X10DAL-i

USER'S MANUAL

Revision 1.0c

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Preface

This manual is written for system integrators, PC technicians, IT professionals, and knowledgeable end users. It provides information for the installation and use of the X10DAL-i motherboard.

About This Motherboard

The Super X10DAL-i motherboard supports dual Intel E5-2600v3/v4 Series processors (Socket R3) that offer Intel Microarchitecture 22nm (E5-2600v3)/14nm (E5-2600v4) Processing Technology, delivering performance, power efficiency, and feature sets optimized for small-form factor workstation platforms. With the PCH C612 built in, the X10DAL-i motherboard supports Intel® Node Manager 3.0, Intel® Management Engine, Intel® Thunderbolt Technology, and up to 2400 MHz DDR4 memory. This motherboard is ideal for workstations used for medical imaging applications. Please refer to our website (http://www.supermicro.com) for CPU 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 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 the BIOS, and provides detailed information on running the CMOS setup utility.

Appendix A provides BIOS error beep codes.

Appendix B lists software installation instructions**.**

Appendix C details UEFI BIOS recovery instructions.

Conventions Used in the Manual

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

Warning: Important information given to ensure proper system installation or to avoid damaging the components or the motherboard,

Note: Additional important information provided for correct system setup.

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Appendix C UEFI BIOS Recovery Instructions

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.

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

The following items are included in the retail box:

• One (1) Supermicro Mainboard

• Six (6) Serial ATA cables (CBL-0044L x6)

• One (1) I/O Shield (MCP-260-00077-0N)

• One (1) Quick Reference Guide (MNL-1701-QRG)

> **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

• Safety Information: http://www.supermicro.com/about/policies/safety_infor-mation.cfm.

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

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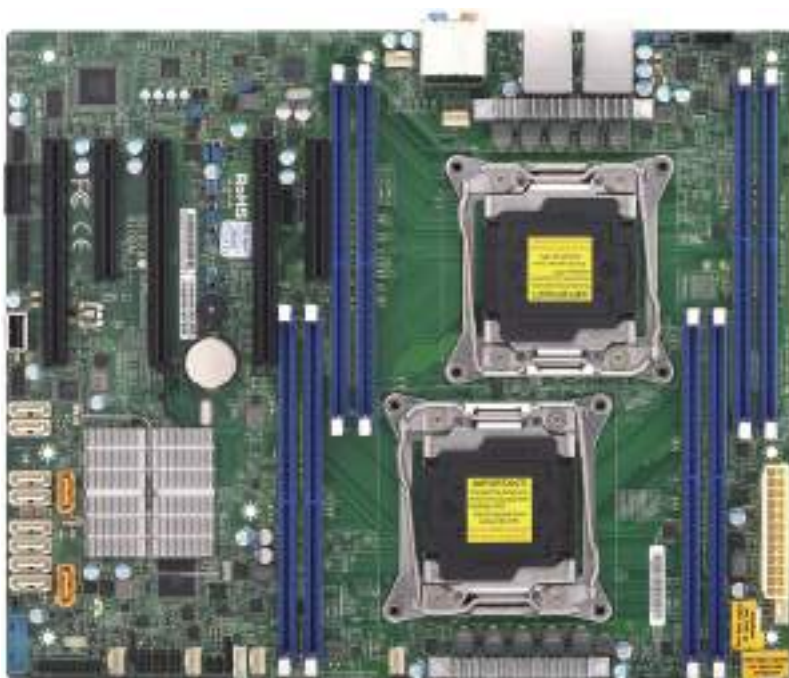
/ **Note**: All graphics shown in this manual were based upon the latest PCB Revision available at the time of publishing of the manual. The motherboard you've received may or may not look exactly the same as the graphics shown in this manual.

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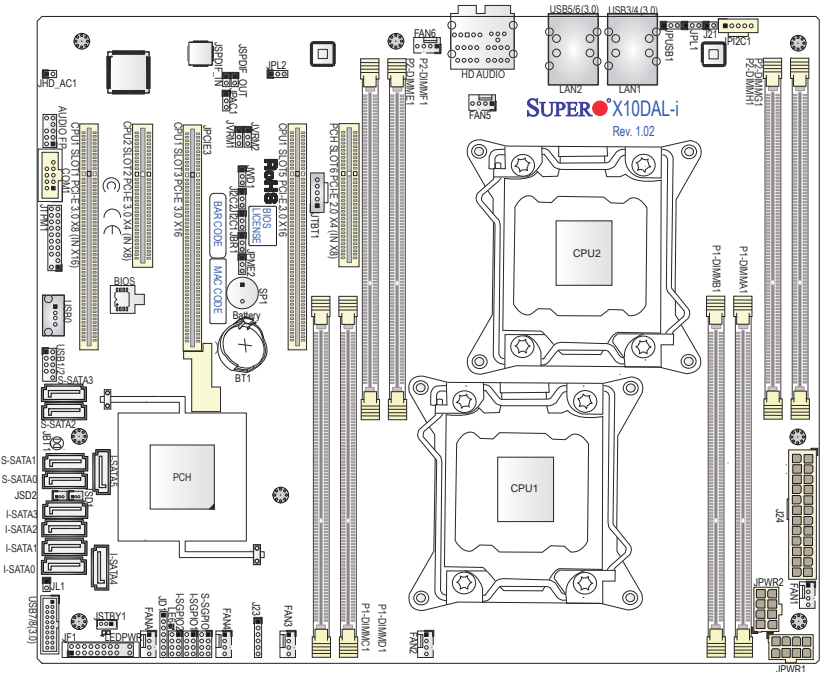
Note: For the latest CPU/Memory updates, please refer to our website at http://www.supermicro.com/products/motherboard/ for details.

X10DAL-i Quick Reference
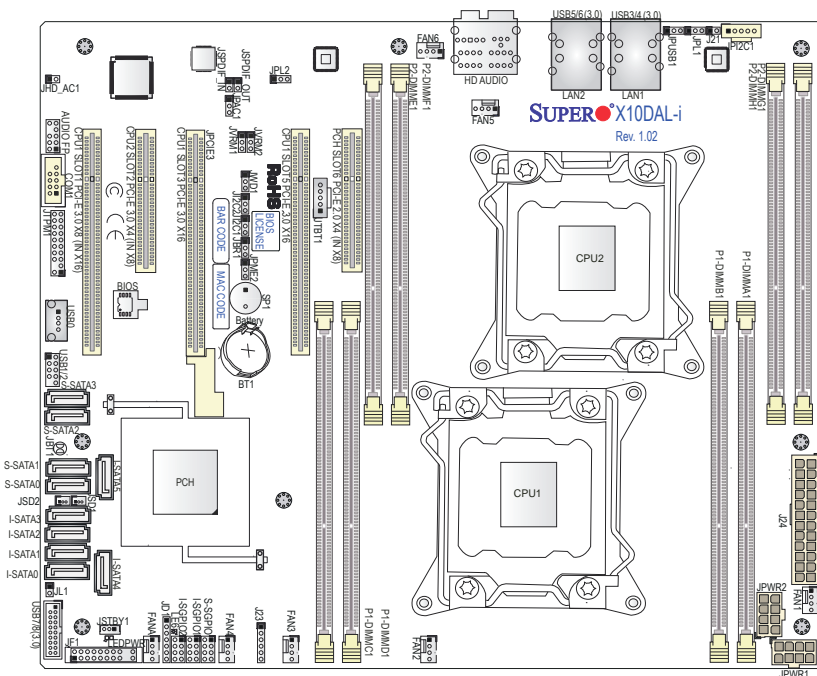
Notes:

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

- "▪" indicates the location of "Pin 1".

- Jumpers/LEDs not indicated are for testing only. Also, components that are not documented in this manual are reserved for internal use only.

- Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid damaging the motherboard.

X10DAL-i Jumpers

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Chapter 2
JI²C1/JI²C2	SMBus to PCI-E Slots	Pins 2-3 (Disabled)
JPAC1	Audio Enable	Pins 1-2 (Enabled)
JPL1	GLAN1 Enable/Disable	Pins 1-2 (Enabled)
JPL2	GLAN2 Enable/Disable	Pins 1-2 (Enabled)
JPME2	ME (Manufacture) Mode Select	Pins 1-2 (Normal)
JPUSB1	USB 0/1 Wake-up Enable	Pins 1-2 (Enabled)
JWD1	Watch Dog	Pins 1-2 (Reset)
J21	LAN Controller EEPROM update	Open (Disabled)

X10DAL-i Connectors

Connectors	Description
Audio_FP	Audio connector for front access
HD Audio	5.1 HD (6-channel High-Definition) + SPDIF audio connector
BT1	Onboard CMOS battery (See Chapter 3 for Used Battery Disposal)
COM1	Serial port header
CPU1 Slot1	PCI-E 3.0 x 8 in 16 slot
CPU2 Slot2	PCI-E 3.0 x 4 in 8 slot (This slot is available when CPU2 is installed.)
CPU1 Slot3/Slot5	PCI-E 3.0 x16 slots
PCH Slot6	PCI-E 2.0 x4 in x8 slot (See the note below for Thunderbolt AOC support.)
FAN1-6, FANA	CPU/System fan headers
J24	ATX 24-pin power connector
JD1	Speaker/Power LED indicator
JF1	Front panel control header
JL1	Chassis intrusion header
JPI2C1	Power supply SMBbus I²C header
JPWR1/JPWR2	12V 8-Pin Power Connectors
JSD1/JSD2	SATA DOM (Device_On_Module) power Connection headers 1/2
JSPDIF_In	SPDIF_(Sony/Philips Digital Interface)_In header
JSPDIF_Out	SPDIF_(Sony/Philips Digital Interface)_Out header

Note: This motherboard supports the latest Thunderbolt technology. For proper Thunderbolt support, please install the Thunderbolt add-on card on PCH Slot6 and connect the GPIO cable from the Thunderbolt add-on card to the GPIO header (JTBT1) on the motherboard for TBT hot-plug support.

JSTBY1	Standby power header
JTBT1	GPIO (General-Purpose I/O) header for Thunderbolt add-on card (See the note on page 1-5 for Thunderbolt AOC support.)
JTPM1	TPM (Trusted Platform Module)/Port 80 header
LAN1/LAN2	Gigabit Ethernet ports 1/2
I-SATA0-5	Serial_Link ATA (SATA 3.0) connections 0-5 supported by Intel PCH (I-SATA4/5 support Supermicro SuperDOMs [Devices-on-Module] with power pins built-in)
S-SATA 0-3	Serial_Link ATA (SATA 3.0) connections 0-3 supported by Intel SCU
SP1	Onboard buzzer (internal speaker)
I-SGPIO 1/2, S-SGPIO	Serial_Link General_Purpose IO (SGPIO) headers (I-SGPIO 1: I-SA-TA0-3, I-SGPIO 2: I-SATA4/5, S-GPIO: S-SATA0-3)
USB 3/4 (3.0)	Rear USB 3.0 ports 3/4 on the IO backpanel
USB 1/2 (2.0)	Front USB 2.0 ports 1/2 for front access
USB 5/6 (3.0)	Rear USB 3.0 ports 5/6 on the IO backpanel
USB 7/8 (3.0)	Front-accessible USB 3.0 connections 7/8
USB 0 (2.0)	Type A USB 2.0 USB connection header

X10DAL-i LED Indicators

LED	Description	State
LE6	Power Good LED	Green: All onboard power VRMs Normal
LEDPWR	Power LED	Solid On: Power On, Blinking: Suspend to RAM

Warning: To prevent damage to the power supply or motherboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these power supply connectors to the 24-pin power connector (J24) and two 8-pin power connectors (JPWR1, JPWR2) on the motherboard. Failure in doing so will void the manufacturer warranty on your power supply and motherboard.

Motherboard Features

CPU	• Dual Intel® E5-2600v3/v4 Series Processors (Socket R3 LGA 2011); each processor supports two full-width Intel QuickPath Interconnect (QPI) links (with support of up to 9.6 GT/s per QPI link). **Note:** E5-2600v4 requires Revision 2.0 BIOS (or higher).

Memory	• Integrated memory controller supports up to 1024 GB of Load Reduced (LRDIMM) or 256 GB Registered (RDIMM) ECC DDR4 2400/2133/1866/1600 MHz memory modules in 8 DIMM slots.
	
	  Note 1: Memory speed support is dependent on the CPUs installed on the motherboard.
	
	  Note 2: For the latest memory updates, please refer to the Tested Memory List posted on our website (http://www.supermicro.com/products/motherboard).
	
	• Virtualization: VT-x, VT-d, and VT-c

Chipset	• Intel® C612 Chipset (PCH)
Expansion Slots	• Two (2) PCI-Express 3.0 x16 slots (CPU1 Slot3, CPU1 Slot5), • One (1) PCI-Express 3.0 x8 in x16 slot (CPU1 Slot1), • One (1) PCI-Express 3.0 x4 in x8 slot (CPU2 Slot2), • One (1) PCI-Express 2.0x4 in x8 slot (PCH Slot6) (See the note on Page 1-5.)
Network	• Two (2) i210 Gigabit (100/1000 Mb/s) Ethernet controllers for LAN 1/LAN 2 ports.

