Version

Clock Spread Spectrum

Select Enabled to enable Clock Spectrum support, which will allow the BIOS to attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

Hyper-Threading (ALL)

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

Cores Enabled

Set a numeric value to enable the number of cores in the CPU. (Please refer to Intel's website for more information.) Enter **0** to enable all cores.

Monitor/Mwait

Select Enable to use the CPU monitor instructions for address-range monitoring and advanced power management to enhance processor performance. The options are **Enable** and Disable.

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

Select Enable to enable the 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 or damage the system during an attack. The options are **Enable** and Disable. (Refer to Intel and Microsoft Web sites for more information.)

PPIN Control

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

Hardware Prefetcher (Available when supported by the CPU)

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

Adjacent Cache Prefetch (Available when supported by the CPU)

If this feature is set to Disable, the CPU prefetches the cache line for 64 bytes. If this feature is set to **Enable**, the CPU prefetches both cache lines for 128 bytes as comprised. The options are Disable and **Enable**.

Use this item to set the limit on power performance states for the run-time processor, with P0 being the state with the highest power and frequency, and P1, a step lower in performance. The options are **Between P1/P0** and **Below P1**.

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enable to enable the DCU (Data Cache Unit) Streamer Prefetcher which will stream and prefetch data, and send it to the Level 1 data cache to improve data processing and system performance. The options are Disable and **Enable**.

DCU IP Prefetcher (Available when supported by the CPU)

Select Enable for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch the next IP address in line to L1 cache to improve network connectivity and system performance. The options are Disable and **Enable**.

Direct Cache Access (DCA)

Select Enable to use Intel's DCA (Direct Cache Access) Technology to improve efficiency in data transferring. The options are Disable, Enable, and **Auto**.

X2APIC

Select Enable to activate APIC (Advanced Programmable Interrupt Controller) support to enhance system performance. The options are Enable and **Disable**.

AES-NI

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

Intel Virtualization Technology (Available when supported by the CPU)

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



Note: If a change is made to this setting, you will need to reboot the system for the change to take effect. Refer to Intel's website for detailed information.

► Advanced Power Management Configuration

This section is used to configure the following CPU Power Management settings.

Power Technology

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

Energy Performance Tuning

Select Enable to allow the AMI BIOS to configure (to choose) energy performance bias tuning settings for your system. Select Disable to allow the Operating System (OS) to configure energy performance bias tuning settings for your system. The options are Enable and Disable. The options are Enable and **Disable**.

Energy/Performance Bias Setting

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

Energy Efficient Turbo

If this feature is set to Enable, the CPU cores will operate at the turbo mode, and the remaining system components will run at normal speeds, which will enhance CPU performance without compromising power efficiency. The options are **Enable** and Disable.

If the item-Power Technology is set to Custom, the following submenus 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 (Available when Intel® EIST Technology is enabled)

Select Enable to use the turbo mode to boost system performance. The options are **Enable** and Disable.

P-State Coordination

Use this feature 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 all 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 particular software program specified by the user in the system. The options are **HW_All**, SW_ALL, and SW_ANY.

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

Enable CPU HWPM (Hardware Power Management)

Use this feature to configure CPU hardware power management settings to enhance energy performance. The options are **Disable**, HWPM Native Mode, HWMP OOB Mode.

Enable CPU Autonomous CState

Select Enable for CPU Autonomous C-State support which will allow the CPU to convert a "HALT" instruction to an "MWait" state to conserve power consumption. The options are **Disable** and Enable.

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

Package C State limit

Use this feature 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 Enable and **Disable**.

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, the power to all cache is turned off. The options are **Enable** and Disable.

Enhanced Halt State (C1E)

Select Enable to use Enhanced Halt-State technology, 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

Select Enable to support CPU throttling by the operating system to reduce power consumption. The options are **Enable** and Disable.

► Chipset Configuration

► North Bridge

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

► I/O 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.

