SUPER●®

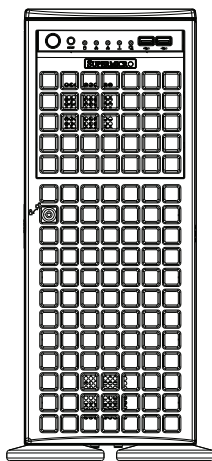## SUPERSERVER

7047R-TXRF

USER'S MANUAL

Revision 1.0

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

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

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

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

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

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

WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

Manual Revision 1.0
Release Date: May 14, 2012

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

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

Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 7047R-TXRF server. Installation and maintenance should be performed by experienced technicians only.

The SuperServer 7047R-TXRF is based on the SC747TQ-R1K28NBP 4U/Tower rackmount server chassis and the Super X9DRX+-F serverboard. Please refer to our web site for an up-to-date list of supported operating systems, processors and memory.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X9DRX+-F serverboard and the SC747TQ-R1K28NBP chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the system into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the system.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DRX+-F serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter

when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC747TQ-R1K28NBP 4U/Tower rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS POST Messages

Appendix B: System Specifications

Notes

Table of Contents

Chapter 1

Introduction

1-1   Overview

The SuperServer 7047R-TXRF is comprised of two main subsystems: the SC747TQ-R1K28NBP 4U/Tower server chassis and the X9DRX+-F dual Intel Xeon processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com).

In addition to the serverboard and chassis, various hardware components have been included with the server, as listed below:

- Two 3.8-cm 4-pin PWM fan assemblies (FAN-0082L4)

- Four 9.2x3.8 cm 4-pin PWM fan assemblies (FAN-0114L4)

- Two 4U active CPU heatsinks (SNK-P0050AP4)

- SATA accessories:
  One HD backplane (BPN-SAS-747TQ)
  Eight 3.5" hard disk drive trays (MCP-220-00094-0B)
  Three 5.25" drive trays (MCP-220-00073-0B)

- One SuperServer 7047R-TXRF User's Manual

- One (1) Supermicro CD containing drivers and utilities

Optional
- One 4U 17.2" width rack rail set (MCP-290-00059-0N)

1-2   Serverboard Features

At the heart of the SuperServer 7047R-TXRF lies the X9DRX+-F, a dual processor serverboard based on the Intel C602 chipset. Below are the main features of the X9DRX+-F. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X9DRX+-F supports two Intel® E5-2600 Series processors in LGA 2011 sockets (Socket R). Please refer to the serverboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9DRX+-F has sixteen DIMM slots that can support up to 512 GB of DDR3-1333/1066/800 RDIMM, LRDIMM or UDIMM ECC/non-ECC memory. Modules of the same size and speed are recommended. See Chapter 5 for details.

Serial ATA

A SATA controller is integrated into the chipset to provide a ten-port SATA subsystem, which is RAID 0, 1, 5 and 10 supported. I-SATA 0/1 are SATA 3.0 ports and I-SATA2-5 and S-SATA0-3 are SATA 2.0 ports. The SATA drives are hot-swappable units.

Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the Serial ATA drives.

PCI Expansion Slots

The X9DRX+-F has ten PCI-E 3.0 x8 and one PCI-E 2.0 x4 (in x8) slots for a total of eleven PCI expansion slots.

Rear I/O Ports

The color-coded I/O ports include one COM port, a VGA (monitor) port, four USB 2.0 ports, a dedicated IPMI LAN port and two Gb Ethernet LAN ports.

IPMI

IPMI (Intelligent Platform Management Interface) is a hardware-level interface specification that provides remote access, monitoring and administration for Supermicro server platforms. IPMI allows server administrators to view a server's

hardware status remotely, receive an alarm automatically if a failure occurs, and power cycle a system that is non-responsive.

1-3   Server Chassis Features

The following is a general outline of the main features of the SC747TQ-R1K28NBP server chassis.

System Power

The SC747TQ-R1K28NBP chassis includes a 1280W high-efficiency, redundant (1+1) power supply consisting of two power supply modules. In the unlikely event a power supply module fails, replacement is simple and can be done without tools. The AC power cord should be removed from the system before servicing or replacing a power supply module. See Chapter 6 for details.

Mounting Rails (optional)

The SC747 can be placed in a rack for secure storage and use. To setup your rack, follow the step-by-step instructions included in this manual in Chapter 2.

Hard Drive/Drive Bays

The SC747 chassis features eight drive bays for SATA drives. These drives are hot-swappable. Once set up correctly, these drives can be removed without powering down the server.

The SC747 chassis also provides three 5.25" peripheral drive bays for floppy drives, DVD-ROM/CD-ROM drives, or additional hard drives.

Control Panel

The control panel on the server provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity, system overheat, UID and power supply failure. A main power button and a system reset button are also included.

Cooling System

The SC747 chassis accepts four system fans and two rear exhaust fans. System fans are powered from the serverboard. These fans are 4U high and are powered by 4-pin connectors.

**Figure 1-1. Intel C602 Chipset:
System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.
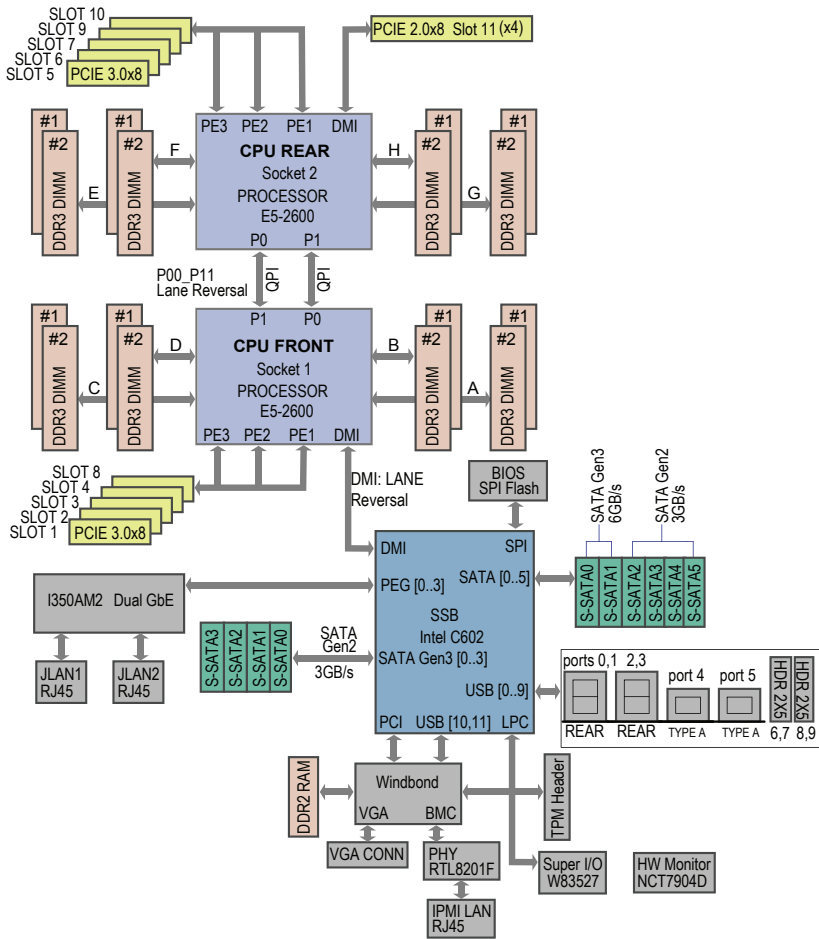
1-4   Contacting Supermicro

Headquarters

Address: Super Micro Computer, Inc.

                    980 Rock Ave.

                    San Jose, CA 95131 U.S.A.

Tel: +1 (408) 503-8000

Fax: +1 (408) 503-8008

Email: marketing@supermicro.com (General Information)

                    support@supermicro.com (Technical Support)

Web Site: www.supermicro.com

Europe

Address: Super Micro Computer B.V.

                    Het Sterrenbeeld 28, 5215 ML

                    's-Hertogenbosch, The Netherlands

Tel: +31 (0) 73-6400390

Fax: +31 (0) 73-6416525

Email: sales@supermicro.nl (General Information)

                    support@supermicro.nl (Technical Support)

                    rma@supermicro.nl (Customer Support)

Asia-Pacific

Address: Super Micro Computer, Inc.

                    4F, No. 232-1, Liancheng Rd.

                    Chung-Ho Dist., New Taipei City 235

                    Taiwan

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3991

Web Site: www.supermicro.com.tw

Technical Support:

Email: support@supermicro.com.tw

Tel: 886-2-8228-1366, ext.132 or 139

Notes

Chapter 2

System Setup

2-1   Overview

This chapter provides a quick setup checklist to get your SuperServer 7047R-TXRF server up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2   Unpacking the System

You should inspect the box the SuperServer 7047R-TXRF server was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for setting up and operating the SuperServer 7047R-TXRF server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet.

Warnings and Precautions!

- Review the electrical and general safety precautions in Chapter 4.

- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.

- Allow the power supply units and Serial ATA drives to cool before touching them.

- To maintain proper cooling, always keep all chassis panels closed when not being serviced.

2-3   Preparing for Setup

The box your server was shipped in may include two sets of rail assemblies, two rail mounting brackets and the mounting screws needed to install the system into the rack (optional parts). Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).

- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

!   **Warnings and Precautions!**   !

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.

- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.

- Always make sure the rack is stable before extending a component from the rack.

- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

- Rack-mounted equipment should not be used as a shelf or work space.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.

- Determine the placement of each component in the rack *before* you install the rails.

- Install the heaviest server components on the bottom of the rack first, and then work up.

- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.

- Allow the hot plug SMicro12

- drives and power supply modules to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4   Installing the Chassis onto a Rack

This section provides information on installing the SC747 chassis into a rack unit with the optional 4U 17.2" width rail set (MCP-290-00059-0B). There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Notes: The outer rail is adjustable from 26" to 38.25". The MCP-290-00059-0N rail kit is an optional accessory.

Removing the Chassis Cover and Feet

The SC747 chassis is shipped with the chassis cover and feet pre-installed. Both the feet and cover must be removed for before installing the rails.

Removing the Chassis Top Cover

1. Locate the chassis cover lock (blue lever) at the rear of the chassis cover.

2. Slide the chassis cover lock to the right and push chassis cover forward.

3. Lift the chassis top cover off the chassis.

Removing the Chassis Feet

1. Place the chassis on its side with the chassis side cover facing upward.

2. Remove the screw holding the chassis foot in place.

3. The foot lock is a tab located in the center of the foot that prevents the foot from sliding. Using a flat head screwdriver, **gently** lift the foot lock upward and slide the foot toward the rear of the chassis.

4. Repeat steps 2 and 3 with each remaining foot.

Figure 2-1. Removing the Feet and Chassis Top Cover

Chassis Cover

Chassis Feet

Chassis Cover Lock
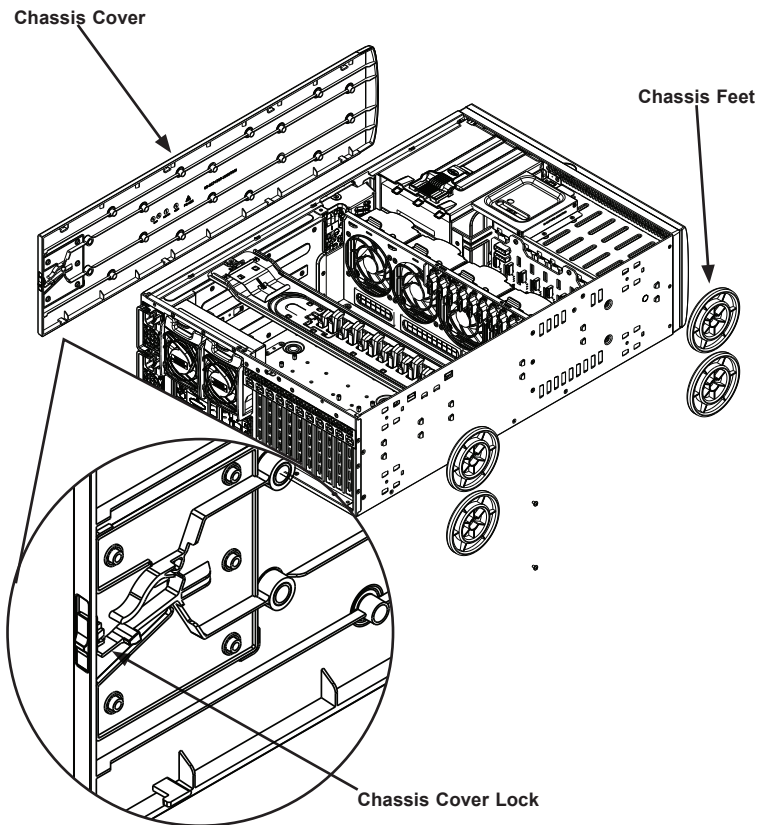
Identifying the Sections of the Rack Rails

The chassis package includes two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself.

Figure 2-2. Identifying the Inner Rails and Chassis Handles

Inner Rails
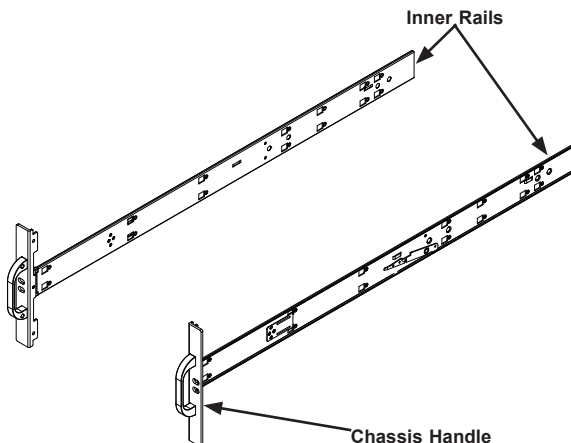
Chassis Handle

Installing the Chassis Handles and Inner Rails

Installing the Inner Rails

1. Locate the chassis handles and handle screws.

2. Align the chassis handle with the front of the chassis and secure with the three chassis handle screws.

3. Repeats steps 1 and 2 with the other handle.

4. Locate the inner rails and screws in the shipping package.

5. Align the inner rails against the chassis, as shown. Confirm that the rails are flushed against the edge of the chassis.

6. Tighten the screws. Do not over-tighten.

7. Repeat steps 5 and 6 with the other inner rail.

Figure 2-3. Installing the Inner Rack Rails
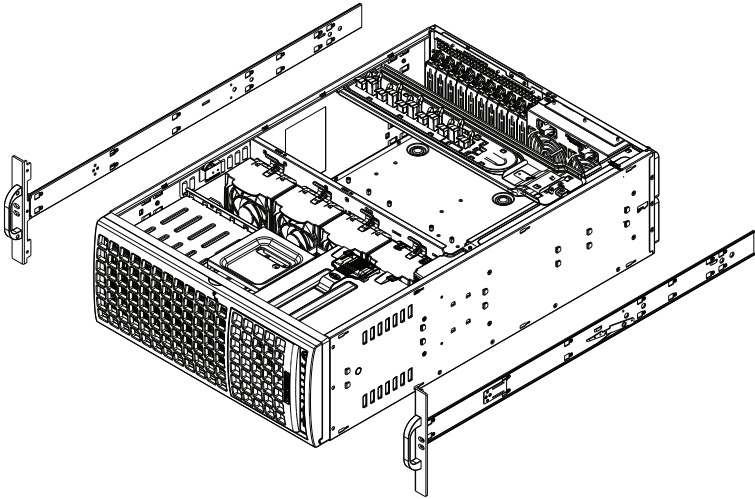
Installing the Outer Rails to the Rack

Installing the Outer Rails

1. Attach the rear bracket to the middle bracket.

2. Adjust both the brackets to the proper distance so that the rail fits snugly into the rack.

3. Secure the rear of the outer rail with two M5 screws and the rear of the rack.
   Note: The outer rail is adjustable from approximately 26" to 38.25".

4. Repeat steps 1-3 for the left outer rail.

Figure 2-4. Assembling the Outer Rails

Slide into the Inner Rail

Secure to the
Rear of the Rack

Attach to Middle Rail
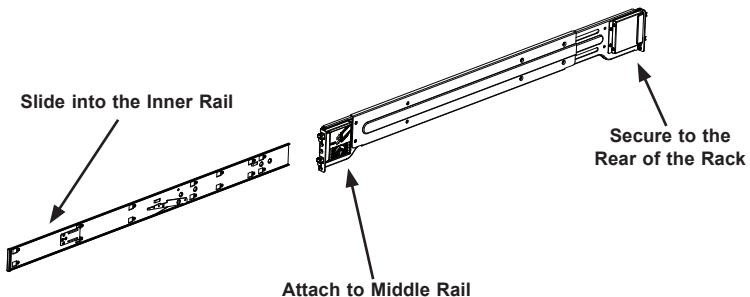
Figure 2-5. Installing the Rack Rails
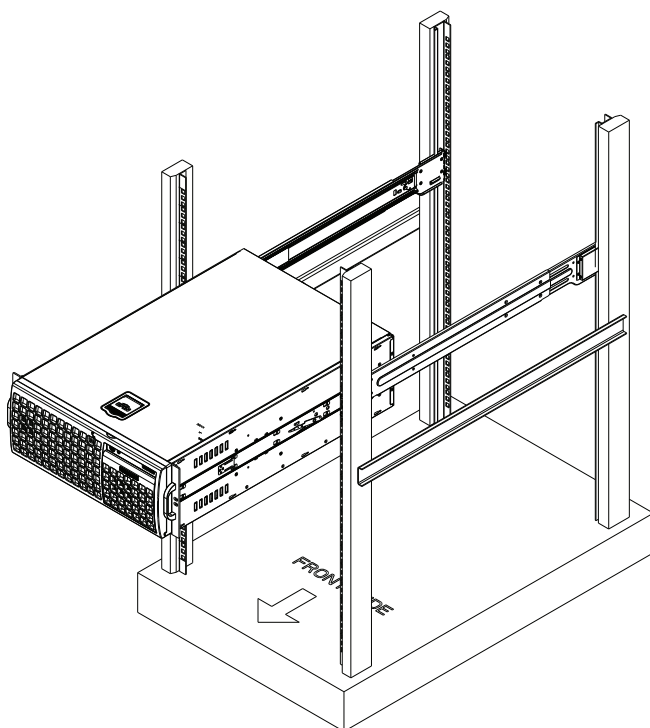
Installing the Chassis into a Rack

Installing the Chassis

1. Confirm that chassis includes the inner rails and the outer rails.

2. Align the inner chassis rails with the front of the outer rack rails (C).

3. Slide the inner rails into the outer rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). When the chassis has been pushed completely into the rack, you should hear the locking tabs "click" into the locked position.