SATA/SAS Connections		
	• SATA Ports	• Six (6) SATA 3.0 ports supported by Intel PCH (I-SATA 0-5) **Note:** I-SATA4/5 support Supermicro SuperDOMs [Devices-on-Module] with power pins built-in) • Four (4) SATA 3.0 ports supported by Intel SCU (S-SATA 0-3)
	• RAID	RAID 0, 1, 5, 10

Peripheral Devices	USB Devices
	• Four (4) USB 3.0 connections on the IO backpanel (USB 3/4, 5/6)
	• Two (2) USB 3.0 connections for front access (USB 7/8)
	• Two (2) USB 2.0 connections for front access (USB 1/2)
	• One (1) Type A USB 2.0 header (USB 0)
I/O Devices	**Audio**
	• ALC888S Audio controller
	• Rear 5.1 High-Definition + SPDIF audio (HD Audio) (**Note**: 7.1 can be supported via SPDIF)
	• Audio header for front access (Audio_FP)
	• SPDIF_In/SPDIF_Out (Sony_Philips Digital Interface)_In/Out headers
Power Connectors	**System Power Connectors**
	• One (1) 24-pin Main power (J24)
	• Two (2) 8-pin CPU power connectors (JPWR1/2)
Super IO	**Super IO**
	• NCT 7904
BIOS	• 16MB AMI SPI BIOS®
	• DMI 2.3, PCI 2.3, ACPI 1.0/2.0/3.0, Plug & Play (PnP) and SMBIOS 2.3
	Thunderbolt Technology Support
	• Intel Thunderbolt Technology supported
	Note: This motherboard supports the latest Thunderbolt technology. For proper Thunderbolt support, please install the Thunderbolt add-on card on PCH Slot6 and connect the GPIO cable from the Thunderbolt add-on card to the GPIO header (JTBT1) on the motherboard for Thunderbolt hot-plug support.
Power Config.	• ACPI/APM Power Management
	• Main switch override mechanism
	• Keyboard Wake-up from Soft-Off USB
	• Power-on mode for AC power recovery

System-Health Monitoring	CPU Monitoring
	• Onboard voltage monitors for 1.05V, 1.25V, 1.5V, +3.3V, 3.3VSB, +5V, +5V Standby, +12V, chipset, memory, CPU1/2 vcores, and battery voltages. • CPU/System overheat LED and control • CPU Thermal Trip support • Thermal Monitor 2 (TM2) support
	Fan Control
	• Multi fan speed control support via onboard BMC
	LED Indicators
	• System/CPU Overheat LED • Suspend-state LED
System Management	**System Management**
	• PECI (Platform Environment Configuration Interface) 2.0 support
	• System resource alert via SuperDoctor® 5
	• Thermal Monitor 2 (TM2) support
	• Chassis Intrusion Header and Detection
	• SuperDoctor® 5, Watch Dog, NMI
Dimensions	• 12.00" (L) x 10.00" (W) (304.80 mm x 254.00 mm)

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

X10DAL-i Block Diagram Rev. 1.02
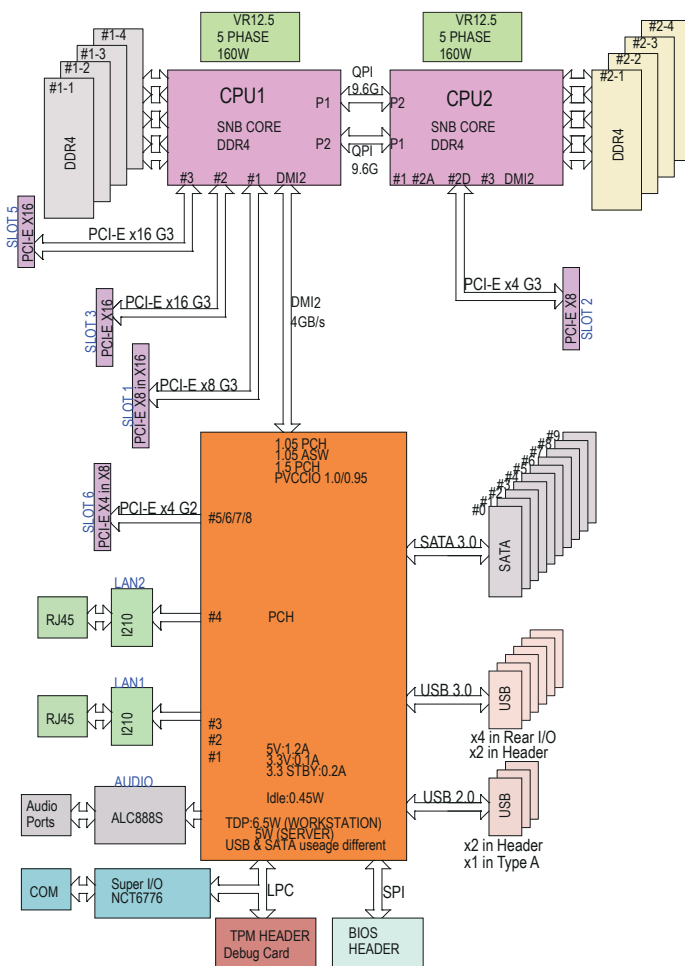
System Block Diagram

Note 1: This is a general block diagram and may not exactly represent the features on your motherboard. See the Motherboard Features pages for the actual specifications of each motherboard.

Note 2: This block diagram is intended for your reference only.

Note 3: Both CPUs need to be installed for full access to the PCI-E slots, DIMM slots, and onboard controllers. Refer to the block diagram above to determine which slots or devices may be affected.

1-2   Processor and Chipset Overview

Built upon the functionality and the capability of the Intel E5-2600v3/v4 Series processors (Socket R3 LGA 2011) and the C612 chipset, the X10DAL-i motherboard provides the performance and feature sets required for small -form factor workstation platforms, optimized for medical imaging applications.

With support of Intel QuickPath interconnect (QPI) Technology, the X10DAL-i offers point-to-point serial interconnect interface with a transfer speed of up to 9.6 GT/s, providing superb system performance.

The C612 chipset provides extensive IO support, including the following features:

- DDR4 288-pin memory support

- Support for MCTP protocol and ME

- GSX capable of GPIO expansion

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

- SPI Enhancements

- Intel® Node Manager 3.0

  Notes:

  1. E5-2600v4 requires Revision 2.0 BIOS (or higher).

  2. Node Manager 3.0 support is dependent on the power supply used in the system.

1-3 Special Features

Recovery from AC Power Loss

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

1-4 System Health Monitoring

This motherboard has an onboard Hardware Monitor Controller that supports system health monitoring, and it will scan the following onboard voltages continuously: 1.05V, 1.2V, 1.5V, +3.3V, 3.3VSB, +5V, +5V Standby, +12V, chipset, memory, and battery voltages. 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 onboard Hardware Monitor Controller can check the RPM status of a cooling fan.

Environmental Temperature Control

The Hardware Monitor Controller monitors the CPU temperature in real time and will turn on the thermal control fan whenever the CPU temperature exceeds a user-defined threshold. Once it detects that the CPU temperature is too high, it will automatically turn on the thermal fan control to prevent the CPU from overheating. The onboard chassis thermal circuitry can monitor the overall system temperature and alert the user when the chassis temperature is too high.

> **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 a system health monitoring software program used to notify the user of certain system events. For example, you can configure SuperDoctor 5 to provide you with warnings when the system/CPU temperatures, CPU 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 PC system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripheral devices 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.

The X10DAL-i motherboard accommodates 24-pin ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, two 8-pin power connections are also required to ensure adequate power supply to the system. Your power supply must also supply 3A (minimal) plus 5V standby and suspend to RAM power support.

Warning: To avoid damaging the power supply or motherboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these power supply connectors to the 24-pin (J24) and two 8-pin power connectors (JPWR1, JPWR2) on the motherboard. Failure to do so will void the manufacturer warranty on your power supply and motherboard.

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant. (For more information, please refer to the website at http://www.ssiforum.org/). Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1-7   Super I/O

The Super I/O supports one high-speed, 16550 compatible serial communication ports (UARTs). The UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability, and a processor interrupt system. The UART provides legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through an SMI or SCI function pin. It also features auto-power management to reduce power consumption.

Chapter 2

Installation

2-1   Standardized Warning Statements

The following statements are industry-standard warnings, provided to warn the user of situations where bodily injuries may occur. Should you have questions, contact Supermicro's Technical Support for assistance. Only certified technicians should attempt to install or change components.

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

Battery Handling

 Warning!

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

電池の取り扱い

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

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

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

Warnung

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

Attention

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

¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. 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 동일
하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사
의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant 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.

סילוק המוצר

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

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

경고!

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

Waarschuwing

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

2-2   Static-Sensitive Devices

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

Precautions

- Use a grounded wrist strap designed to prevent static discharge.

- Touch a grounded metal object before removing the board from the antistatic bag.

- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.

- When handling chips or modules, avoid touching their pins.

- Put the motherboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

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

2-3   Motherboard Installation

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

Tools Needed

- Phillips Screwdriver

- Pan head screws (8 pieces)

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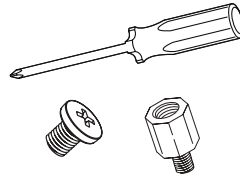
Location of Mounting Holes

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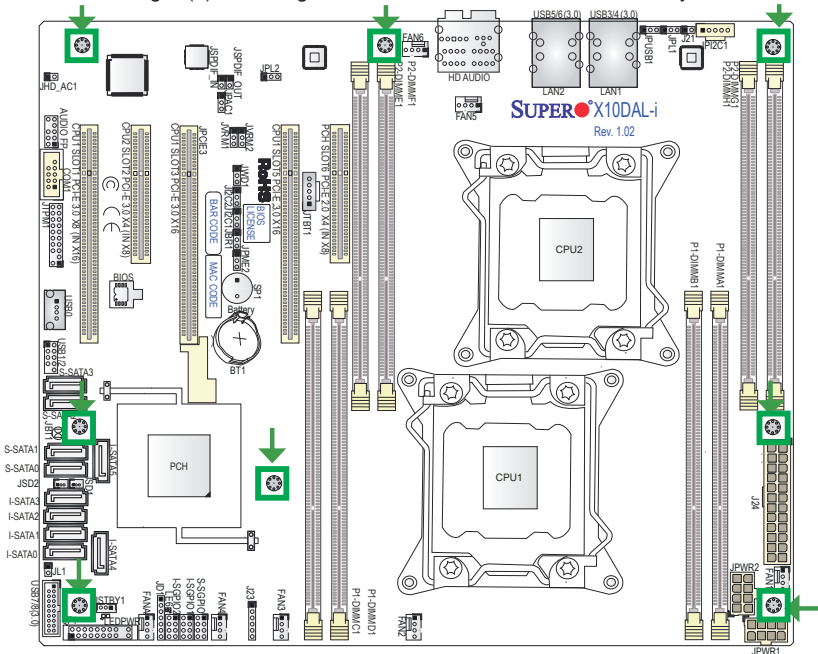
Warning: 1) To avoid damaging the motherboard and the components, please do not use the force greater than 8 lb/inch on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging components when installing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

Installing the Motherboard

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

1. Install the I/O shield into the chassis.
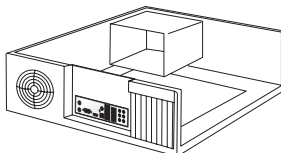
2. Locate the mounting holes on the motherboard.

3. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.
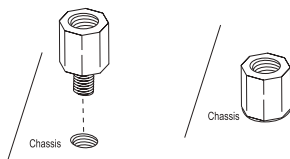
4. Install standoffs in the chassis as needed.

5. Install the motherboard into the chassis carefully to avoid damaging mother- board components.
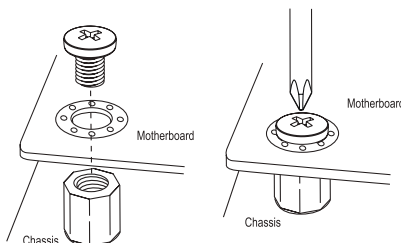
6. Using the Phillips screwdriver, insert a Pan head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.

7. Repeat Step 5 to insert #6 screws into all mounting holes.

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

Note: Images displayed are for illustration only. Your chassis or compo- nents might look different from those shown in this manual.