Snoop Response Hold Off

User this feature to set the value of the Snoop Response Hold-Off setting. The default setting is **256 cycle**.

► IIO1 Configuration

IOU2 (II01 PCIE Port 1)

Use this item to configure the PCI-E port Bifurcation setting for a PCI-E port specified by the user. The options are x4x4, x8, and **Auto**.

IOU0 (II01 PCIE Port 2)

Use this feature to set the PCI-Exp bus speed for the slot specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (II01 PCIE Port 3)

Use this feature to set the PCI-Exp bus speed for the slot specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 IOU0 Non-Posted Prefetch/IOU1 IOU1 Non-Posted Prefetch/IOU1 IOU2 Non-Posted Prefetch

Select Enable to use the function of Non-Posted Prefetch on the slot specified by the user. The options are Enable and **Disable**.

► IIO2 Configuration

IOU2 (II02 PCIE Port 1)

Use this item to configure the PCI-E port Bifurcation setting for a PCI-E port specified by the user. The options are 4x4, x8, and **Auto**.

IOU0 (II02 PCIE Port 2)

Use this feature to set the PCI-Exp bus speed for the slot specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (II02 PCIE Port 3)

Use this feature to set the PCI-Exp bus speed for the slot specified above. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU2 IOU0 Non-Posted Prefetch/IOU2 IOU1 Non-Posted Prefetch/IOU2 IOU2 Non-Posted Prefetch

Select Enable to use the function of Non-Posted Prefetch on the slot specified by the user. The options are Enable and **Disable**.

► IOAT Configuration

Enable IOAT (I/O Acceleration Technology)

Select Enable to enable Intel I/OAT (I/O Acceleration Technology), which significantly reduces CPU overhead by leveraging CPU architectural improvements

and freeing the system resource for other tasks. The options are **Enable** and **Disable**.

No Snoop

Select **Enable** to support no-snoop mode to ensure cache coherency within each memory platform. 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 and 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 Direct I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

Select **Enable** to enable Intel Virtualization Technology support for Direct I/O VT-d 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

The following QPI information will be displayed:

- Number of CPU
- Number of IIO
- Current QPI Link Speed: This item displays the current QPI Link speed.
- Current QPI Link Frequency: This item displays the frequency of the QPI Link.
- QPI Global MMIO Low Base / Limit
- QPI Global MMIO High Base / Limit

- QPI PCI-E Configuration Base / Size

Link Frequency Select

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

Link L0p Enable

Select Enable for the QPI to enter the L0p state for power saving. The options are Disable and **Enable**.

Link L1 Enable

Select Enable for the QPI to enter the L1 state for power saving. The options are Disable and **Enable**.

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

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

Early Snoop (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**.

Home Dir Snoop with IVT-Style OSB (Available when the OS and the CPU support this feature)

Select Enable to use the Home Directory snoop mode for Opportunistic Snoop Broadcast (OSB) support for Ivy Bridge-based systems to boost system performance. The options are Enable Disable, and **Auto**.

Isoc Mode

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

►Memory Configuration

Integrated Memory Controller (IMC)

Enforce POR

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

S5 Trigger ADR

When this item is set to Enabled, the setting of OS S5 Shutdown will trigger an ADR (Asynchronous DRAM Refresh) to save NVDIMM data. 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 reliability and reduces power consumption in the processor via automatic voltage control during processor idle states. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

A7 Mode

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

►DIMM Information

This item displays the status of a DIMM module specified by the user.

- P1-DIMMA1/A2/A3
 - P1-DIMMB1/B2/B3
 - P1-DIMMC1/C2/C3
 - P1-DIMMD1/D2/D3
 - P2-DIMME1/E2/E3
 - P2-DIMMF1/F2/F3
 - P2-DIMMG1/G2/G3
-

- P2-DIMMH1/H2/H3

►Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

Memory RAS Configuration Setup

RAS Mode

Use this feature to configure memory RAS settings. Select Independent to use a memory module separately as an independent memory unit. 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 **Independent**, Mirror, and Lockstep Mode.