2-5   Tower Mounting Instructions

The SC747 chassis is shipped with the chassis cover and feet pre-installed. To use the chassis as a desktop server, no other installation is required.

Use the instructions in this section if you have converted the chassis for rack use and need to return the chassis to tower mounting.

Figure 2-6. Adding Chassis Feet and Top Cover
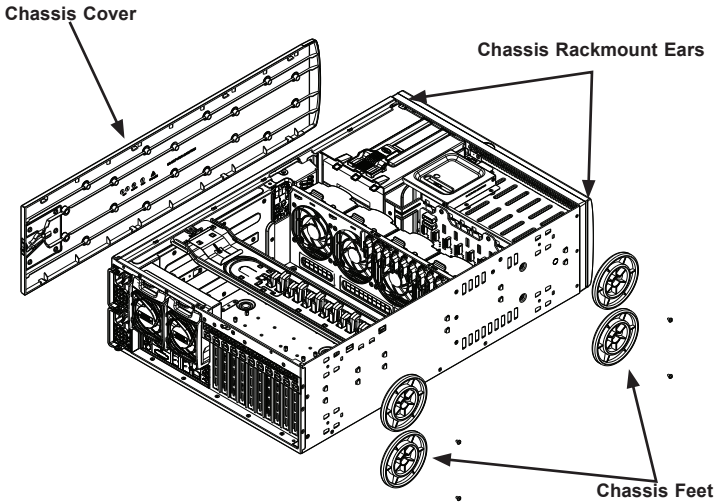
Installing the Chassis Cover

Installing the Cover

1. Remove the rack mount ears.

2. Align the cover post with the corresponding holes on the top of the chassis and place the cover on top of the chassis. The cover should overhang approximately one-half inch over the front of the chassis.

3. Slide the chassis cover toward the rear of the chassis to lock the cover into place.

Figure 2-7. Placing Chassis Feet
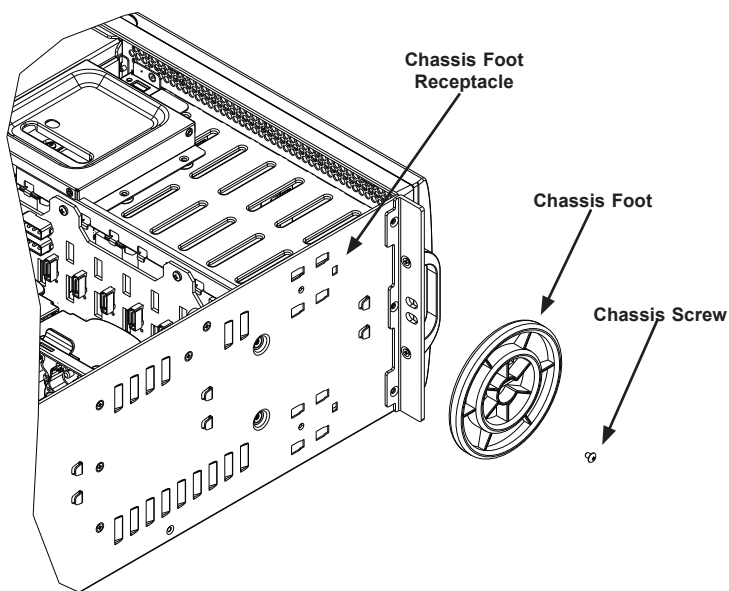
Installing Feet on the Chassis

Installing the Chassis Feet

1. Place the chassis foot in the foot receptacle and slide the foot toward the front of the chassis. The foot should lock into place.

2. Secure the foot to the chassis using one screw enclosed in the packaging.

3. Repeat steps 1 and 2 for the remaining three chassis feet.

Chapter 3

System Interface

3-1   Overview

There are several LEDs on the control panel as well as others on the drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are two buttons on the chassis a control panel: a reset button and an on/off switch. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

Figure 3-1. Front LEDs
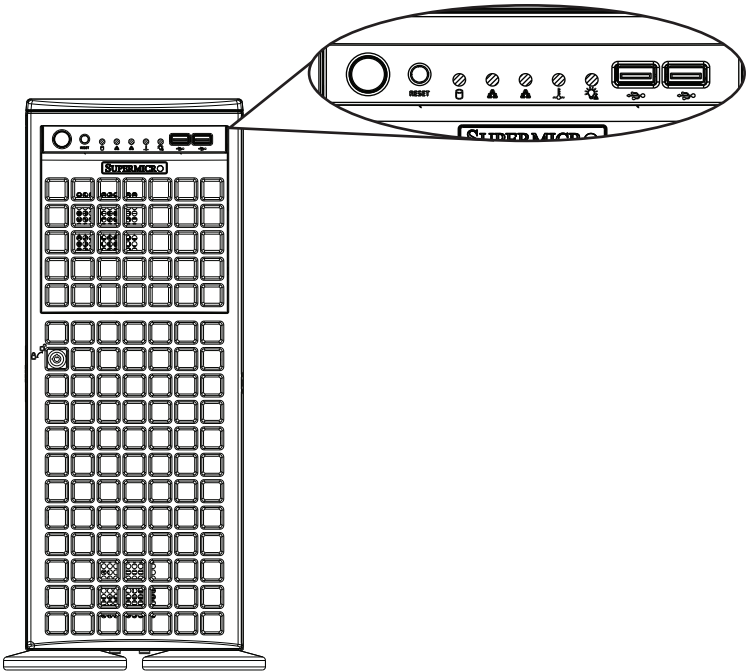
3-2   Control Panel Buttons

There are two push-buttons located on the front of the chassis. These are power on/off button and a reset button.

Power

The main power switch is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system. Therefore, you must unplug system before servicing.
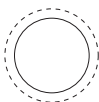
Reset

The reset button is used to reboot the system.

3-3   Control Panel LEDs

The control panel located on the front of the SC747 chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

HDD

Indicates IDE channel activity. SAS/SATA and/or DVD-ROM drive activity when flashing.

NIC1

Indicates network activity on GLAN1 when flashing.

NIC2

Indicates network activity on GLAN2 when flashing.

Overheat/Fan Fail

When this LED flashes it indicates a fan failure. When continuously on (not flashing) it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly. This LED will remain flashing or on as long as the overheat condition exists.

Power Fail

Indicates a power failure to the system's power supply units.

3-4   Drive Carrier LEDs

Each SAS/SATA drive carrier has two LEDs.

- Green: Each drive carrier has a green LED. When illuminated, this green LED (on the front of the drive carrier) indicates drive activity. A connection to the SATA backplane enables this LED to blink on and off when that particular drive is being accessed.

- Red: The red LED indicates a SAS/SATA drive failure. If one of the SAS/SATA drives fail, you should be notified by your system management software.

Chapter 4

System Safety

4-1   Electrical Safety Precautions

⚠️ Note: power should always be disconnected before performing any service
on the system.

Basic electrical safety precautions shall be followed to protect yourself from harm
and the server from damage:

- Be aware of the locations of the power on/off switch on the chassis as well
  as the room's emergency power-off switch, disconnection switch or electrical
  outlet. If an electrical accident occurs, you can then quickly remove power from
  the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or in-
  stalling main system components, such as the serverboard, memory modules
  and floppy drive. When disconnecting power, you should first power down the
  system with the operating system first and then unplug the power cords of all
  the power supply units in the system.

- When working around exposed electrical circuits, another person who is familiar
  with the power-off controls should be nearby to switch off the power if neces-
  sary.

- Use only one hand when working with powered-on electrical equipment. This
  is to avoid making a complete circuit, which will cause electrical shock. Use
  extreme caution when using metal tools, which can easily damage any electrical
  components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection
  from electrical shock. Instead, use rubber mats that have been specifically
  designed as electrical insulators.

- The power supply power cords must include a grounding plug and must be
  plugged into grounded electrical outlets.

- This product may be connected to an IT power system. In all cases, make sure that the unit is also reliably connected to Earth (ground).