2-4   Processor and Heatsink Installation

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

Notes:

- Make sure to 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."
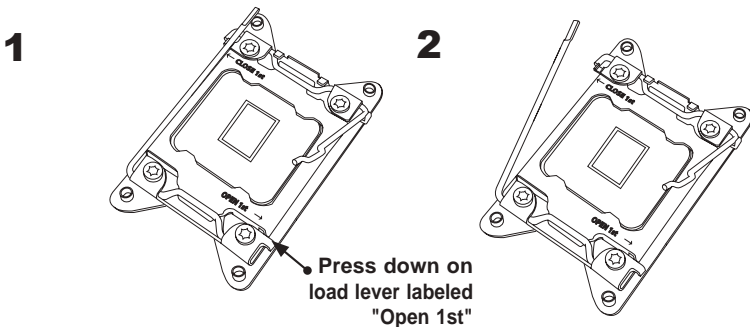
Press down on load lever labeled "Open 1st"

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

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

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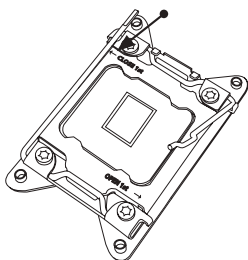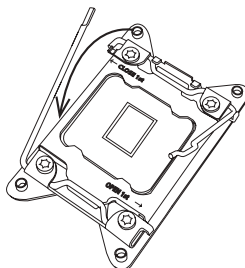
3. With the lever labeled "Close 1st" fully retracted, gently push down on the lever labeled "Open 1st" to open the load plate. Lift the load plate to open it completely.

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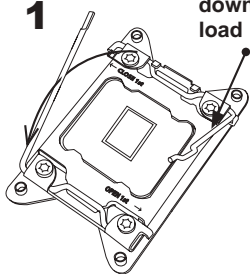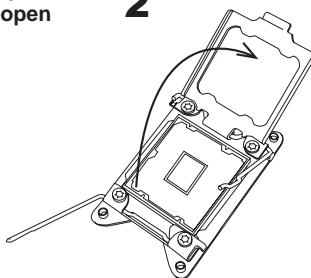
Note: All graphics, drawings and pictures shown in this manual are for illustration only. The components that came with your machine may or may not look exactly the same as those shown in this manual.

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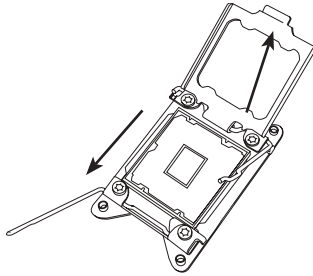
5. Using your thumb and index finger, hold the CPU by its edges. Align the CPU keys, which are semicircle notches, against the socket keys.

Socket Keys

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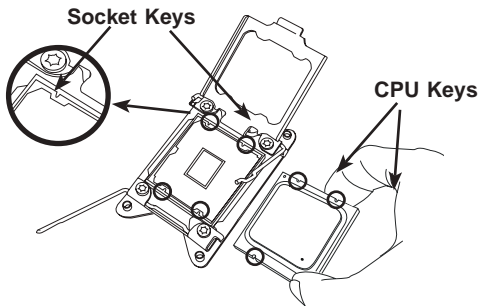
6. Once they are aligned, carefully lower the CPU straight down into the socket. Do not drop the CPU on the socket or move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any of the socket pins to avoid damaging the CPU or the socket.
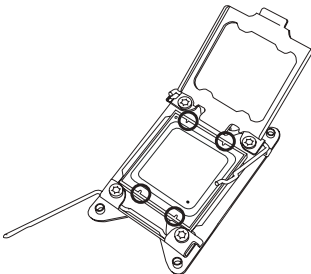
Warning: You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as this may damage your CPU. Instead, open the load plate again to make sure that the CPU is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

7. With the CPU inside the socket, inspect the four corners of the CPU to make sure that the CPU is properly installed.

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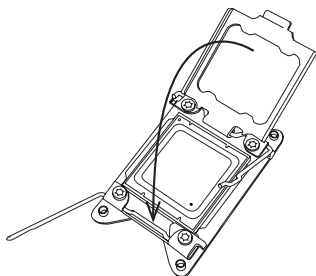
2   **Push down and lock the lever labeled "Close 1st"**
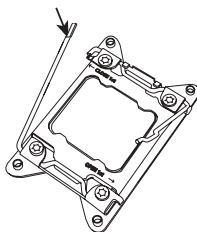
8. Close the load plate with the CPU inside the socket. Lock the lever labeled "Close 1st" first, then lock the lever labeled "Open 1st" second. Using your thumb, gently push the load levers down to the lever locks.

3

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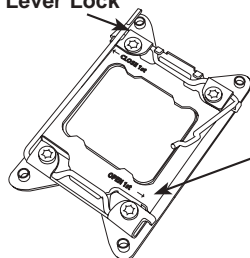
Push down and lock the lever labeled "Open 1st"

4

Lever Lock
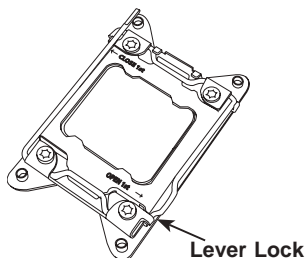
Installing a Passive CPU Heatsink

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

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

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

4. Finish the installation by fully tightening all four screws.

Top View

Screw#1   Screw#4

Screw#3   Screw#2

Side View   Screw#1   Screw#2   Side View

Screw#3

Bottom View
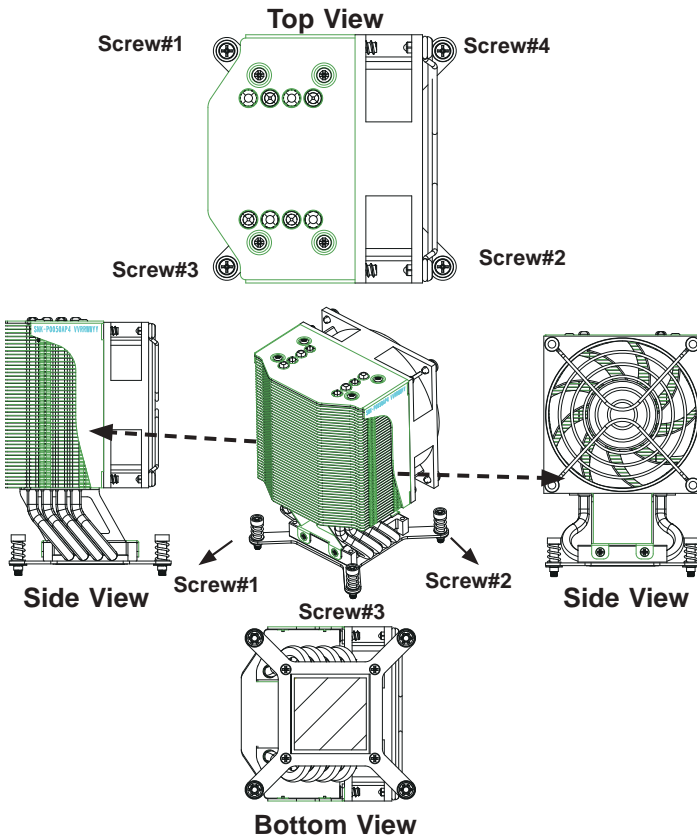
Notes: 1. For optimized airflow effency, please follow your chassis airflow direction to install the heatsink. 2. Graphics shown in this manual are for reference only. They may or may not look the same as the components installed in your system.

Removing the Heatsink

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

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

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

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

4. Remove the used thermal grease and clean the surface of the CPU and the heatsink, Reapply the proper amount of thermal grease on the surface before reinstalling the CPU and the heatsink.

Loosen the screws in the sequence as shown.

Screw#1   Screw#2

Screw#3

Motherboard
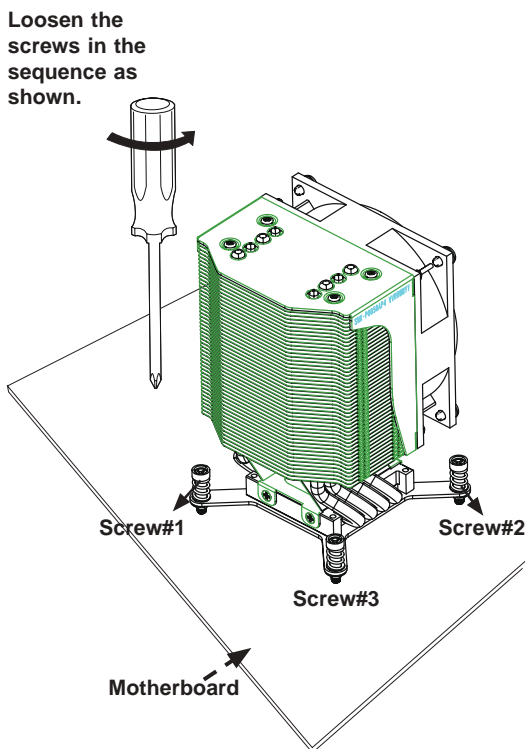
2-5 Installing and Removing the Memory Modules

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

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

Installing & Removing DIMMs

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMMA1. (For best performance, please use the memory modules of the same type and the same speed.)

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

Notches

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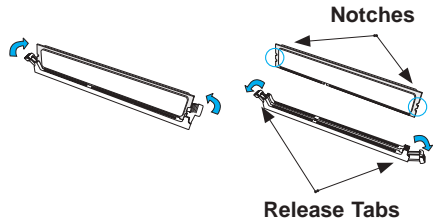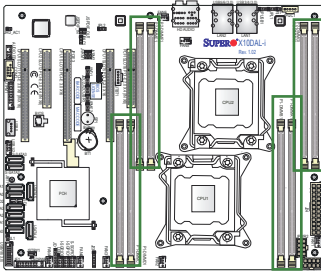
3. Align the key of the DIMM module with the receptive point on the memory slot.

4. Align the notches on both ends of the module against the receptive points on the ends of the slot.

5. Use two thumbs together to press the notches on both ends of the module straight down into the slot until the module snaps into place.

6. Press the release tabs to the locking positions to secure the DIMM module into the slot.

> Press both notches straight down into the memory slot at the same time.
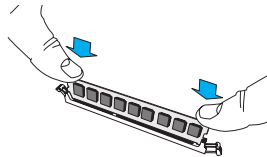
DIMM Module Removal

Press the release tabs on both ends of the DIMM socket to release the DIMM module from the socket as shown in the drawing on the right.
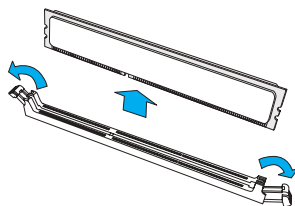
Warnings: 1. Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the DIMM module or the DIMM socket. 2. Please handle DIMM modules with care. Carefully follow all the instructions given on Page 1 of this chapter to prevent ESD-related damages to your memory modules or components.

Memory Support

This motherboard supports up to 1024 GB of Load Reduced (LRDIMM) or 256 GB Registered (RDIMM) ECC DDR4 2400/2133/1866/1600 MHz memory modules in 8 DIMM slots.

> **Note1:** Memory speed support is depending on the CPUs installed on the motherboard.
>
> **Note2:** For the latest memory updates, please refer to the Tested Memory List posted on our website (http://www.supermicro.com/products/mother-board).

Processor & Memory Module Population Configuration

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

Processors and their Corresponding Memory Modules			
CPU#	**Corresponding DIMM Modules**		
CPU 1	P1-DIMMA1	P1-DIMMB1	P1-DIMMC1	P1-DIMMD1
CPU2	P2-DIMME1	P2-DIMMF1	P2-DIMMG1	P2-DIMMH1

Populating RDIMM/LRDIMM DDR4 Memory Modules for the E5-2600v3-based Motherboard

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

Populating RDIMM/LRDIMM DDR4 Memory Modules for the E5-2600v4-based Motherboard

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

Note: Be sure to use memory modules of the same type, same speed, same frequency on the same motherboard. Mixing of memory modules of different types and speeds is not allowed.

2-6   Control Panel Connectors and I/O Ports

The I/O ports are color coded in conformance with the industry standards. See the picture below for the colors and locations of the various I/O ports.

Back Panel Connectors and I/O Ports
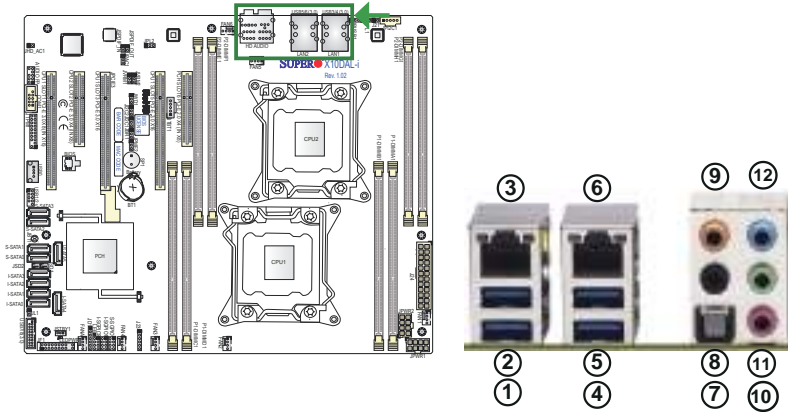
Back Panel I/O Port Locations and Definitions

1.	Rear USB 3.0 Port 3
2.	Rear USB 3.0 Port 4
3.	Gigabit LAN Port 1
4.	Rear USB 3.0 Port 5
5.	Rear USB 3.0 Port 6
6.	Gigabit LAN Port 2
7.	SPDIF_Out
8.	Surround_Out
9.	CEN/LFE_Out
10.	Mic_In
11.	Line-Out
12.	Line_In

Ethernet Ports

Two Gigabit Ethernet ports (LAN1/2) are located on the I/O back panel on the motherboard All these ports accept RJ45 type cables. (**Note**: Please refer to the LED Indicator Section for LAN LED information.)