Memory Rank Sparing

Select Enabled 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 Enabled, read-and-write will be performed every 16K cycles per cache line if there is no delay caused by internal processing. 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 Controllers
- USB Devices

Legacy USB Support

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there is no legacy USB device 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 item is enabled, EHCI ownership change will be claimed by the EHCI driver. The settings are Enabled and **Disabled**.

Port 60/64 Emulation

Select Enabled for I/O port 60h/64h emulation support, which in turn, 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, Disabled and Manual.

EHCI

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 Driver

Select Enabled to load the Intel XHCI (Extensible Host Controller Interface) pre-boot driver for system boot. The settings are **Enabled** and Disabled.

►SATA Configuration

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

SATA Controller

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

Configure SATA as

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

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

SATA 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 **Disabled** and Enabled.

SATA Port 0~ SATA Port 5

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

- Model number of drive and capacity
- Software Preserve Support

Port 0~ Port 5

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

Port 0 ~ Port 5 Hot Plug

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

Port 0 ~ Port 5 Spin Up Device

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

Port 0 ~ Port 5 SATA Device Type

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

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

Serial ATA Port 0~ Port 5

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

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

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

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

SATA 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 **Disabled** and Enabled.

SATA RAID Option ROM/UEFI Driver

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

SATA/sSATA RAID Boot Select

Select SATA Controller to boot the system from a SATA RAID device. Select sSATA Controller to boot the system from a S-SATA RAID device. Select Both to boot the system either from a SATA RAID device or from an sSATA RAID device.

Please note that the option "Both" is not supported by the Windows Server 2012/R2 OS. The options are Both, SATA Controller, and **sSATA Controller**.

Serial ATA Port 0~ Port 5

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

- Model number of drive and capacity
- Software Preserve Support

Port 0~ Port 5

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

Port 0 ~ Port 5 Hot Plug

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

Port 0 ~ Port 5 Spin Up Device

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

Port 0 ~ Port 5 SATA Device Type

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

►sSATA Configuration

When this submenu is selected, AMI BIOS automatically detects the presence of the SATA devices that are supported by the PCH 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:*

sSATA Support Aggressive Link Power Management

When this item is set to Enabled, the sSATA 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 **Disabled** and Enabled.

sSATA Port 0~ Port 3

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

- Model number of drive and capacity
- Software Preserve Support

sSATA Port 0~ Port 3

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

sSATA Port 0 ~ Port 3 Hot Plug

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

sSATA Port 0 ~ Port 3 Spin Up Device

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

Port 0 ~ Port 3 sSATA Device Type

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

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

sSATA Port 0~ Port 3

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

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

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

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

sSATA Support Aggressive Link Power Management

When this item is set to Enabled, the sSATA 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 **Disabled** and Enabled.

sSATA RAID Option ROM/UEFI Driver

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

SATA/sSATA RAID Boot Select

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

sSATA Port 0~ Port 3

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

- Model number of drive and capacity
- Software Preserve Support

sSATA Port 0~ Port 3

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

sSATA Port 0 ~ Port 3 Hot Plug

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

sSATA Port 0 ~ Port 3 Spin Up Device

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

Port 0 ~ Port 3 sSATA Device Type

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

►Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

- General ME Configuration
- Operational Firmware Version
- ME Firmware Type
- Recovery Firmware Version
- ME Firmware Features
- ME Firmware Status #1
- ME Firmware Status #2
 - Current State
 - Error Code

►PCIe/PCI/PnP Configuration

The following PCI information will be displayed:

- PCI Bus Driver Version

PCI Devices Common Settings:**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 for the system to log an error event when a PERR (PCI/PCI-E Parity Error) or a SERR (System Error) occurs. 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 base memory size according to memory-address mapping for the IO hub. The base memory size must be between 4032G to 4078G. The options are **56 TB**, 40 TB, 24 TB, 3 TB, 2 TB, and 1 TB.