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032). Dispose of used batteries according to the manufacturer's instructions.

- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

4-2   General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the server clean and free of clutter.

- The server weighs approximately 76 lbs. (34.5 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3   ESD Precautions

Electrostatic Discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

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

- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

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

- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

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

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

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

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

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the system is operating to ensure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery

LITHIUM BATTERY

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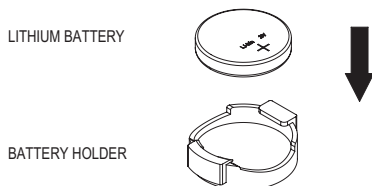
Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency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

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install the X9DRX+-F serverboard into the chassis, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the serverboard to better cool and protect the system.

5-1   Handling the Serverboard

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

- Use a grounded wrist strap designed to prevent Electrostatic Discharge (ESD).

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

- Handle a 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 serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

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

Unpacking

The serverboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

5-2   Connecting Cables

Several cables need to be connected from the chassis to the serverboard. These include the data cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the serverboard layout for connector locations.)

- SATA drive data cables (I-SATA0 ~ SATA7)

- Control Panel cable (JF1)

Important! Make sure the the cables do not come into contact with the fans.

Connecting Power Cables

The X9DRX+-F has a 24-pin proprietary power supply connector (JPW1) for connection to the ATX power supply. In addition, there are two 8-pin secondary power connectors (JPW2, JPW3) that also must be connected to your power supply. See Section 5-8 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See below for details and pin descriptions.

Figure 5-1. Control Panel Header Pins

	20	19	
Ground	○	○	NMI
X	○	○	X
FP PWRLED	○	○	3.3 V
HDD LED	○	○	ID_UID_SW/3/3V Stby
NIC1 Link LED	○	○	NIC1 Activity LED
NIC2 Link LED	○	○	NIC2 Activity LED
Blue+ (OH/Fan Fail/ PWR FaiL/UID LED)	○	○	Red+ (Blue LED Cathode)
Power Fail LED	○	○	3.3V
Ground	○	○	Reset — Reset Button
Ground	○	○	PWR — Power Button
	2	1	
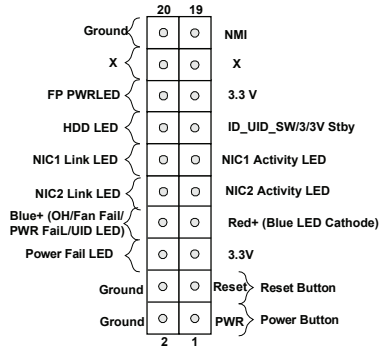
5-3 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. I/O Ports
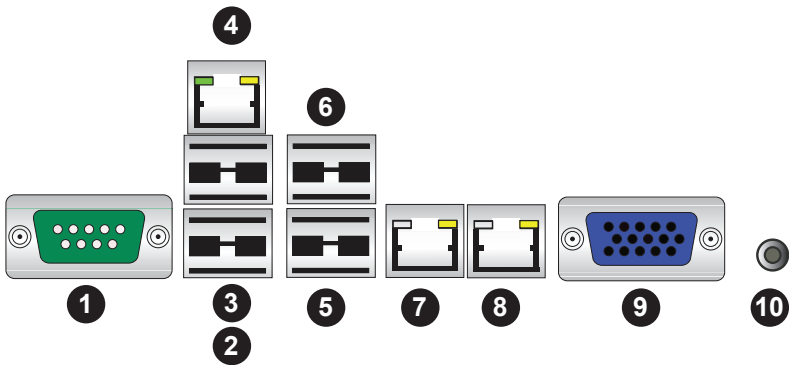
Rear I/O Ports	
1. COM1 Port	2. USB0 Port
3. USB1 Port	4. Dedicated IPMI LAN Port
5. USB2 Port	6. USB3 Port
7. LAN1 Port	8. LAN2 Port
9. VGA Port	10. UID Switch

5-4   Installing the Processor and Heatsink

!   When handling the processor package, avoid placing direct pressure on the label area of the fan.

Notes:

- Always connect the power cord last and always remove it before adding, re-moving or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.

- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.

- Make sure to install the serverboard into the chassis before you install the CPU heatsinks.

- When receiving a serverboard 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 web site for updates on CPU support.

Installing an LGA2011 Processor

Press down on the lever labeled 'Close 1st'

1. There are two levers on the LGA2011 socket. First press and release the load lever labeled 'Open 1st' on CPU socket 1.

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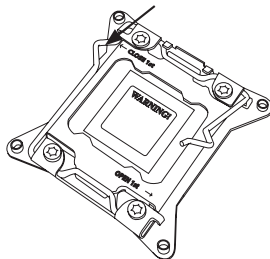
Pull lever away from the socket
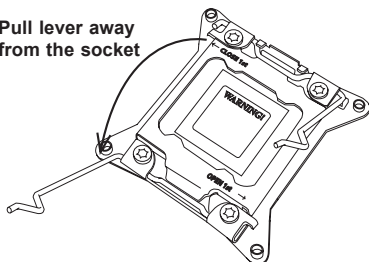
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

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

Gently push down to pop the load plate open.

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

6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)

Socket Keys

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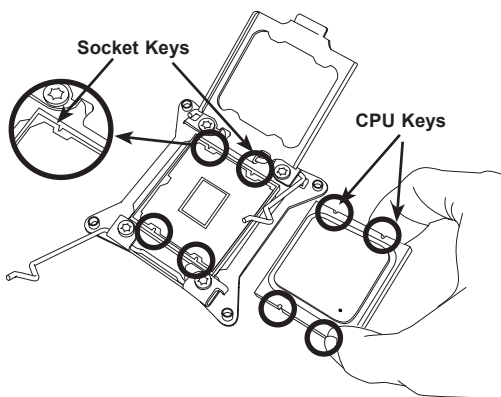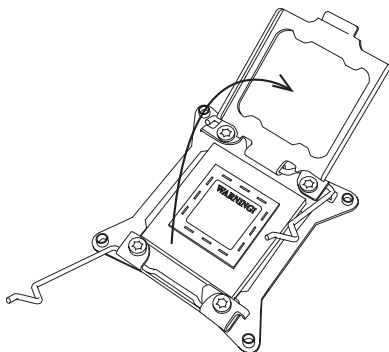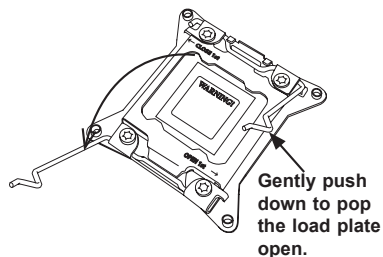
Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is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

7. With the CPU in the socket, inspect the four corners of the CPU to make sure that they are flush with the socket.

8. Close the load plate. Lock the lever labeled 'Close 1st', then lock the lever labeled 'Open 1st'. Use your thumb to gently push the load levers down until the lever locks.

9. Repeat steps to install a CPU to socket 2.

Gently close the load plate.
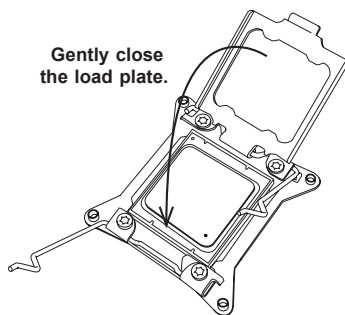
Push down and lock the level labeled 'Close 1st'.

Lever Lock

Push down and lock the lever labeled 'Open 1st'.
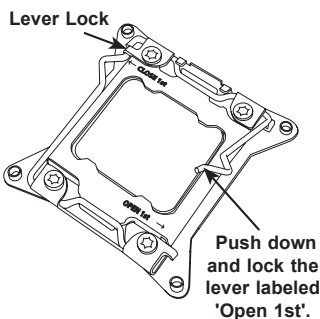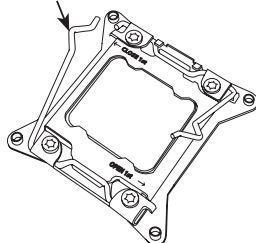
Installation and Removal of the Heatsink

Installing the 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 retention mechanism.

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

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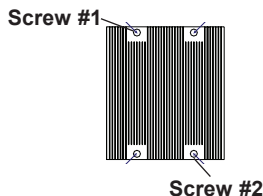
Uninstalling the Heatsink

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

1. Unscrew and remove the heatsink screws in the sequence shown in the picture on the right.

2. Hold the heatsink as shown in the picture on the right and gently wriggle to loosen it from the CPU. (Do not use excessive force when doing this!)

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

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease before you re-install the heatsink.
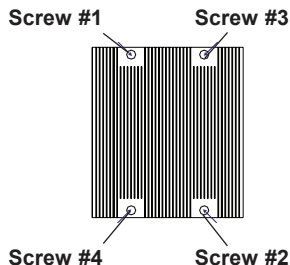
5-6   Installing Memory

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

Installing Memory Modules

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMM 1A. For best memory performance, please install memory modules of the same type and same speed on the memory slots as indicated on the tables below.