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

(NC: No Connection)
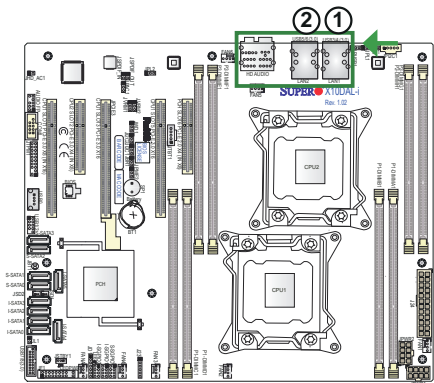
1. LAN1
2. LAN2

Universal Serial Bus (USB)

Six Universal Serial Bus (USB) 3.0 ports and three USB 2.0 connections are located on the motherboard. USB 3.0 ports 3/4 and 5/6 are located on the IO backpanel, while the USB 3.0 header that provides two USB 3.0 connections (USB 7/8) is located next to the Front Control panel. A USB header with two USB 2.0 connections (USB 1/2) is located next to S-SATA3, and next to this header is the Type A USB 2.0 connector (USB 0). USB Cables are not included. See the tables below for pin definitions.

Front Panel USB (3.0) Pin Definitions		
Pin#	Signal Name	Description
1	VBUS	Power
2	IntA_P1_SSRX-	USB 3.0 Port 1 SuperSpeed RX-
3	IntA_P1_SSRX+	USB 3.0 Port 1 SuperSpeed RX+
4	GND	GND
5	IntA_P1_SSTX-	USB 3.0 Port 1 SuperSpeed TX-
6	IntA_P1_SSTX+	USB 3.0 Port 1 SuperSpeed TX+
7	GND	GND
8	IntA_P1_D-	USB 3.0 Port 1 D- (USB 2.0 Signal D-)
9	IntA_P1_D+	USB 3.0 Port 1 D- (USB 2.0 Signal D+)
10	ID	Over Current Protection
11	IntA_P2_D+	USB 3.0 Port 2 D+ (USB 2.0 Signal D+)
12	IntA_P2_D-	USB 3.0 Port 2 D- (USB 2.0 Signal D-)
13	GND	GND
14	IntA_P2_SSTX+	USB 3.0 Port 2 SuperSpeed TX+
15	IntA_P2_SSTX-	USB 3.0 Port 2 SuperSpeed TX-
16	GND	GND
17	IntA_P2_SSRX+	USB 3.0 Port 2 SuperSpeed RX+
18	IntA_P2_SSRX-	USB 3.0 Port 2 SuperSpeed RX-
19	VBUS	Power

Front Panel USB (2.0) 1/2, 0 Pin Definitions			
USB 1, 0		USB 2	
Pin #	Definition	Pin #	Definition
1	+5V	2	+5V
3	USB_PN2	4	USB_PN3
5	USB_PP2	6	USB_PP3
7	Ground	8	Ground
9	Key	10	Ground
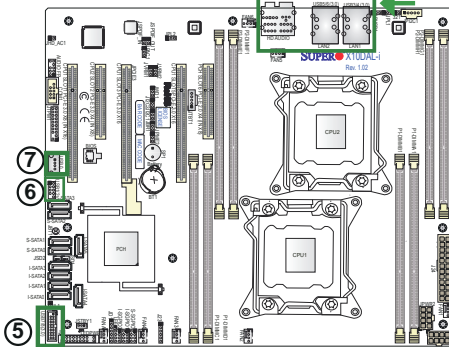
1. Rear USB Port 3 (3.0)
2. Rear USB Port 4 (3.0)
3. Rear USB Port 5 (3.0)
4. Rear USB Port 6 (3.0)
5. Front USB Ports 7/8 (3.0)
6. Front USB Ports 1/2 (USB 2.0)
7. Type A USB 0 (USB 2.0)

5.1 HD (High-Definition) Audio

This motherboard features a 5.1 High-Definition Audio (HDA) codec that provides 6-DAC channels. The HD audio supports multiple-streaming 7.1 sound playback through the SPDIF fiber connector. Download the appropriate software from our website to use this feature.

HD Audio

5.1 HD Audio	
Conn#	Signal
1	SPDIF_Out
2	Surround_Out
3	CEN/LFE_Out
4	Mic_In
5	Line_Out
6	Line_In

Front Accessible Audio Header

A 10-pin audio header (AUDIO_FP), located next to COM1, allows you to use the onboard audio for playback. Connect an audio cable to the audio header to use this feature. See the table below for pin definitions.

10-Pin Audio Pin Definitions	
Pin#	Signal
1	Microphone_Left
2	Audio_Ground
3	Microphone_Right
4	Audio_Detect
5	Line_2_Right
6	Microphone_Detect
7	Ground
8	Key
9	Line_2_Left
10	Headphone_Detect

1.SPDIF_Out
2. Surround_Out
3. CEN/LFE_Out
4. Mic_In
5. Line-Out
6. Line_In
7. Audio Header
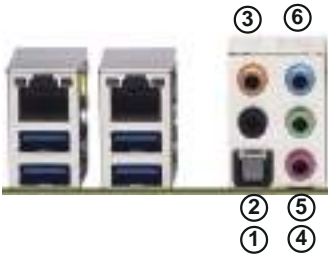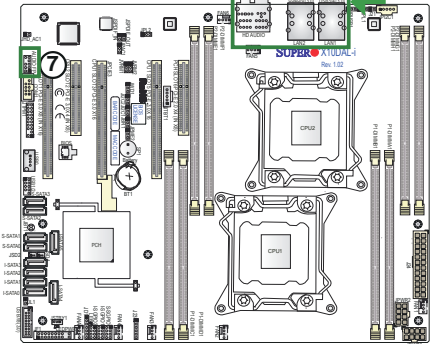
Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro's server chassis. See the figure below for the descriptions of the various control panel buttons and LED indicators. Refer to the following section for descriptions and pin definitions.
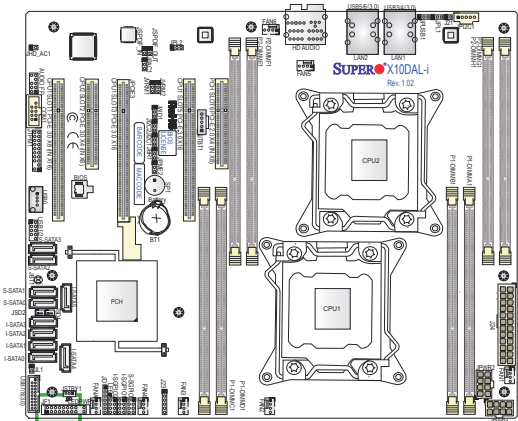
		20	19		
Ground	{	○	○	NMI	
X	{	○	○	X	
Power LED	{	○	○	Vcc	
HDD LED	{	○	○	Vcc	
NIC1 LED	{	○	○	Vcc	
NIC2 LED	{	○	○	Vcc	
OH/Fan Fail LED	{	○	○	Vcc	
PWR Fail LED	{	○	○	Vcc	
Ground		○	○	Reset	Reset Button
Ground		○	○	PWR	Power Button
		2	1		

JF1 Header Pins

2-21

Front Control Panel Pin Definitions

NMI Button

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

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

Power LED

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

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

A. NMI
B. PWR LED
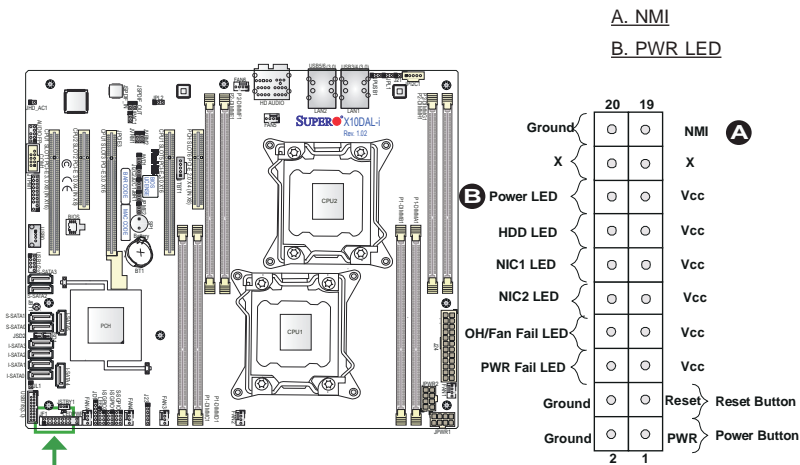
HDD LED

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

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

NIC1/NIC2 LED Indicators

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

GLAN1/2 LED Pin Definitions (JF1)	
Pin#	Definition
9	VCC NIC 2
10	NIC 2 Link/Activity LED
11	VCC NIC 1
12	NIC 1 Link/Activity LED
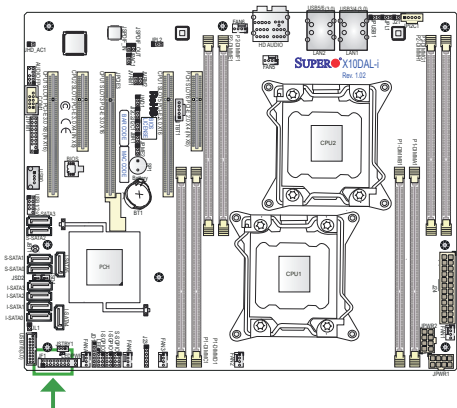
A. HDD LED
B. NIC1 LED
C. NIC2 LED

	20	19	
Ground	○	○	NMI
X	○	○	X
Power LED	○	○	Vcc
A HDD LED	○	○	Vcc
B NIC1 LED	○	○	Vcc
C NIC2 LED	○	○	Vcc
OH/Fan Fail LED	○	○	Vcc
PWR Fail LED	○	○	Vcc
Ground	○	○	Reset — Reset Button
Ground	○	○	PWR — Power Button
	2	1	
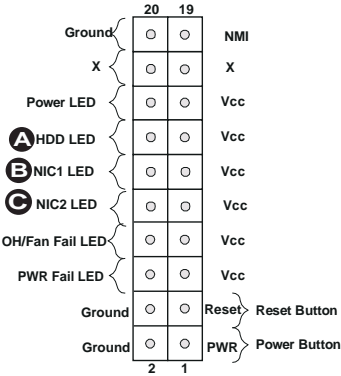
Overheat (OH)/Fan Fail LED

Connect an LED cable to pins 7 and 8 of JF1 to provide advanced warnings of chassis overheating and fan failure. Refer to the table on the right for pin definitions.

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

OH/Fan Fail Indicator Status	
State	Definition
Off	Normal
On	Overheat
Flash-ing	Fan Fail

Power Fail LED

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

PWR Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	PWR Supply Fail
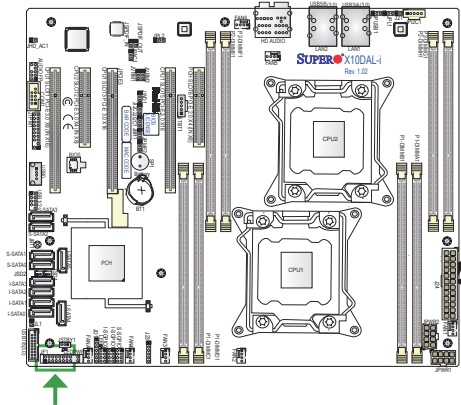
A. OH/Fail Fail LED

B. PWR Supply Fail

	20	19	
Ground	○	○	NMI
X	○	○	X
Power LED	○	○	Vcc
HDD LED	○	○	Vcc
NIC1 LED	○	○	Vcc
NIC2 LED	○	○	Vcc
A OH/Fan Fail LED	○	○	Vcc
B PWR Fail LED	○	○	Vcc
Ground	○	○	Reset — Reset Button
Ground	○	○	PWR — Power Button
	2	1	
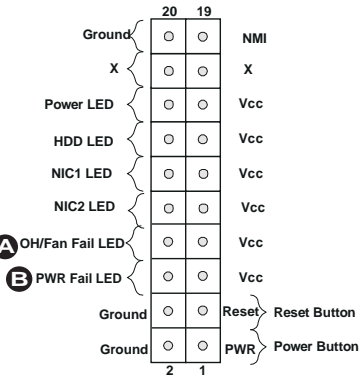
Reset Button

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

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

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. Refer to the table on the right for pin definitions.