MMIO High Size

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

**RSC-R1UTP-E16R PCI-E 3.0 x16 OPROM/CPU1 PCI-E 3.0 x4 OPROM/
RSC-P-6 PCI-E 3.0 x16 OPROM 1/CPU2 SXB2A PCI-E 3.0 x8 OPROM/CPU2
SXB2B PCI-E 3.0 x16 OPROM**

Use this feature to select the type of device to be installed on the PCI-E slot specified by the user for system boot. The options are Disabled, **Legacy** and EFI.

Onboard LAN OPROM (Option ROM) Type

Use this feature to select the type of device installed on the onboard LAN ports to be used for system boot. The options are EFI and **Legacy**.

**Onboard LAN1 OPROM/Onboard LAN2 OPROM/Onboard LAN3 OPROM/
Onboard LAN4 OPROM**

Use this feature to select the type of device to be installed in LAN Port 1, LAN Port 2, LAN Port 3, and LAN Port 4 for system boot. The default setting for LAN1 OPROM is **PXE**. The default setting for LAN2 OPROM/LAN3 OPROM/LAN4 OPROM is **Disabled**.

Onboard Video OPROM

Use this feature to select the type of video firmware to be used for system boot. Select Legacy to boot the system using a legacy video device installed on the motherboard for system boot. The options are Disabled, **Legacy** and EFI.

VGA Priority

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

Network Stack

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

Ipv4 PXE Support (Available when Network Stack is set to Enabled)

Select Enabled to enable Ipv4 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, Ipv4 PXE boot option will not be supported. The options are **Enabled** and Disabled.

Ipv6PXE Support (Available when Network Stack is set to Enabled)

Select Enabled to enable Ipv6 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, Ipv6 PXE boot option will not be supported. The options are **Disabled** and Enabled.

►Super IO Configuration

Super IO Chip AST2400

►Serial Port 1 Configuration/Serial Port 2 Configuration

Serial Port 1/Serial Port 2

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

Device Settings

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

Change Port 1 Settings/Change Port 2 Settings

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

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

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

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

COM1 Console Redirection

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

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

►COM1 Console Redirection Settings

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

This 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, SCD, ESCN, and VT400.

Redirection After BIOS Post

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

COM2/SOL (Serial-On-LAN)

COM/SOL 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:*

►COM2/SOL Console Redirection Settings

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

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with 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 overflowing. 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, SCD, ESCN, and VT400.

Redirection After BIOS Post

Use this feature to enable or disable legacy Console Redirection after BIOS POST. 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.

►EMS Console Redirection Settings (Available when EMS Console Redirection is set to 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, in an emergency situation.

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** and SOL.

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 overflowing. Send a "Stop" signal to stop data-sending

when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each these features is displayed:

Data Bits, Parity, Stop Bits

►ACPI Settings

WHEA Support

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

High Precision Timer

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

NUMA Support (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 IQN format. Once the name of the iSCSi Initiator is entered into the system, configure the proper settings for the following items.

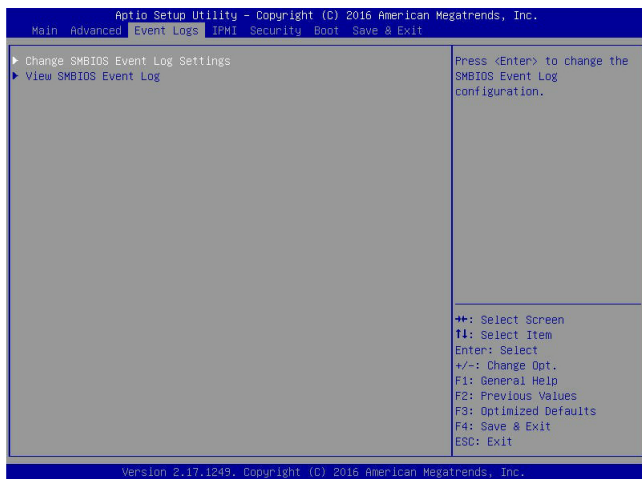
►Add an Attempt

►Delete Attempts

►Change Attempt order

4-4 Event Logs

Use this feature to configure Event Log settings.