2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to avoid installing incorrectly (see Figure 5-3).

3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules.

Figure 5-3. DIMM Installation

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the alignment notch at the bottom.

To Remove:
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.

Notch   Notch

Front View

Note: Notch should align with the receptive key point on the slot.

Release Tab   Release Tab

Top View of DDR3 Slot
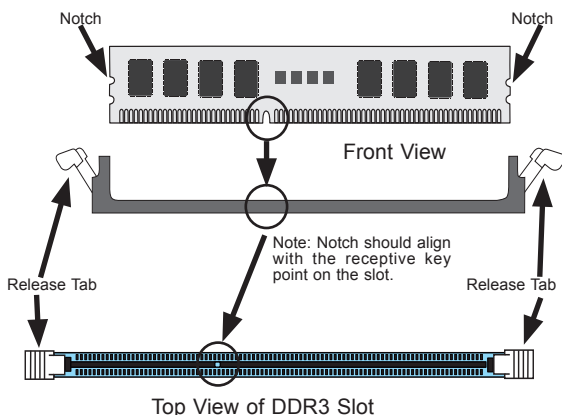
Memory Support for the X9DRX+-F Serverboard

The X9DRX+-F serverboard supports up to 512 GB of DDR3-1333/1066/800 RDIMM, LRDIMM or UDIMM ECC/non-ECC memory in 16 DIMM slots. See the following table for memory installation. For the latest memory updates, please refer to our website a at http://www.supermicro.com/products/serverboard.

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	P1-DIMMA2	P1-DIMMB2	P1-DIMMC2	P1-DIMMD2
CPU2	P2-DIMME1	P2-DIMMF1	P2-DIMMG1	P2-DIMMH1	P2-DIMME2	P2-DIMM F2	P2-DIMMG2	P2-DIMMH2

Processor and Memory Module Population for Optimal Performance	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table** **(For memory to work proper, please install DIMMs in pairs)**
1 CPU & **2 DIMMs**	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & **4 DIMMs**	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
1 CPU & **5~8 DIMMs**	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots
2 CPUs & **4 DIMMs**	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & **6 DIMMs**	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1
2 CPUs & **8 DIMMs**	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & **10~16 DIMMs**	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots
2 CPUs & **16 DIMMs**	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1,P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2

Notes:

- For optimal memory performance, please install DIMM modules in pairs (w/even number of DIMMs installed).

- All channels in a system will run at the fastest common frequency.

UDIMM Memory Support

Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (Note)		
SRx8 Non-ECC	1GB	2GB	4GB
DRx8 Non-ECC	2GB	4GB	8GB
SRx16 Non-ECC	512MB	1GB	2GB
SRx8 ECC	1GB	2GB	4GB
DRx8 ECC	2GB	4GB	8GB

Note: 1Gb/2Gb/4Gb DRAMs are supported; however, only 2Gb and 4Gb DRAMs are validated.

RDIMM Memory Support

Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (Note 1)		
SRx8	1GB	2GB	4GB
DRx8	2GB	4GB	8GB
SRx4	2GB	4GB	8GB
DRx4	4GB	8GB	16GB
QRx4	8GB	16GB	32GB
QRx8	4GB	8GB	16GB

Notes:
1. 1Gb/2Gb/4Gb DRAMs are supported; however, only 2Gb and 4Gb DRAMs are validated.
2. QR RDIMMs are supported but not validated. Memory testing are limited to system level testing. Signal integrity testing in interoperability testing are not performed. The passing QR RDIMMs will be posted on the website.

LRDIMM Memory Support

Ranks Per DIMM & Data Width (Note 1)	Memory Capacity Per DIMM (Note 2)	
QRx4 (DDP) (Note 5)	16GB	132GB
QRx8 (P) (Note 6)	8GB	16GB

Notes:
1. Physical Rank is used to calculate DIMM capacity.
2. Command Address Timing is 1N.
3. Only 2Gb/4Gb DRAMs are supported and validated.
4. The speeds listed are estimated only and will be verified through simulation.
5. DDP is for Dual Die Package DRAM stacking.
6. "P" Means "Planer Monolithic DRAM Die."

5-6   Adding PCI Add-On Cards

The SuperServer 7047R-TXRF server can support four PCI-E Gen. 3.0 x8 expansion cards and one PCI-E Gen. 2.0 x4 (in x8) expansion card.

Installing an Add-on Card

1. Locate the release tab on the top of the PCI slot bracket.

2. Gently apply pressure in the middle of the release tab to unlock the PCI slot bracket.

3. Pull the release tab upward.

4. Remove the screw holding the bracket in place and pull the bracket from the chassis.

Figure 5-7: Add-on Card/Expansion Card Port
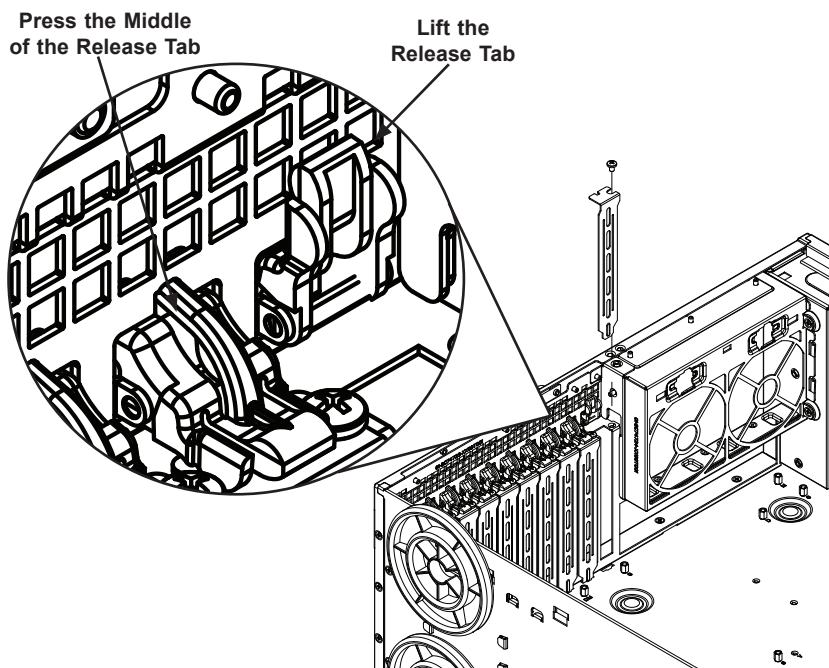
5-7   Serverboard Details

Figure 5-8. X9DRX+-F Layout
(not drawn to scale)
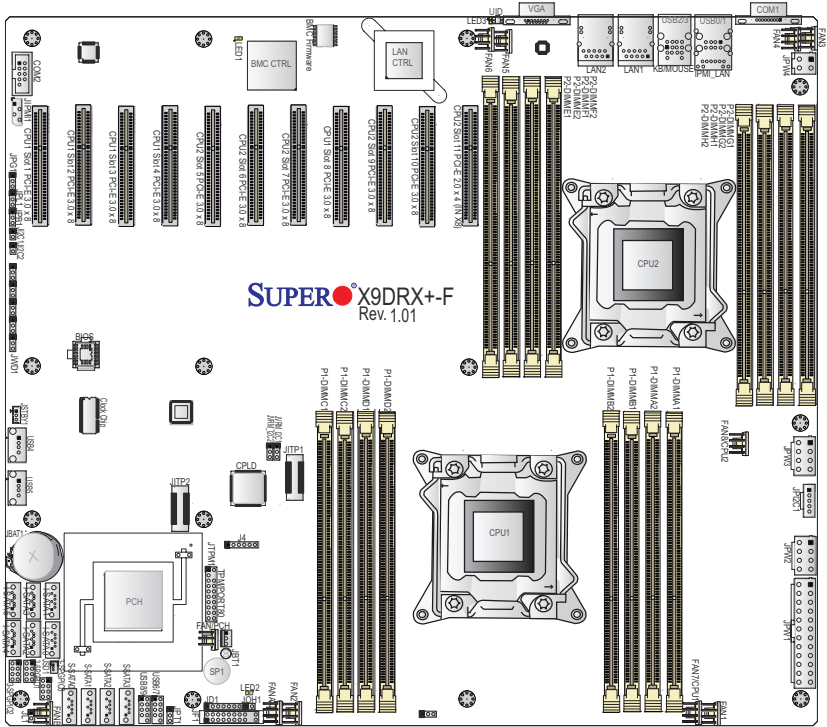
Note: Jumpers not indicated are for test purposes only.