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

A. Reset Button

B. PWR Button

	20	19	
Ground	○	○	NMI
X	○	○	X
Power LED	○	○	Vcc
HDD LED	○	○	Vcc
NIC1 LED	○	○	Vcc
NIC2 LED	○	○	Vcc
OH/Fan Fail LED	○	○	Vcc
PWR Fail LED	○	○	Vcc
Ground	○	○	Reset	Reset Button Ⓐ
Ground	○	○	PWR	Power Button Ⓑ
	2	1	
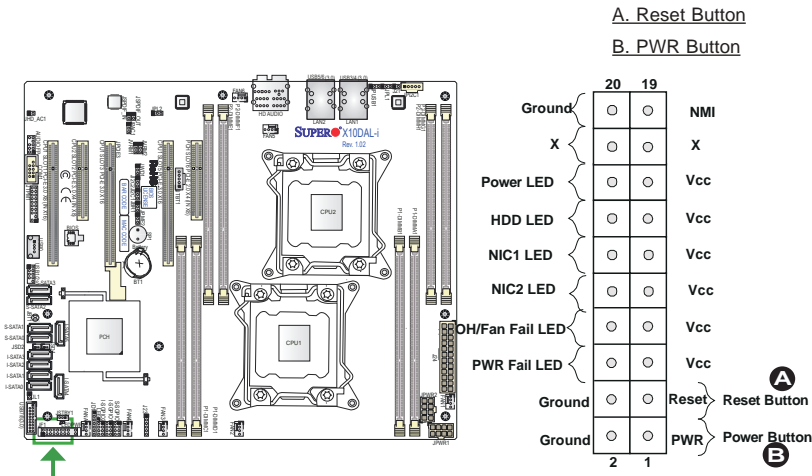
2-7 Connecting Cables

Power Connectors

A 24-pin main power supply connector (J24) and two 8-pin CPU PWR connectors (JPWR1, JPWR2) are located on the motherboard. These power connectors meet the SSI EPS 12V specification. These power connectors must also be connected to your power supply. See the table on the right for pin definitions.

Warning: To provide adequate power to the motherboard, be sure to connect the 24-pin ATX PWR (J24) and two 8-pin PWR connectors (JPWR1, JPWR2) to the power supply. Failure to do so will void the manufacturer warranty on your power supply and motherboard.

ATX Power 24-pin Connector Pin Definitions			
Pin#	Definition	Pin #	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

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

(Required)
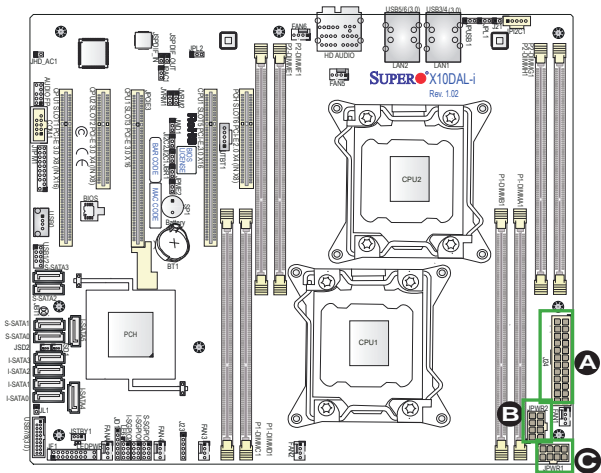
A. J24: 24-pin ATX PWR (Req'd)
B. JPWR1: 8-pin Processor PWR (Req'd)
C. JPWR2: 8-pin Processor PWR (Req'd)

Fan Headers

This motherboard has seven system/CPU fan headers (Fan 1~Fan 6, and Fan A) on the motherboard. All these 4-pin fans headers are backward compatible with the traditional 3-pin fans. See the table on the right for pin definitions.

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

Chassis Intrusion

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

Chassis Intrusion Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground
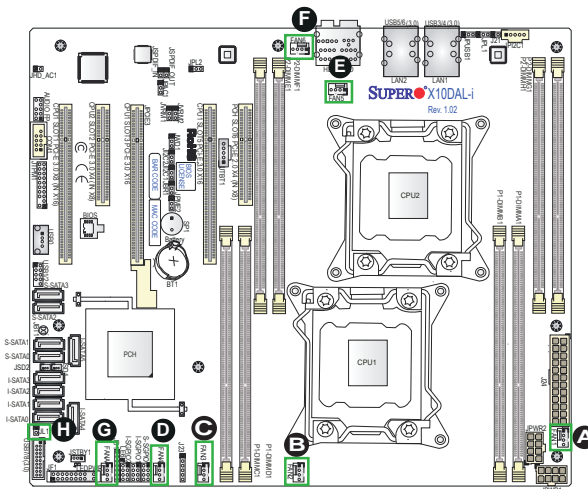
A. Fan 1
B. Fan 2
C. Fan 3
D. Fan 4
E. Fan 5
F. Fan 6
G. Fan A
H. Chassis Intrusion

Internal Speaker

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

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

Power LED/Speaker

On JD1 header, pins 1-3 are used for power LED indication, and pins 4-7 are for the speaker. Please note that the speaker connector pins (4-7) are used with an external speaker. If you wish to use the onboard (internal) buzzer, please close pins 6-7 with a jumper. See the tables on the right for pin definitions.

PWR LED Pin Definitions	
Pin#	Definition
Pin 1	Anode (+)
Pin2	Cathode (-)
Pin3	NA

Speaker Connector Pin Settings	
Pin#	Definition
Pins 4-7	External Speaker
Pins 6-7	Internal Speaker
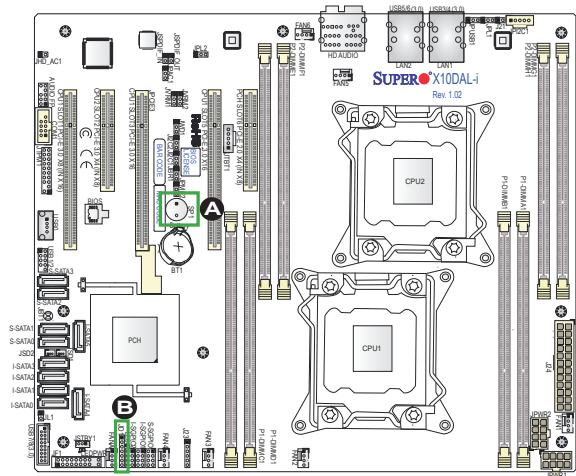
A. Internal Speaker (Buzzer)
B. PWR LED/Speaker

TPM Header/Port 80 Header

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

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

Standby Power Header

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

Standby Power Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up
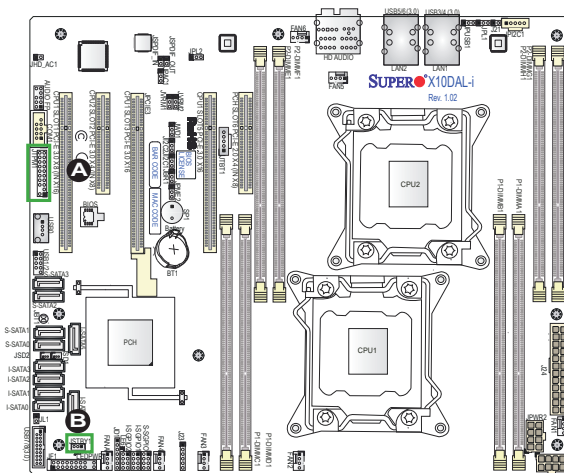
A. TPM/Port 80 Header

B. Standby PWR

2-29

I-SGPIO 1/2 & S-SGPIO Headers

Three SGPIO (Serial-Link General Purpose Input/Output) headers are located on the motherboard. These headers support Serial_Link interface for onboard SATA/SAS connections when available. See the tables on the right for SGPIO support and for pin definitions.

I-SGPIO 1/2 & S-SGPIO Pin Definitions			
Pin#	Definition	Pin#	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	Clock	8	NC

Note: NC= No Connection

I-SGPIO 1/2 & S-SGPIO Support	
I-SGPIO 1	I-SATA 0-3 supported
I-SGPIO 2	I-SATA 4/5 supported
S-SGPIO	S-SATA 0-3 supported

SATA_DOM Power Connectors

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

SATA DOM/Connectors Pin Definitions	
Pin#	Definition
1	+5V
2	Ground
3	Ground
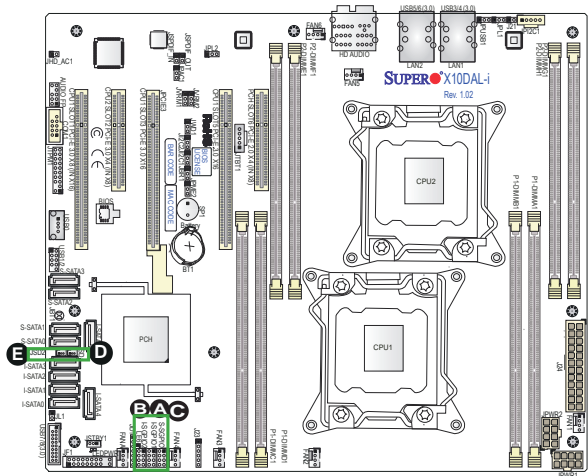
A. I-SGPIO1
B. I-SGPIO2
C. S-SGPIO
D. JSD1
E. JSD2

SPDIF_In/SPDIF_Out Headers

The SPDIF_In (JSPDIF_In) and SP-DIF_Out (JSPDIF_Out) headers are located next to the GLAN Controller on the motherboard. Place a cap on each header for audio support. You will also need to have a cable to use each connection.

SPDIF_In Pin Definitions	
Pin#	Definition
1	S/PDIF_In
2	Ground

SPDIF_Out Pin Definitions	
Pin#	Definition
1	S/PDIF_Out
2	Ground

Power SMB (I²C) Connector

Power System Management Bus (I²C) Connector (JPI²C1) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

PWR SMB Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V
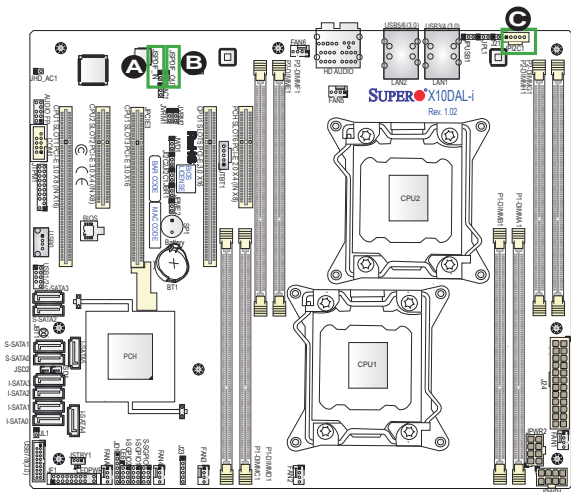
A. SPDIF_In
B. SPDIF_Out
C. JPI²C1

COM Header

A COM header (COM1) is located next to the front audio header on the motherboard. This header provides serial-port (COM) connection support. Refer to the board layout below for the location.

A. COM1
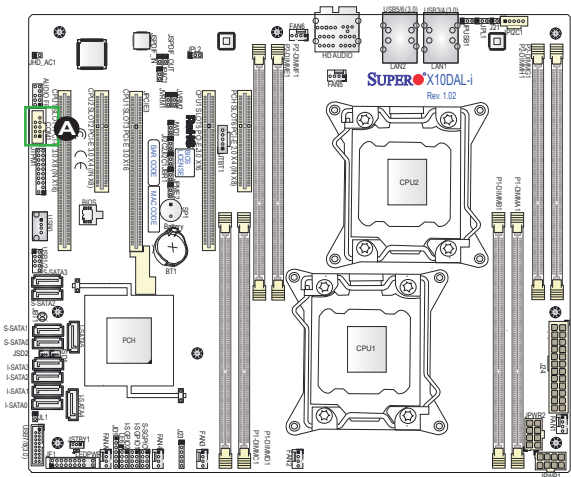
2-8   Jumper Settings

Explanation of Jumpers

To modify the operation of the mother-
board, jumpers can be used to choose
between optional settings. Jumpers
create shorts between two pins to
change the function of the connector.
Pin 1 is identified with a square solder
pad on the printed circuit board. See
the motherboard layout pages for
jumper locations.
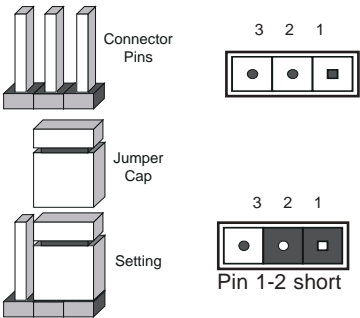
> **Note:** On two-pin jumpers,
> "Closed" means the jumper
> is on and "Open" means the
> jumper is off the pins.

Connector
Pins

Jumper
Cap

Setting

3 2 1

3 2 1

Pin 1-2 short

GLAN Enable/Disable

Jumpers JPL1/JPL2 enable or dis-
able GLAN Port1 and Port2 on the
motherboard. See the tables on the
right for more information.