►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. If this item is set to Enable, the following item will be available for configuration:

Erasing Settings

Erase Event Log

Select Yes, Every Reset 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) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.



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

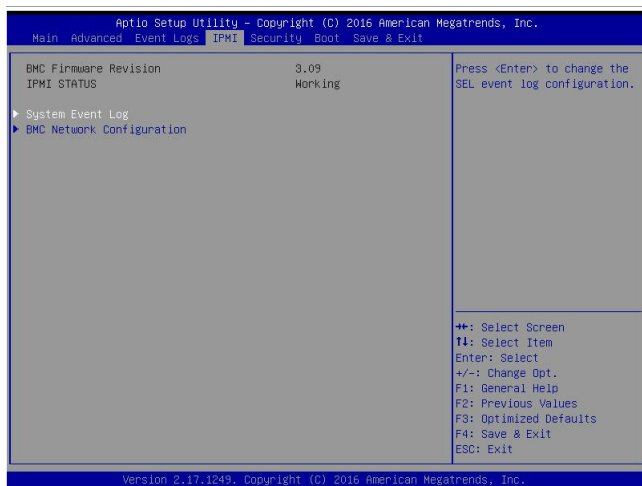
►View SMBIOS Event Log

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

- Date
- Time
- Error Code
- Severity

4-5 IPMI

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



BMC (Baseboard Management Controller) Firmware Revision

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

IPMI Status

This item indicates the status of the IPMI firmware installed in your system.

►System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL (System Event Log)

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 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. Please note that you will need to reboot the system for the changes to take effect. The options are **Do Nothing** and Erase Immediately.

►BMC Network Configuration**IPMI LAN Selection**

Use this feature to select the type of the IPMI LAN. The default setting is **Failover**.

IPMI Network Link Status

This item indicates the status of the IPMI Network Link. The default setting is **Shared LAN**.

Update IPMI LAN Configuration

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

Configuration Address Source

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** Unspecified, 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

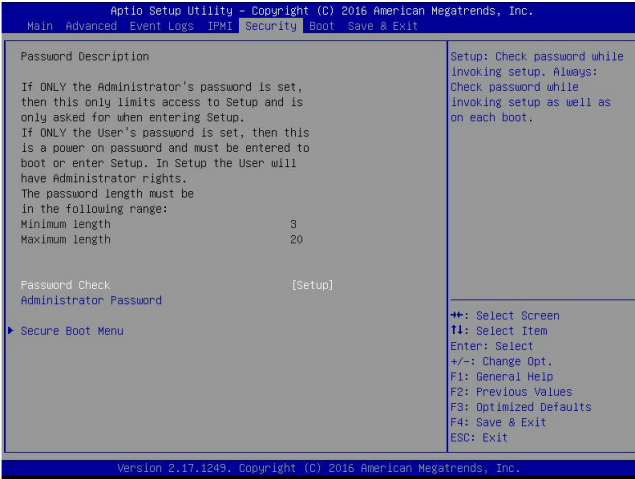
This item displays the gateway IP address for this computer.

VLAN

Select Enable for VLAN port support.

4-6 Security Settings

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



Password Check

If this feature is set to Setup, a password is required for a user to enter the BIOS Setup utility. If Always selected, the user will need to enter a password when entering the Setup utility and upon each system boot. 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

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
- Vendor Keys

Secure Boot

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

Secure Boot Mode

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

CSM (Compatibility Support Module) Support

Select Enabled to enable CSM booting support which will allow a UEFI-compatible device to boot from a system that uses a legacy BIOS ROM. The options are **Enabled** and Disabled.

►Key Management

Provision Factory Default Keys

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

►Enroll All Factor Default Keys

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

►Save All Secure Boot Variables

This feature allows the user to set and save the Secure Boot Variable settings:

►Platform Key (PK)

This feature allows the user to configure and save platform key settings.