X9DRX+-F Quick Reference

LED	Description	State	Status
LED1	BMC Heartbeat LED	Green: Blinking	BMC Normal
LED2	Onboard PWR LED	Green: On	Main Power On
LED3	UID Switch LED		

X9DRX+-F Jumpers

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JI²C1/JI²C2	SMB to PCI-E Slots	Off (Disabled)
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	GLAN1/GLAN2 Enable/Disable	Pins 1-2 (Enabled)
JPT1	TPM Enable/Disable	Pins 1-2 (Enabled)
JWD1	Watch Dog Timer Enable/Disable	Pins 1-2 (Reset)

Connectors	Description
COM1/COM2	Backplane COM Port1/Front Accessible COM2 Header
FAN#1~8, FAN#A, B	CPU/System Fan Headers (FAN7/FAN8: CPU 1/2 Fans)
FAN PCH	3-Pin PCH Fan Header
I-SATA 0/1, S-SATA 0~4	SATA 3.0 I-SATA#0/1 SATA 2.0 #0~4
I-SATA 2~5	Intel PCH SATA 2.0 Ports 2~5 (Color: Black)
JD1	Speaker/Power LED Indicator
JF1	Control Panel Header
JIPMI1	4-pin External BMC I²C Header (for an IPMI Card)
JL1	Chassis Intrusion Header
JOH1	Overheat LED Indicator
JPI²C1	Power Supply SMBbus I²C Header
JPW1	ATX 24-Pin Power Connector
JPW2/3	12V 8-Pin Power Connectors
JPW4	12V 4-Pin Power Connector
JSTBY1	3V Standby Power Header
JTPM1	TPM (Trusted Platform Module)/Port 80 Header
JSD1	SATA Device Power Connector
Keyboard/Mouse	PS2 Keyboard/Mouse
LAN1/LAN2	G-bit Ethernet Ports 1/2
(IPMI) LAN	IPMI_Dedicated LAN
3-SGPIO 1/2/3	Serial Link General Purpose I/O Headers
BP USB 0/1, 2/3	Back Panel USB 0/1, 2/3
USB 4, 5	Front Panel Type A USB Connections
USB 6/7, USB 8/9	Front Panel Accessible USB Connections
UID	UID (Unit Identification) Switch

5-8   Connector Definitions

Power Connections

A 24-pin main power supply connector (JPW1), two 8-pin CPU PWR connectors (JPW2/JPW3) and a 4-pin PWR connector (JPW4) are provided on the serverboard. These power connectors meet the SSI EPS 12V specification. All these power connectors must be connected to your power supply to ensure adequate power supply to your system. See the table on the right for pin definitions.

> **Warning**: To provide adequate power supply to the serverboard, be sure to connect the 24-pin PWR (JPW1), the 8-pin PWR connectors (JPW2, JPW3), and the 4-pin PWR connector (JPW4) to the power supply. Failure to do so will void the manufacturer warranty on your power supply and serverboard.

24-pin Main Power 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 Pin Definitions		12V 4-pin PWR Pin Definitions	
Pins	Definition	Pins	Definition
1~ 4	Ground	1/2	Ground
5~8	+12V	3/4	+12V

Required Connections

NMI Button

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

NMI Button Pin Definitions (JF1)

Pin#	Definition
19	Control
20	Ground

Power LED

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

Power LED Pin Definitions (JF1)

Pin#	Definition
15	3.3V
16	PWR LED

HDD 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 the LED connection 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
10	NIC 2 LED
11	Vcc
12	NIC 1 LED

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

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

OH/Fan Fail/ PWR Fail/Blue_UID LED Pin Definitions (JF1)	
Pin#	Definition
7	Red_LED-Cathode/OH/Fan Fail/ Power Fail5.5V.SB
8	Blue_UID LED

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

Power Fail LED

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

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

Reset Button

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

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

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - See Chapter 5). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table on the right for pin definitions.

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

Serial Ports

Two COM connections (COM1 & COM2) are located on the serverboard. COM1 is located on the rear I/O panel. COM2, located close to PCI-E CPU1 Slot1, provides front access support. See the table on the right for pin definitions.

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

NC = No Connection

Universal Serial Bus (USB)

Four Universal Serial Bus ports (USB 0/1, USB 2/3) are located on the I/O back panel. Please note that BP USB 2/3 can also be used for Keyboard/ Mouse connections. In addition, three USB headers, located close to the IO Hub, provides four front-accessible USB connections (USB USB 6/7, USB 8/9). Two Type A connectors (USB4, USB5) also supports front panel USB connections. (Cables are not included). See the tables on the right for pin definitions.

FP USB (USB 6/7, 8/9, USB 4, 5) Pin Definitions			
USB 4, 5, 6,8 Pin # Definition		USB 7, 9 Pin # Definition	
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	NC	5	Key

Backplane USB (0/1, 2/3) Pin Definitions	
Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	NA

Ethernet Ports

Two Gigabit Ethernet ports (LAN1, LAN2) are located on the I/O backplane. In addition, a dedicated IPMI LAN port is located above the USB 0/1 ports on the backplane to provide KVM support for IPMI 2.0. All these ports accept RJ45 type cables.

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

Unit Identifier Switch

A Unit Identifier (UID) Switch and two LED Indicators are located on the serverboard. The UID Switch is located next to the LAN ports on the backplane. The Rear UID LED (LED3) is located next to the UID Switch. The Front Panel UID LED is located at Pins 7/8 of the Front Control Panel at JF1. Connect a cable to Pin 8 on JF1 for Front Panel UID LED indication. When you press the UID switch, both Rear UID LED and Front Panel UID LED Indicators will be turned on. Press the UID switch again to turn off both LED Indicators. These UID Indicators provide easy identification of a system unit that may be in need of service.

Note: UID can also be triggered via IPMI on the serverboard. For more information on IPMI, please refer to the IPMI User's Guide posted on our Website @http://www.supermicro.com.

UID Switch	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Ground

UID LED (LE2) Status		
Color/State	OS	Status
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified

Fan Headers

This serverboard has ten system/CPU/PCH fan headers (Fan 1~Fan 8 Fan A, and Fan B) on the serverboard. Fans 7/8 are CPU fans. All these 4-pin fans headers are backward compatible with the traditional 3-pin fans. The fan speeds are controlled by IPMI. In addition to 4-pin fans, a 3-pin fan (Fan PCH), located next to the PCH chip, is also available for PCH cooling. See the table on the right for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation (Available for 4-pin fans only)

Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the serverboard. 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

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. (+)	Beep In
Pin 2	Neg. (-)	Alarm Speaker
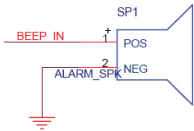
System Management Bus Header

A System Management Bus header for IPMI 2.0 is located at JIPMI1. Connect the appropriate cable here to use the IPMI I^{2}C connection on your system.

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

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)

Overheat LED/Fan Fail

The JOH1 header is used to connect an LED indicator to provide warnings of chassis overheating and fan failure. This LED will blink when a fan failure occurs. Refer to the tables on right for pin definitions.

Overheat LED Pin Definitions	
Pin#	Definition
1	5vDC
2	OH Active

OH/Fan Fail LED Status	
State	Message
Solid	Overheat
Blinking	Fan Fail

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

SATA Device Power Connector

A power connector for SATA DOM (Disk_On_Module) devices is located at JSD1. Connect an appropriate cable here to provide power support for your SATA devices.

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

3-SGPIO 1/2/3 Headers

Three SGPIO (Serial-Link General Purpose Input/Output) headers are located on the serverboard. These headers support Serial_Link interface for onboard SATA connections. See the table on the right for pin definitions.

3-SGPIO Pin Definitions			
Pin#	Definition	Pin	Definition
2	NC	1	NC
4	SATA_Data_Out0	3	Ground
6	Ground	5	SATA Load
8	NC	7	SATA Clock

NC = No Connection

Power LED/Speaker

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

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

Speaker Connector Pin Settings	
Pin Setting	Definition
Pins 4-7	External Speaker
Pins 6-7	Internal Speaker (Default)

5-9   Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, 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 serverboard layout pages for jumper locations.

Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.
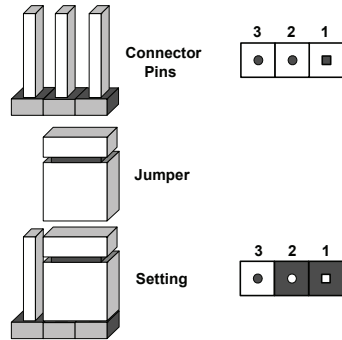
CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

1. First power down the system and unplug the power cord(s).

2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.

3. Remove the screwdriver (or shorting device).

4. Reconnect the power cord(s) and power on the system.

Note: *Do not use the PW_ON connector to clear CMOS*.

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

LAN1/2 Enable/Disable

Change the setting of jumper JPL1 to enable or disable the LAN1/LAN2 Ethernet ports on the serverboard. See the table on the right for jumper settings. The default setting is enabled.

LAN1/2 Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Watch Dog Enable/Disable

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application hangs. Jumping pins 1-2 will cause WD to reset the system if an application hangs. Jumping pins 2-3 will 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 BIOS.

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

Note: When enabled, the user needs to write their own application software in order to disable the Watch Dog Timer.

BMC Enable

Jumper JPB1 allows you to enable the embedded Nutovon (Baseboard Management) Controller to provide IPMI 2.0/KVM support on the serverboard. See the table on the right for jumper settings.