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

LAN Enable/Disable Jumpers	
Jumpers	LAN Ports Supported
JPL1	Enables/disables LAN1
JPL2	Enables/disables LAN 2
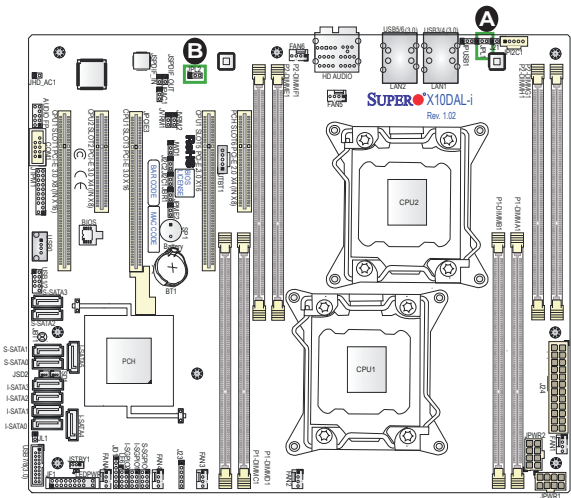
A. GLAN1 Enable
B. GLAN2 Enable

CMOS Clear

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

> **Note 1:** Please completely shut down the system, remove the AC power cord, and then short JBT1 to clear CMOS.

> **Note 2:** Be sure to remove the onboard CMOS Battery before you short JBT1 to clear CMOS.

Watch Dog Enable/Disable

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

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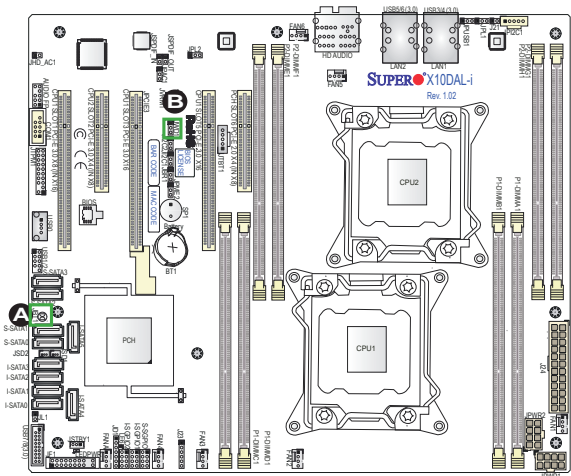
A. Clear CMOS

B. Watch Dog Enable

I²C Bus to PCI-Exp. Slots

Use Jumpers JI²C1 and JI²C2 to connect the System Management Bus (I²C) to PCI-Express slots to improve PCI performance. These two jumpers are to be set at the same time. The default setting is on pins 2/3 to disable the connections. See the table on the right for jumper settings.

I²C for PCI-E slots Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled (Default)

Manufacturer Mode Select

Close this jumper (JPME2) to bypass SPI flash security and force the system to use the Manufacturer mode which will allow the user to flash the system firmware from a host server to modify system settings. See the table on the right for jumper settings.

ME Mode Select Jumper Settings	
Jumper Setting	Definition
1-2	Manufacture Mode (Default)
2-3	Disabled
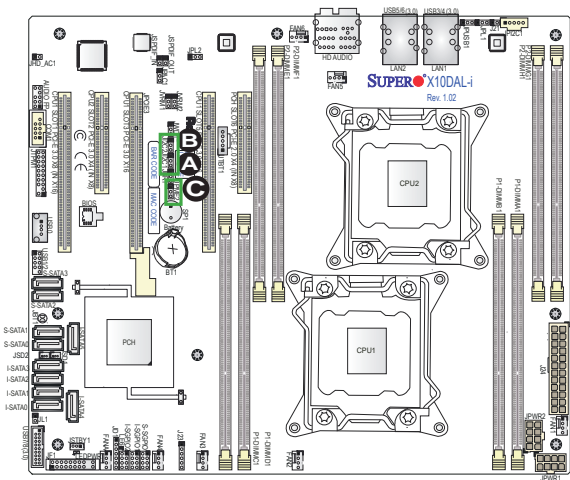
A. JI²C1
B. JI²C2
C. JPME2

Onboard Audio Enable

Use Jumper JPAC1 to enable or disable onboard audio connections. The default setting is on pins 1-2 to enable onboard audio support. See the table on the right for jumper settings.

Onboard Audio Enable Jumper Settings	
Jumper Setting	Definition
1-2	Enabled (Default)
2-3	Disabled
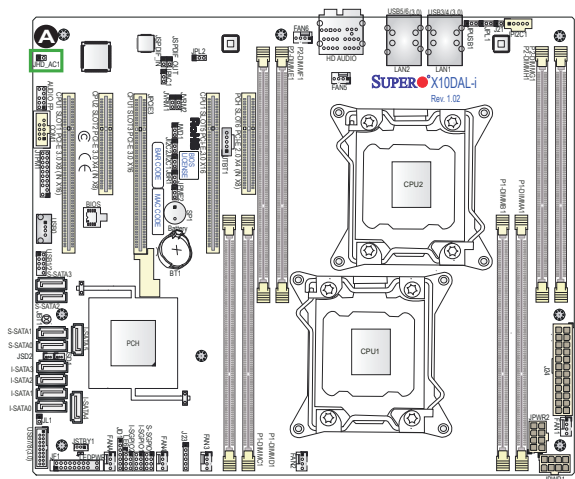
A. Onboard Audio Enable

USB 0/1 Wake-up Enable

Jumper JPUSB1 is used for USB 0/1 wake-up support, which will allow the system to "wake-up" when a signal sent by a device installed in the backpanel USB port 0 or port 1 is received by the system. The default setting is on pins 1-2 to enable USB 0/1 wake-up support. See the table on the right for jumper settings.

USB 0/1 Wake-up Enable Jumper Settings	
Jumper Setting	Definition
1-2	Enabled (Default)
2-3	Disabled
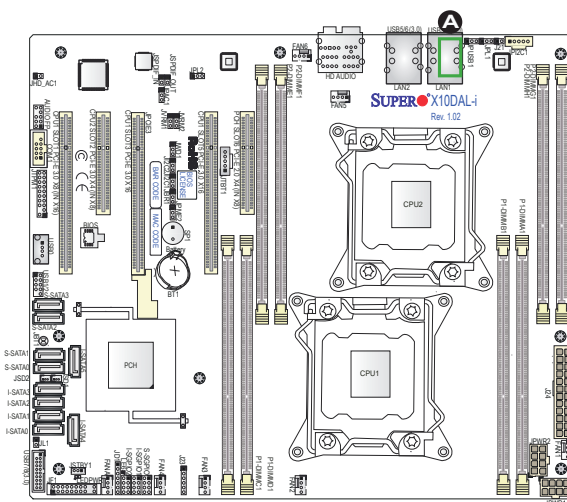
A. Backpanel USB Enable

2-9   Onboard LED Indicators

GLAN LEDs

Two LAN ports (LAN 1/LAN 2) are located on the IO backplane of the motherboard. Each Ethernet LAN port has two LEDs. The yellow LED indicates activity, while the other Link LED may be green, amber or off to indicate the speed of the connections. See the tables on the right for more information.

Link LED Activity LED

Rear View (when facing the rear side of the chassis)

GLAN 1/2 Activity Indicator LED Settings		
Color	Status	Definition
Yellow	Flashing	Active

GLAN Ports 1/2 Link Indicator LED Settings	
LED Color	Definition
Off	No Connection/10 Mbps
Amber	1 Gbps
Green	100 Mbps

Onboard Power LED

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

Onboard PWR LED Indicator LED Settings	
LED Color	Status
Off	System Off (PWR cable not connected)
Solid: On	System PWR On
Blinking	ACPI S3 State
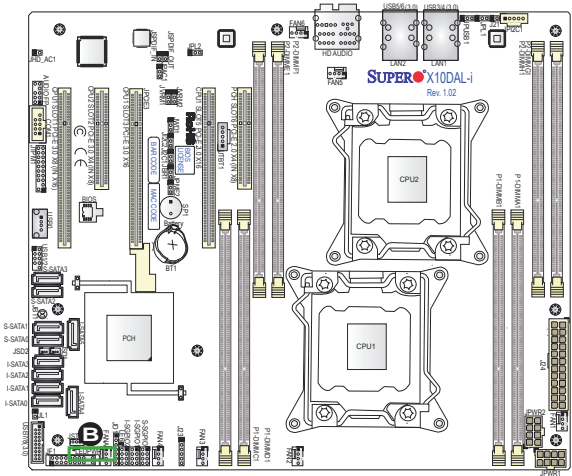
A. LAN1/2 LEDs
B. Onboard PWR LED

Power Good LED

An Onboard Power Good LED is located at LE6 on the motherboard. When LE6 is green, all onboard power VRMs are normal. See the table on the right for more information.

Power Good LED (LE6) LED Settings	
LED Color	Status
Green	All Onboard PWR VRMs: Normal
Red	One or more PWR VRMs: failed
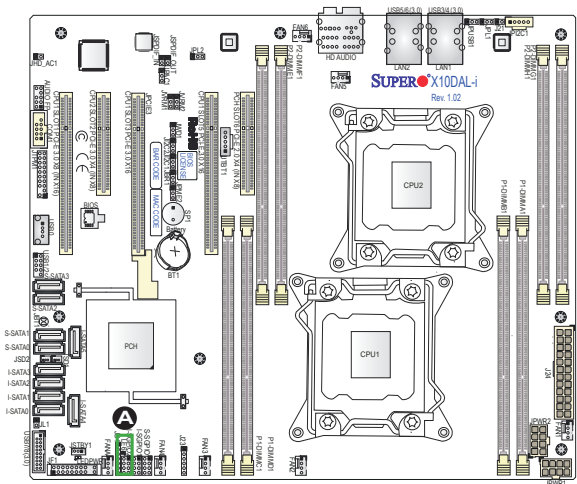
A. PWR Good LED

2-10 SATA 3.0 Connections

SATA 3.0 Connections

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

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

> **Notes:** For more information on SATA HostRAID configuration, please refer to the Intel SATA HostRAID User's Guide posted on our website @ http://www.supermicro.com.
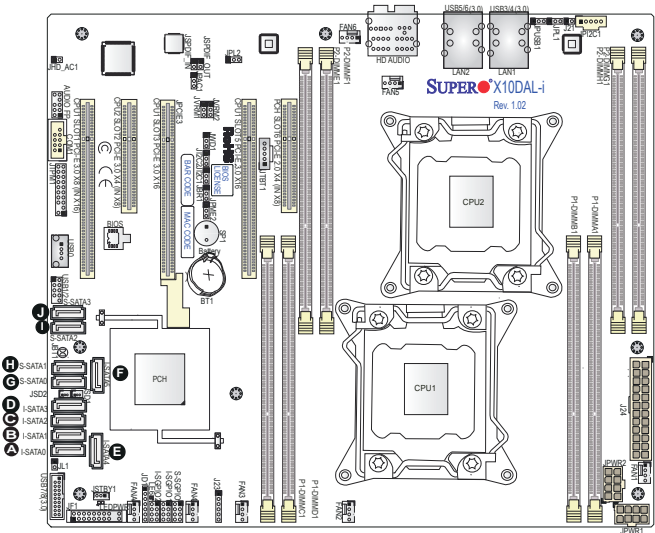
A. I-SATA0
B. I-SATA1
C. I-SATA2
D. I-SATA3
E. I-SATA4
F. I-SATA5
G. S-SATA0
H. S-SATA1
I. S-SATA2
J. S-SATA3

Chapter 3

Troubleshooting

3-1   Troubleshooting Procedures

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

Before Power On

1. Make sure that there are no short circuits between the motherboard and chassis.

2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.

3. Remove all add-on cards.

4. Install CPU 1 first (making sure it is fully seated) and connect the front panel connectors to the motherboard.

No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.

2. Make sure that all power connectors are properly connected

3. Check that the 115V/230V switch on the power supply is properly set, if available.

4. Turn the power switch on and off to test the system, if applicable.

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

No Video

1. If the power is on, but you have no video, remove all the add-on cards and cables.

2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes.

System Boot Failure

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

1. Check for any error beep from the motherboard speaker.

• If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, try to turn on the system again with only one processor installed in CPU Socket#1. If there is still no error beep, replace the motherboard.

• If there are error beeps, clear the CMOS settings by unplugging the power cord and contracting both pads on the CMOS Clear Jumper (JBT1). (Refer to Section 2-8 in Chapter 2.)

2. Remove all components from the motherboard, especially the DIMM modules. Make sure that the system's power is on, and memory error beeps are activated.

3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this Chapter.

Losing the System's Setup Configuration

1. Make sure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information. Refer to Section 2-7 for details on recommended power supplies.

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

3. If the above steps 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 different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM speed for all DIMMs in the system.