►Key Exchange Key

This feature allows the user to configure and save Key-Exchange-Key settings.

►Authorized Signatures

This feature allows the user to set and save authorized signatures and grant access to those whose names appear on the list.

►Forbidden Signatures

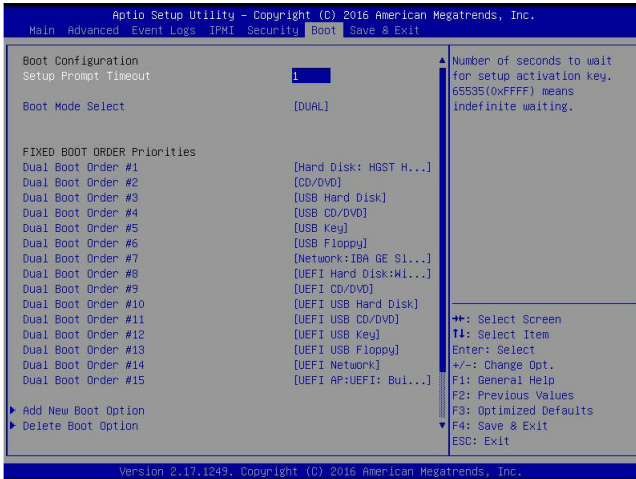
This feature allows the user to set and save the forbidden signatures and deny the access to those whose names appear on the list.

►Authorized TimeStamps

This feature allows the user to set and save the timestamps for authorized signatures to indicate when these signatures were entered into the system.

4-7 Boot Settings

Use this feature to configure Boot Settings:



Boot Configuration

Setup Prompt Timeout

This feature allows the user to determine how long the system should wait for the setup activation key before it boots up. The default setting is **1 (second)**.

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:

- Dual Boot Option #1 - Dual Boot Option #15

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

- Legacy Boot Option #1 - Legacy Boot Option #7

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

- UEFI Boot Option #1 - UEFI Boot Option #8

►Add New Boot Option

Add Boot Option

This feature allows the user to add a new pre-formatted boot device for system boot.

Path for Boot Option

This feature allows the user to define the pathway for the system to access the boot device for system boot.

Boot Option File Path

Create

This feature allows the user to select the name of boot device and set a file path for this device to boot the system.

►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.

►Hard Disk Driver BBS Priorities

- Legacy Boot Order #1 - Legacy Boot Order #6

►NETWORK Disk Drive BBS Priorities

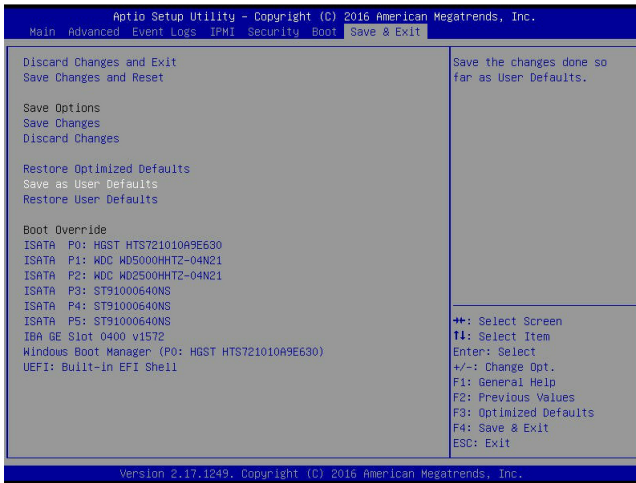
- Legacy Boot Order #1

►UEFI Application Boot Priorities

- UEFI Boot Order #1

4-8 Save & Exit

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



Discard Changes and Exit

Select this option to quit the BIOS setup without making permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Save Changes and Reset

After making system configuration changes, select this option to save the changes you've made and reboot the computer for the new configuration parameters to take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

Save Options

Save Changes

After making system configuration changes, select this option to save all changes made. This will not reset (reboot) the system.