BMC Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	BMC Enable
Pins 2-3	Normal (Default)

I2C Bus to PCI-Exp. Slots

Jumpers JI^{2}C1 and JI^{2}C2 allow you to connect the System Management Bus (I^{2}C) to PCI-Express slots. The default setting is Open to disable the connection. See the table on the right for jumper settings.

I^{2}C to PCI-Exp Jumper Settings	
Jumper Setting	Definition
Closed	Enabled
Open	Disabled (Default)

5-10 Onboard Indicators

GLAN LEDs

There are two GLAN ports on the serverboard. An additional IPMI dedicated LAN port is also located above the USB 0/1 ports on the backpanel. Each Gigabit Ethernet LAN port has two LEDs. The yellow LED indicates activity, while the Link LED may be green, amber or off to indicate the speed of the connection. See the tables at right for more information.

Note: IPMI dedicated LAN does not operate at 1 Gbps.

Rear View (when facing the rear side of the chassis)
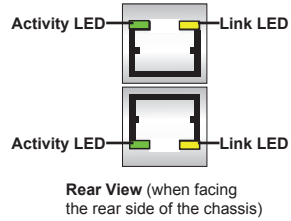
GLAN Activity Indicator LED Settings		
Color	Status	Definition
Green	Flashing	Active

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

Onboard Power LED

An Onboard Power LED is located at LED2 on the serverboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components. See the tables at right for more information.

Onboard PWR LED Indicator Settings	
LED Color	Definition
Off	System Off (PWR cable not connected)
Green	System On
Green: Flashing	ACPI S1 State

BMC Activity LED

A BMC Heartbeat LED is located at LED1 on the serverboard. When DM1 is blinking, BMC functions normally. See the table at right for more information.

BMC Activity LED Indicator LED Settings	
Green: Blinking	BMC is active

Unit Identification LED

A rear UID LED indicator (LED3) is located next to the Unit Identifier (UID) switch on the back of the chassis. When the user pushes the rear UID switch, the rear UID LED (LED3) will be turned on. Push the UID switch again to turn off the LED indicator. The UID switch provides easy identification of a system unit that may be in need of service. See the tables on the right for more information.

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

5-11 SATA Ports

Serial ATA Ports

There are ten SATA ports on the serverboard. I-SATA0/1 support SATA 3.0 connections. S-SATA0~3 and I-SATA2~5 are SATA 2.0 ports. See the table on the right for pin definitions.

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

5-12 Installing Software

After the hardware has been installed, you should first install the operating system and then the drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your serverboard.

Figure 5-12. Driver/Tool Installation Display Screen
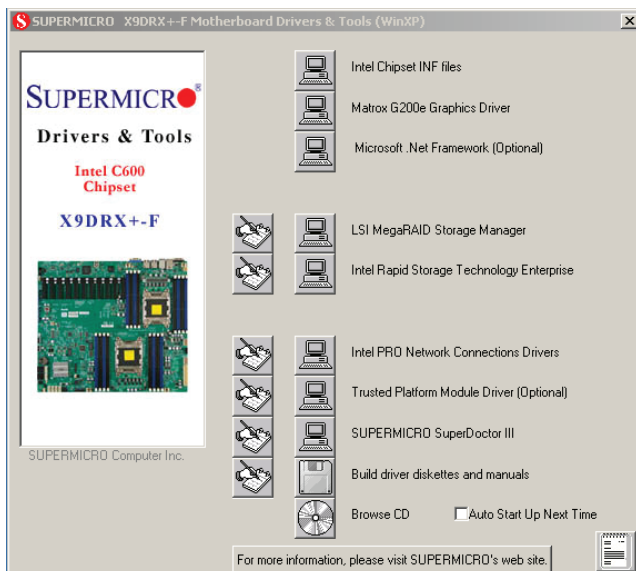
Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

Supero Doctor III

The Supero Doctor III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CD-ROM that came with your serverboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

Note: The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

Note: When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

Figure 5-13. Supero Doctor III Interface Display Screen (Health Information)
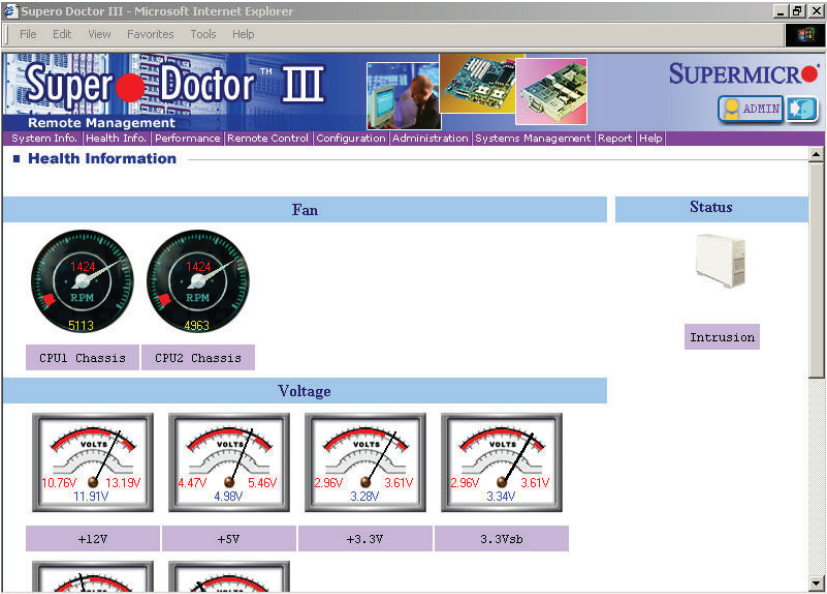
Figure 5-14. Supero Doctor III Interface Display Screen (Remote Control)

Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download the SDIII User's Guide at: <http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf>. For Linux, we will recommend using Supero Doctor II.

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the chassis. The only tool you will need to install components and perform maintenance is a Phillips screwdriver. Print this page to use as a reference while setting up your chassis.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

⚠️ Review the warnings and precautions listed in the manual before setting up or servicing this chassis. These include information in Chapter 4: System Safety and the warning/precautions listed in the setup instructions.

Figure 6-1. Chassis: Front and Rear Views

Front Control Panel

Storage Module

Front Lock Cover

IO Shield

Power Supplies

PCI Card Slots
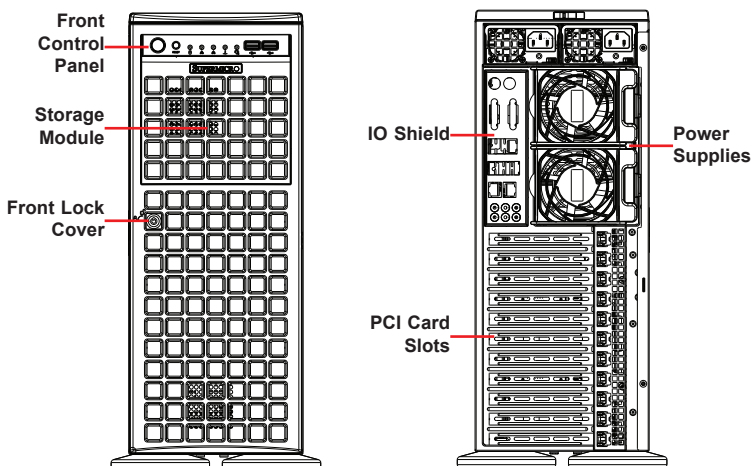
Figure 6-2. Chassis in Rack Mount Mode
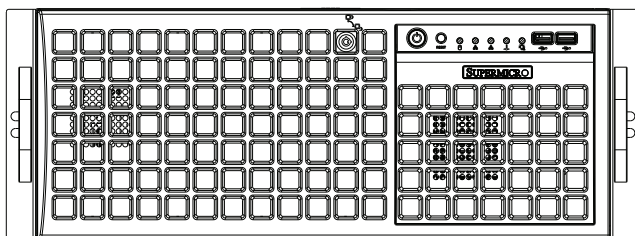
6-1   Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully.

The following measures are generally sufficient to protect your equipment from ESD damage:

Precautions

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

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

- Handle a 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 serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

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

6-2   Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Installation."

6-3   System Cooling

Six heavy-duty fans provide cooling for the chassis. Four fans are located in the mid-section of the chassis with two fans in the rear. These fans circulate air through the chassis as a means of lowering the chassis internal temperature.

The fans come pre-installed to the chassis. Each fan is hot-swappable and can be replaced without removing any connections.

System Fan Failure

Fan speed is controlled by system temperature via a BIOS setting. If a fan fails, the remaining fans will ramp up to full speed. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan).

Replacing System Fans

The SC747 chassis contains two types of system fans: mid-system fans and rear system fans.

Replacing Mid-System Fans

1. Determine which fan has failed. Because the fans are hot-swappable, the chassis does not need to be powered-down.

2. Press the fan release tab and lift the failed fan from the chassis. Mid fans must be pulled straight out of the chassis (see Figure 6-3).