3. Make sure that you are using the correct type of Registered (RDIMM)/Load Reduced (LRDIMM) ECC DDR4 2400/2133/1866/1600 MHz modules recommended by the manufacturer.

4. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.

5. Make sure that all memory modules are fully seated in their slots. Follow the instructions given in Section 2-4 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, and CPU/system fans, etc., work properly. Check Hardware Monitoring settings in the 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 require-ment.

6. Proper software support: Make sure that the correct drivers are used.

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

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

4. Identifying bad components by isolating them: If necessary, remove a compo-nent 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).

• 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 out-
    wards 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

1. To install an onboard battery, follow the steps 1 & 2 above and continue
    below:

2. Identify the battery's polarity. The positive (+) side should be facing up.

3. 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.

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

BATTERY HOLDER
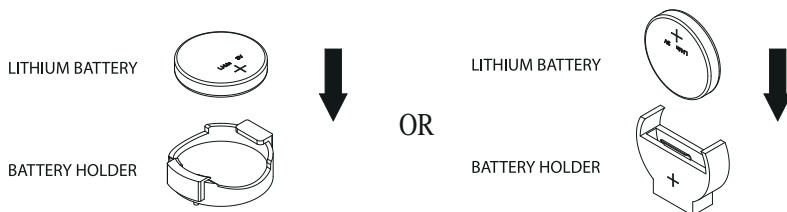
3-4   Frequently Asked Questions

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

Answer: The motherboard supports Registered (RDIMM)/Load Reduced (LRDIMM) ECC DDR4 2400/2133/1866/1600 MHz 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?

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

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

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

Question: How do I 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.

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 X10DAL-i. The ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS setup utility screens.

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

Starting BIOS Setup Utility

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

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

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

> **Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.

The AMI BIOS setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F4>, <Enter>, <Esc>, arrow keys, etc.

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

How To Change the Configuration Data

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

How to Start the Setup Utility

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

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

4-2   Main Setup

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

The following Main menu items will be displayed:
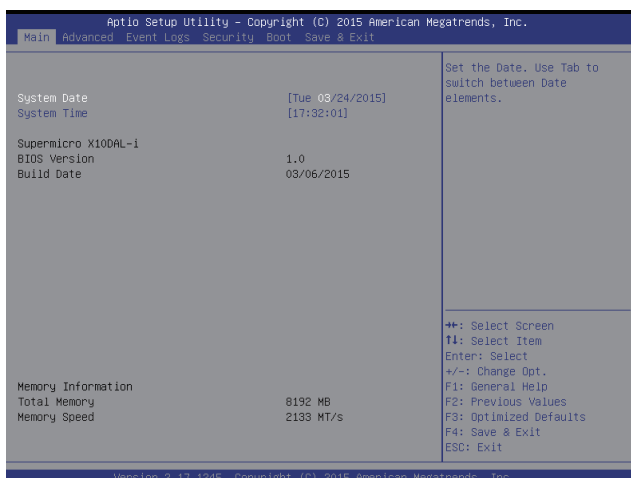
System Date/System Time

Use this feature 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 X10DAL-i

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.

Memory Information

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

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

4-3   Advanced Setup Configurations

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

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

      Start SuperFlash Utility                              Excute SuperFlash utility
    ▶ Boot Feature                                          to update BIOS.
    ▶ CPU Configuration
    ▶ Chipset Configuration
    ▶ SATA Configuration
    ▶ sSATA Configuration
    ▶ Server ME Configuration
    ▶ PCIe/PCI/PnP Configuration
    ▶ Super IO Configuration
    ▶ Serial Port Console Redirection
    ▶ ACPI Settings
    ▶ NCT7904D HW Monitor



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

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

Warning: Take Caution when changing the Advanced settings. An incorrect value, a wrong DRAM frequency, or an improper BIOS timing setting may cause the system to malfunction. When this occurs, please clear the CMOS, restore the setting to the manufacture default setting, and reboot your system. (Please refer to the Jumper section in Chapter 2 for the instructions on how to clear CMOS.)

Start SuperFlash Utility

▶Boot Feature

Quiet Boot

Use this item 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 system BIOS. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock 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

DeepSx Power Policies

Use this item to configure the Advanced Configuration and Power Interface (ACPI) settings for the system. Select Enabled in S5 to power off the whole computer system except the power supply unit (PSU) and keep the power button "alive" so that the user can "wake-up" the system by using an USB keyboard or mouse. The options are **Disabled**, and Enabled in S5.

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 CPU information as detected by the BIOS. It also allows the user to configure CPU settings.

- Processor Socket

- Processor ID

- Processor Frequency

- Processor Max Ratio

- Processor Min Ratio

- Microcode Revision

- L1 Cache RAM

- L2 Cache RAM

- L3 Cache RAM

- CPU1 Version

- CPU2 Version

Clock Spread Spectrum

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

Cores Enabled

This feature allows the user to set the number of CPU cores to enable. Enter "0" to enable all cores. The default setting is **0**.

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

Select Enable for Execute Disable Bit Technology support, which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor to damage the system during an attack. The options are **Enable** and Disable. (Refer to Intel and Microsoft websites for more information.)

PPIN Control

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

Hardware Prefetcher (Available when supported by the CPU)

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

Adjacent Cache Prefetch (Available when supported by the CPU)

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

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

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

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

DCU IP Prefetcher

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

Direct Cache Access (DCA)

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

X2APIC (Advanced Programmable Interrupt Controller)

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

AES-NI

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

Intel Virtualization Technology

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

▶ Advanced Power Management Configuration

Advanced Power Management Configuration

Power Technology

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

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

Energy Performance Tuning

Select Enable to activate energy-performance tuning for your system to maximize energy efficiency. The options are Enable and Disable.

Energy Performance Bias Setting

Use this feature to select an appropriate fan setting to achieve maximal system performance (with maximum cooling) or maximum energy efficiency with maximum power saving). The options are Performance, Balanced Performance, Balanced Power, and Power.

Energy Efficiency Turbo Mode

Select Enable to use the Energy Efficiency Turbo mode to turn up the CPU core frequency to improve CPU performance without compromising energy efficiency. The options are **Enable** and Disable.

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

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

EIST (P-states)

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

Turbo Mode

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

P-state Coordination

This feature is used to change the P-state (Power-Performance State) coordination type. P-state is also known as "SpeedStep" for Intel processors. Select HW_ALL to change the P-state coordination type for hardware components only. Select SW_ALL to change the P-state coordination type for all software installed in the system. Select SW_ANY to change the P-state coordination type for any software program in the system. The options are **HW_All,** SW_ALL, and SW_ANY.

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

Package C State limit

Use this item to set the limit on the C-State package register. C-State, a processor power management architecture developed by Intel, can further reduce power consumption from the basic C1 (Halt State) state that blocks clock cycles to the CPU. Select C0/C1 State to limit the power supply only to the CPU for basic instruction processing. Select C2 State to turn off CPU core clocks and bus clocks (I/O) to lower power consumption. Select C6 State to turn off power supply to all caches. The options are C0/1 state, C2 state, C6 (non-Retention) state, and **C6 (Retention) state**.

CPU C3 Report

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

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

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

Enhanced Halt State (C1E)

Select Enabled to use Intel 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. You will need to reboot the system for the change of this setting to take effect. 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

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

▶North Bridge

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

▶IIO Configuration

EV DFX (Device Function On-Hide) Feature

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

▶IIO1 Configuration

CPU1 Slot1 PCI-E 3.0 x8 (in x16)

Use this item to configure the link speed of a PCI-E device installed on the PCI-E slot specified by the user. The options are Gen1 (2.5 GT/s), Gen2 (5 GT/s), and **Gen3 (8 GT/s)**.

CPU1 Slot3 PCI-E 3.0 x16

Use this item to configure the link speed of a PCI-E device installed on the PCI-E slot specified by the user. The options are Gen1 (2.5 GT/s), Gen2 (5 GT/s), and **Gen3 (8 GT/s)**.

CPU1 Slot5 PCI-E 3.0 x16

Use this item to configure the link speed of a PCI-E device installed on the PCI-E slot specified by the user. The options are Gen1 (2.5 GT/s), Gen2 (5 GT/s), and **Gen3 (8 GT/s)**.

▶IIO2 Configuration

CPU2 Slot2 PCI-E 3.0 x4 (in x8)

Use this item to configure the link speed of a PCI-E device installed on the PCI-E slot specified by the user. The options are Gen1 (2.5 GT/s), Gen2 (5 GT/s), and **Gen3 (8 GT/s)**.

▶IOAT (Intel® IO Acceleration) Configuration

Enable IOAT

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

No Snoop

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

Relaxed Ordering

Select Enable to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to other transactions that have already been enqueued earlier. The options are **Disable** and Enable.

▶ Intel VT for Directed I/O (VT-d)

Intel VT for Directed I/O (VT-d)

Select Enable to use Intel Virtualization Technology for Direct I/O VT-d support by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and avail-ability 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.

Coherency Support (Non-Isoch)

Select Enable for the Non-Iscoh VT-d engine to pass through DMA (Direct Memo-ry Access) to enhance system performance. The options are **Enable** and Disable.

Coherency Support (Isoch)

Select Enable for the Iscoh VT-d engine to pass through ATS to enhance system performance. The options are Enable and **Disable**.

▶QPI (Quick Path Interconnect) Configuration

▶QPI General Configuration

QPI Status

The following information will display:

- Number of CPU

- Number of IIO

- Current QPI Link Speed

- Current QPI Link Frequency

- QPI Global MMIO Low Base/Limit

- QPI Global MMIO High Base/Limit

- QPI PCIe Configuration Base/Size

Link Frequency Select

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

Link L0p Enable

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

Link L1 Enable

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

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

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

Isoc Mode

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

▶**Memory Configuration**

Enforce POR

Select Enabled to enforce POR restrictions on memory 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.

Enable ADR

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

DRAM RAPL (Running Average Power Limit) Baseline

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

Set Throttling Mode

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

A7 Mode

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

▶DIMM Information

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

P1-DIMMA1, P1-DIMMB1, P1-DIMMC1, P1-DIMMD1, P2-DIMME1, P2-DIMMF1, P2-DIMMG1, and P2-DIMMH1

▶Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

RAS Mode

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

Memory Rank Sparing

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

Patrol Scrub

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

Patrol Scrub Interval

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

Demand Scrub

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

Device Tagging

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

▶South Bridge Configuration

The following South Bridge information will display:

▶USB Configuration

- USB Module Version

- USB Devices

Legacy USB Support

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

XHCI (Extensible Host Controller Interface) Hand-Off

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

EHCI (Enhanced Host Controller Interface) 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 to support I/O port 60h/64h emulation, 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, and Disabled.

EHCI1

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

EHCI2

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

Azalia

Select Enabled to enable onboard Azalia audio devices. Select Auto for the BOIS to automatically enable Azalia support when an onboard Azalia device is detected. The settings are **Auto**, Enabled, and Disabled.

Azalia PME Enable

Select Enabled to enable PME (Power Management Event) support for Azalia audio devices. 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:

Support Aggressive Link Power Management

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

SATA Port 0~ Port 5

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

- Model number of drive and capacity

- Software Preserve Support

SATA Port 0~ Port 5

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

Port 0 ~ Port 5 Hot Plug

Select Enabled to support hot-plugging for a device installed on a SATA port specified by the user, which will allow the user to change, remove, or install a device 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 installed (present) or not.

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

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

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

Support Aggressive Link Power Management

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

SATA RAID Option ROM/UEFI Driver

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

SATA/sSATA RAID Boot Select

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

Serial ATA Port 0~ Port 5

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

- Model number of drive and capacity

- Software Preserve Support

SATA 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 support hot-plugging for a device installed on a SATA port specified by the user, which will allow the user to change, remove, or install a device 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 COMRE-SET 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-sSATA controller and displays the following items:

sSATA Controller

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

Configure sSATA as

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

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

Support Aggressive Link Power Management

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

sSATA Port 0~ Port 3

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

- Model number of drive and capacity

- Software Preserve Support

Port 0 ~ Port 5 Hot Plug

Select Enabled to support hot-plugging for a device installed on an sSATA port specified by the user, which will allow the user to change, remove, or install a device 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 COMRE-SET 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 con-nected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

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

sSATA Port 0~ Port 3

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

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 con-nected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

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

Support Aggressive Link Power Management

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

sSATA RAID Option ROM/UEFI Driver

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

SATA/sSATA RAID Boot Select

Select SATA Controller to use a device supported by the SATA connector for system boot. Select sSATA Controller to use a device supported by the sSATA connector for system boot. The options are None, SATA Controller, **sSATA Controller**, and Both.

sSATA Port 0~ Port 3

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

- Model number of drive and capacity

- Software Preserve Support

sSATA Port 0~ Port 3

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

Port 0 ~ Port 5 Hot Plug

Select Enabled to support hot-plugging for a device installed on an sSATA port specified by the user, which will allow the user to change, remove, or install a device 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 COMRE-SET 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

- Recovery Firmware Version

- ME Firmware Features

- ME Firmware Status #1

- ME Firmware Status #2

    - Current State

    - Error Code

▶PCIe/PCI/PnP Configuration

PCI Bus Driver Version

PCI Devices Common Settings

PCI PERR/SERR Support

Select Enabled to support PERR (PCI/PCI-E Parity Error)/SERR (System Error) runtime error reporting for a PCI/PCI-E slot. The options are Enabled and **Disabled**.