Discard Changes

Select this option and press <Enter> to discard all the changes you've made and return to the AMI BIOS Utility Program.

Restore Optimized Defaults

To set this feature, select Restore Optimized Defaults from the Exit menu and press <Enter>. These are manufacturer default settings designed for maximum system performance but not for maximum stability.

Save As User Defaults

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables the user to save any changes to the BIOS setup for future use.

Restore User Defaults

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined settings that were saved previously.

Boot Override

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

Notes

Appendix A

Software Installation Instructions

A-1 Installing Software Programs

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

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

After creating a DVD with the ISO files, insert the disk into the DVD drive on your system and the display shown in Figure A-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 hard drive or a USB flash drive and install from there.



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

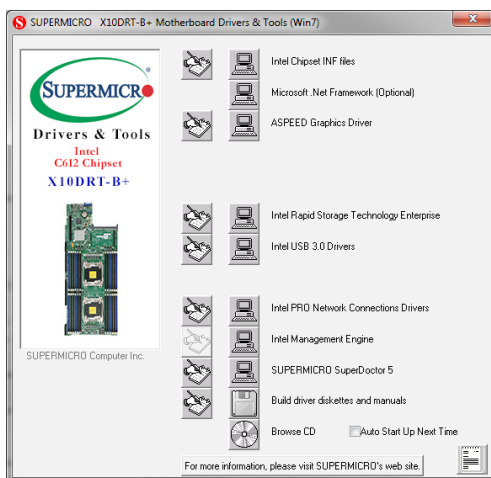


Figure A-1. Driver/Tool Installation Display Screen

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 re-boot 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 SATA as IDE in the BIOS Setup. After making the driver diskette, be sure to change the SATA settings back to your original settings.

A-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, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

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



Note: The default Username and Password for SuperDoctor 5 is ADMIN / ADMIN.

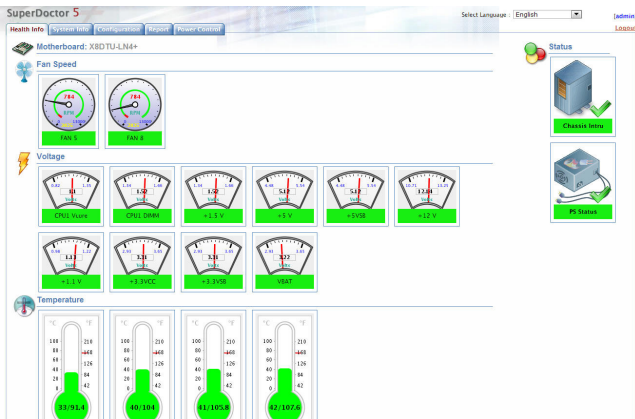


Figure A-2 SuperDoctor 5 Interface Display Screen (Health Information)



Note: The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro web site at http://www.supermicro.com/products/nfo/sms_sd5.cfm.

A-3 Logging into the BMC (Baseboard Management Controller)

Supermicro ships standard products with a unique password for the BMC ADMIN 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 B

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.

B-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.

B-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.

B-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
3. While powering on the system, please keep pressing <Ctrl> and <Home> simultaneously on your keyboard until the following screen (or a screen similar to the one below) displays.

Warning!! Please **stop** pressing the <Ctrl> and <Home> keys immediately when you see the screen (or a similar screen) below; otherwise, it will trigger a system reboot.