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

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

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

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

Maximum Payload

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

Maximum Read Request

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

ASPM Support

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

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

MMIOHBase

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

MMIO High Size

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

PCI Devices Option ROM Setting

CPU1 Slot1 PCI-E 3.0 x8 (in x16)/CPU2 Slot2 PCI-E 3.0 x4 (in x8) /CPU1 Slot3 PCI-E 3.0 x16/CPU1 Slot5 PCI-E 3.0 x16/PCH Slot6 PCI-E 2.0 x4 (in x8)

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

Onboard LAN Option ROM Type

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

Onboard LAN1 Option ROM/Onboard LAN2 Option ROM

Use this option to select the type of device installed in LAN Port1, LAN Port2 or the onboard video device used for system boot. The default setting for LAN1 Option ROM is **PXE**, for LAN2 Option ROM is **Disabled**.

Network Stack

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

▶**Super IO Configuration**

Super IO Chip NCT6776

▶**Serial Port1 Configuration**

Serial Port 1

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

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1. 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).

▶Serial Port Console Redirection

COM 1

COM 1 Console Redirection

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

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

▶COM1 Console Redirection Settings

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

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

Redirection After BIOS Post

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

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

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

EMS Console Redirection

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

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

▶EMS Console Redirection Settings (Available when EMS Console Redirection is enabled)

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

Out-of-Band Management Port

The feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The default setting is **COM1**.

Terminal Type

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

Bits Per Second

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

Flow Control

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

The setting for each these features is displayed:

Data Bits, Parity, Stop Bits

▶Trusted Computing (Available when a TPM device is installed and detected by the BIOS)

Configuration

Security Device Support

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

TPM State

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

Pending Operation

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

> **Note**: Your system will need to reboot for a pending TPM operation to be carried out.

Current Status Information

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

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

▶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 Instruc-

tion embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

NUMA (Available when the OS supports this feature)

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

▶Intel® Thunderbolt

The following Thunderbolt information will be displayed:

- Intel® Thunderbolt Configuration

- Thunderbolt Specification Version

- Intel® Sample Code Version

- Thunderbolt Host Chip

Intel® Thunderbolt Technology

Use this feature to enable or disable the wake-up feature on a Thunderbolt device. The options are Disabled and **Enabled**.

Security Level

Use this item to specify the security level for the Intel Thunderbolt port(s). The options are **Legacy Mode**, Unique ID, One time saved key, and DP++ only.

Wake Up From Thunderbolt Devices

This feature allows a Thunderbolt device to wake up the system. The options are **Enabled** and Disabled.

AIC Support

This item allows you to apply the Go2Sx command before a Thunderbolt device goes to sleep mode. The options are **Enabled** and Disabled.

AIC Location

Use this item to specify the Thunderbolt AIC location. The options are SB PCIE D28F0, SB PCIE D28F1, SB PCIE D28F2, SB PCIE D28F3, **SB PCIE D28F4**, SB PCIE D28F5, SB PCIE D28F6, SB PCIE D28F7.

Thunderbolt PCIe Cache-line Size

Use this item to configure the cache-line size value on the Thunderbolt PCIe subtree. The options are 0, 1, 2, 4, 8, 16, **32**, 64, 128.

SMI/Notify Support

Select Enabled to enable the SMI notification support. The options are **Enabled** and Disabled.

SwSMI Support

Select Enabled to enable software SMI support in ASL code. The options are **Enabled** and Disabled.

Notify Support

Select Enabled to enable notification support in ASL code. The options are **Enabled** and Disabled.

Ignore Thunderbolt Optoin ROM

Use this feature to enable or disable ignore Thunderbolt Device Option Rom. Enabling this feature will skip TBT Option Rom at POST time. Disabling this feature will execute TBT Option Rom at POST time. The options are **Enabled** and Disabled.

Thunderbolt SwSMI Delay

Use this feature to configure the Thunderbolt Software SMI Delay. Enter a numeric value in milliseconds. Default is **0**.

TBT Device IO resource Support

This feature enables or disables the Thunderbolt IO resource. The options are **Disabled** and Enabled.

Reserved Mem per phy slot

Use this feature to configure the Thunderbolt reserved memory for each physical slot. If a PCIe device consumes <X MB of memory, the BIOS will reserve X MB per physical slot.

Reserved PMem per phy slot

Use this feature to configure the Thunderbolt reserved prefetchable memory for each physical slot. If a PCIe device consumes <X MB of prefetchable memory, the BIOS will reserve X MB per physical slot.

▶NCT7904D HW Monitor

This submenu displays system health monitoring information on the following items as detected by the BIOS:

- CPU1 Temperature

- CPU2 Temperature

- PCH Temperature

- System Temperature

- Fan1 Speed - Fan6 Speed & FanA Speed

- 1.05V

- 1.5V

- 5VSB

- 5V

- 12V

- CPU1 VCore/CPU2 VCore

- VDIMM AB/VDIMM CD/VDIMM EF/VDIMM GH

- 3.3V

- 3.3VSB

- VBAT

- DIMMA1 Temperature/DIMMB1 Temperature/DIMMC1 Temperature/DIMMD1 Temperature/DIMME1 Temperature/DIMMF1 Temperature/DIMMG1 Temperature/DIMMH1 Temperature

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

Erasing Settings

Erase Event Log

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

When Log is Full

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

SMBIOS Event Log Standard Settings

Log System Boot Event

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

MECI (Multiple Event Count Increment)

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

METW (Multiple Event Count Time Window)

This item is used to determine how long (in minutes) 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   Security Settings

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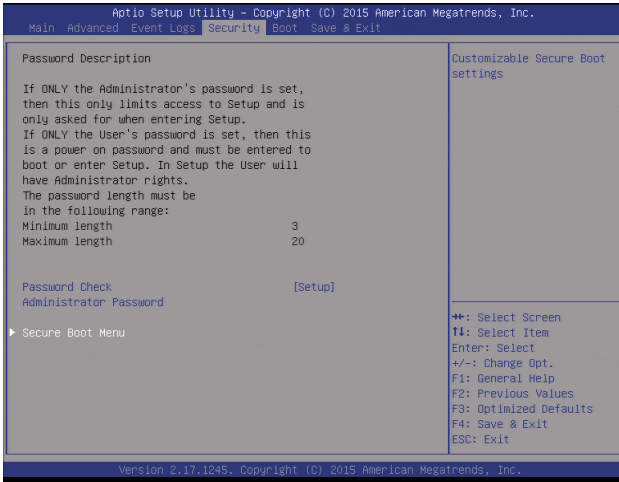
Password Check

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

Administrator Password

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

▶Secure Boot Menu

System Mode

Secure Boot

Secure Boot

Select Enabled for the system to bootup securely. The options are Enabled and **Disabled**.

Secure Boot Mode

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

▶**Key Management**

Default Keys Provision

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

▶**Enroll All Factory Default Keys**

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

▶**Save All Secure Boot Variables**

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

Platform Key (PK)

▶**Delete PK**

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

▶**Set New Key**

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

Key Exchange Key (KEK)

▶**Delete KEK (Key Exchange Key)**

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

▶**Set New KEK (Key Exchange Key)**

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

▶**Append KEK (Key Exchange Key)**

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

Authorized Signatures

▶**Delete DB (DataBase)**

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

▶**Set New DB (DataBase)**

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

▶**Append DB (DataBase)**

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

Authorized TimeStamps

▶**Delete DBT (DataBase Timer)**

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

▶**Set New DBT (DataBase Timer)**

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

▶**Append DBT (DataBase Timer)**

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

Forbidden Signatures

▶**Delete DBX**

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

▶**Set New DBX**

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

▶**Append DBX (DataBase Timer)**

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

4-6   Boot Settings

Use this feature to configure Boot Settings:
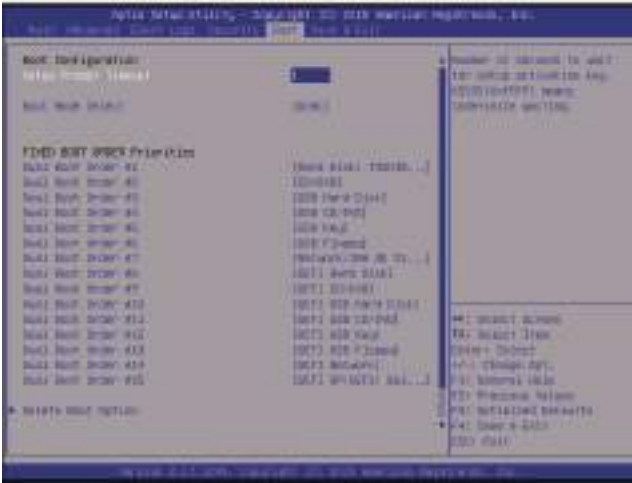
Boot Configuration

Setup Prompt Timeout

Use the keyboard to enter the number of seconds for the system to wait before the setup activation key is enabled at bootup. 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.

- Boot Order #1

- Boot Order #2

- Boot Order #3

- Boot Order #4

- Boot Order #5

- Boot Order #6

• Boot Order #7

• Boot Order #8

• Boot Order #9

• Boot Order #10

• Boot Order #11

• Boot Order #12

• Boot Order #13

• Boot Order #14

• Boot Order #15

▶**Delete Boot Option**

This feature allows the user to remove a device from the list of onboard bootable devices.

4-7   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 any 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

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

Save Options

Save Changes

When you have completed the 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 and return to the AMI BIOS setup utility.

Restore Optimized Defaults

Select Restore Optimized Defaults from the Exit menu and press <Enter> to load the manufacture default settings. These settings are designed for maximum system performance but not for maximum stability.

Save as User Defaults

Select Save as User Defaults from the Exit menu and press <Enter> to save any changes to the BIOS setup for future use.

Restore User Defaults

Select Restore User Defaults from the Exit menu and press <Enter> to retrieve user-defined settings that were previously saved.

Boot Override

Use this feature 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

BIOS POST Error Beep Codes

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

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

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

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

A-1   BIOS POST Error Beep Codes

BIOS POST Error Beep Codes		
Beep Code/LED	**Error Message**	**Description**
1 beep	Refresh	Ready to boot
5 short beeps + 1 long beep	Memory error	No memory detected in the system
5 beeps	No Con-In or no Con-Out devices	Con-In includes USB or PS/2 keyboard, PCI or Serial Console Redirection. Con-Out includes Video Controller, PCI or Serial Console Redirection.

Notes

Appendix B

Software Installation Instructions

B-1   Installing Software Programs

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

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

After creating a DVD with the ISO files, insert the disk into the DVD drive on your system and the display shown in Figure B-1 should appear.

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

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

Driver/Tool Installation Display Screen

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

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

B-2   Configuring SuperDoctor® 5

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

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

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

SuperDoctor 5 Interface Display Screen (Health Information)

Appendix C

UEFI BIOS Recovery Instructions

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

C-1   An Overview to the UEFI BIOS

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

C-2   How to Recover the UEFI BIOS Image (-the Main BIOS Block)

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The boot block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a new BIOS image if the original main BIOS image is corrupted. When the system power is on, the boot block codes execute first. Once it is completed, the main BIOS code will continue with system initialization and bootup.

> **Note:** Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS boot crashes. However, when the BIOS boot block crashes, you will need to follow the procedures below for BIOS recovery.

C-3   To Recover the Main BIOS Block Using a USB-Attached Device

This feature allows the user to recover a BIOS image using a USB-attached device without additional utilities used. A USB flash device such as a USB Flash Drive, or a USB CD/DVD ROM/RW device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

The file system supported by UEFI is FAT (including FAT12, FAT16, and FAT32) installed on a bootable or non-bootable USB-attached device. However, the BIOS

might need several minutes to locate the SUPER.ROM file if the media size be-comes too large because it contains too many folders and files.

To perform UEFI BIOS recovery using a USB-attached device, follow the instruc-tions 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 you hear two short beeps. This may take from a few seconds to one minute.

    Note: If the system fails to locate the BIOS binary image, four short beeps will sound and trigger a system reboot. 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.)

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

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

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

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

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

7. Using a different system, extract the BIOS package into a bootable USB flash drive.

8. When a DOS prompt appears, enter FLASH.BAT BIOSname.### at the prompt.

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

9. After seeing the message that BIOS update is completed, unplug the AC power cable from the power supply to clear the CMOS, and then plug the AC power cable in the power supply again to power on the system.

10. Press <Del> continuously to enter the BIOS Setup utility.

11. Press <F3> to load default settings.

12. After loading default settings, press <F4> to save the settings and exit the BIOS Setup utility.

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