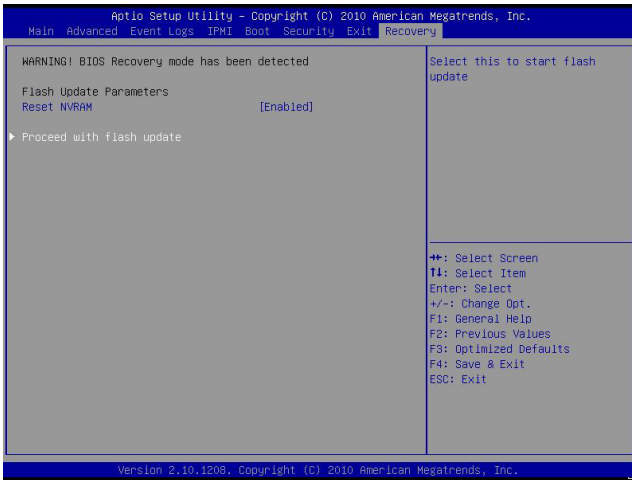
Note: On the other hand, if the following screen displays, please load the "Super.ROM" file to the root folder and connect this folder to the system. (You can do so by inserting a USB device that contains the new "Super.ROM" image to your machine for BIOS recovery.)



- After locating the new BIOS binary image, the system will enter the BIOS recovery menu as shown below.



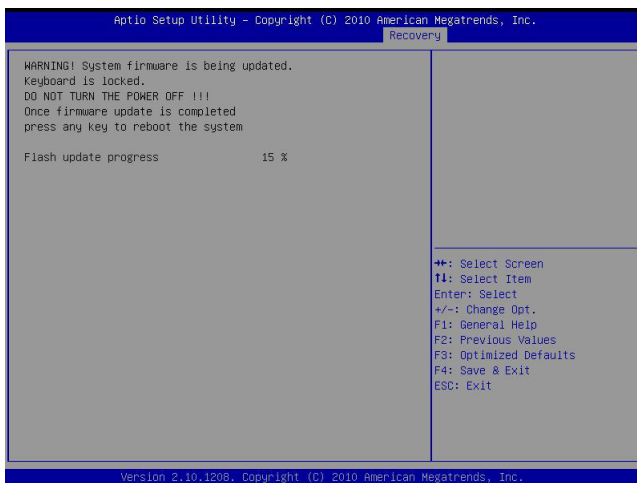
Note: At this point, you may decide if you want to start with BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.



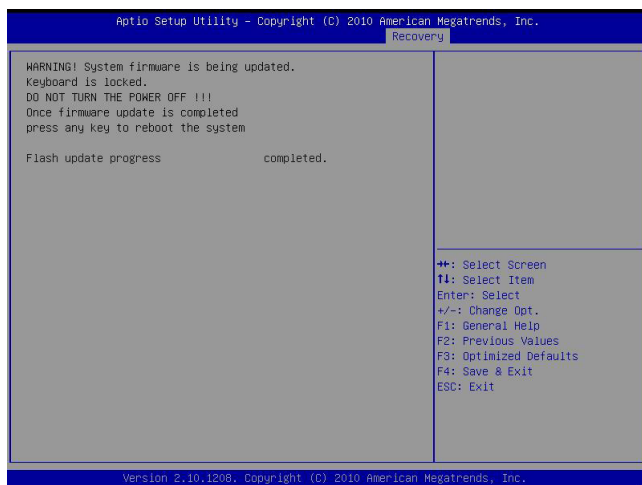
- When the screen as shown above displays, using the arrow key, select the item "Proceed with flash update" and press the <Enter> key. You will see the progress of BIOS recovery as shown in the screen below.



Note: Do not interrupt the process of BIOS flashing until it is completed.



6. After the process of BIOS recovery is completed, press any key to reboot the system.



7. Using a different system, extract the BIOS package into a bootable USB flash drive.
8. When a DOS prompt appears, enter FLASH.BAT BIOSName.### at the prompt.



Note: Do not interrupt this process until BIOS flashing is completed.

9. After seeing the message that BIOS update is completed, unplug the AC power cable from the power supply to clear the CMOS, and then plug the AC power cable into the power supply again to power on the system.
10. Press <Del> continuously to enter the BIOS Setup utility.
11. Press <F3> to load default settings.
12. After loading default settings, press <F4> to save the settings and exit the BIOS Setup utility.