3. Place the new fan into the vacant space in the housing while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans. As soon as the fan is connected, it will begin working.

Replacing the Rear System Fan

1. Determine which fan is not operation

2. Press the rear fan release tab (see Figure 6-4).

3. Pull the fan away from the chassis by pulling out the top first.

4. Place the new fan in the chassis, inserting the bottom of the fan first.

5. Push the fan fully into the housing until the fan clicks into place.

Figure 6-3. Mid-System Chassis Fans

Mid Fan
Release Tab
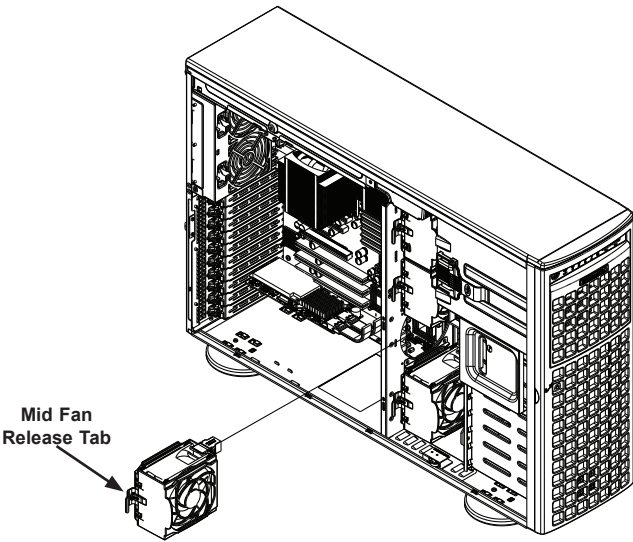
Figure 6-4. Rear System Chassis Fans

Rear Fan Release
Tab
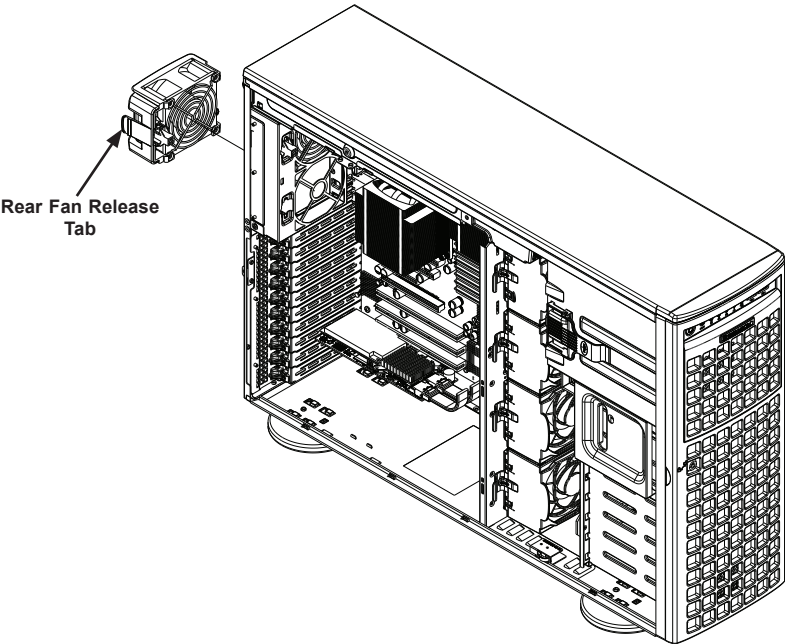
6-4   Power Supply

The SC747 chassis has a 1280W (redundant) power supply. This power supply is auto-switching capable. This enables it to automatically sense and operate at a 100v to 240v input voltage. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

Power Supply Failure

If the power supply module fails, the system will shut down and you will need to replace the module. Replacements can be ordered directly from Supermicro (see contact information in the Preface).

As there is only one power supply module in the system, power must be completely removed from the server before removing and replacing the power supply for whatever reason.

Replacing the Power Supply

With a redundant power supply, the system automatically switches to the second power supply if the first should fail.

Replacing the Power Supply

1. Power down the chassis and unplug the power cord. If your chassis includes a redundant power supply (at least two power modules), you can leave the server running and remove only one power supply.

2. Push the release tab (on the back of the power supply) as illustrated in Figure 6-5.

3. Pull the power supply out using the handle provided.

4. Replace the failed power module with the exact same model (available from Supermicro).

5. Push the new power supply module into the power bay until you hear a click.

6. Plug the AC power cord back into the module and power up the server.

Figure 6-5. Power Supply Release Button

Release
Button
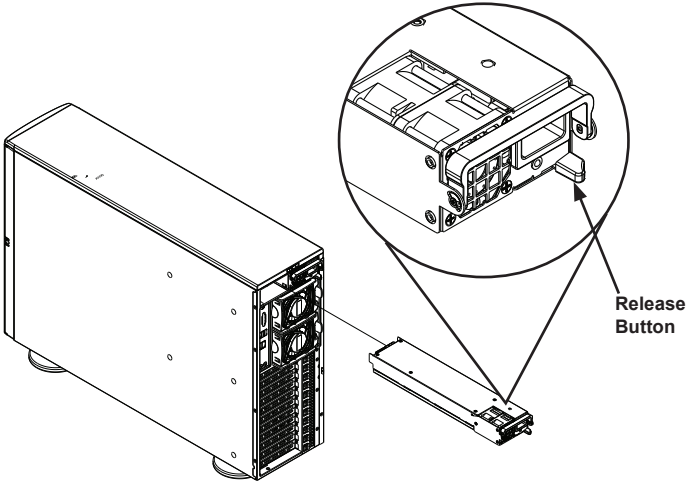
Power Supply Connections

Connect each of the following cables, as required, by your serverboard manufacturer. In some instances, some cables may not need to be connected. Some cables may not be available with your model.

Power Supply Cables			
Name	**Qty**	**Connects to:**	**Description**
20-pin or 24-pin power cable	1	Serverboard	20-pin or 24-pin power cable provides electricity to the serverboard. and has twenty to twenty-four yellow, black, gray, red, orange, green and blue wires.
HDD (Hard Drive) power cable	2	Backplane	Each cable has three connectors (two Hard Drive [HDD] and one Floppy Drive [FDD]). Attach the HDD connectors to the backplane. **If you are using a Supermicro backplane, the FDD connector does not need to be attached.**
8-pin serverboard cable	1	Serverboard	Provides power to the serverboard CPU. This cable has two black and two yellow wires.
4-pin serverboard cable	1	Serverboard	Provides power to PCI expansion card. This cable has two black and two yellow wires.
5-pin SMBus power cable (small)	1	Serverboard	Allows the SM (System Management) bus to monitor power supply
2-pin INT cable	1	Serverboard	Intrusion detection cable allows the system to log when the server chassis has been opened.

6-5   Configuring the Storage Module

This section covers configuring the storage module in the SC747 chassis.

Figure 6-6. Chassis in Rack Mount Mode
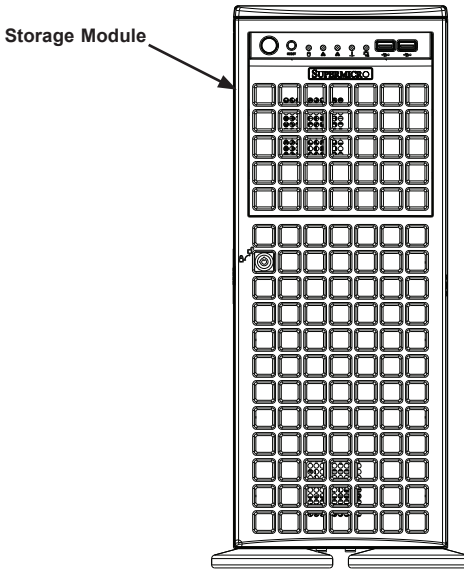
Figure 6-7. Chassis in Tower Mode
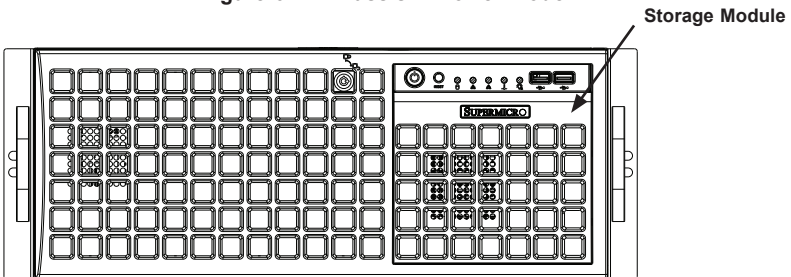
Tower or Rack Configuration

The SC747 chassis is shipped in tower mode and can be immediately used as desktop server. If the chassis is to be used in a rack, the storage module must be rotated 90 degrees and the storage moudule cover must be replaced (see Figure 6-7). This can be done before, during, or after setup. It is not necessary to replace the storage module cover when the chassis is in the tower configuration.

Rotating the Storage Module

Use the procedure below to rotate the storage module for rack configurations.

Figure 6-8. Removing the Storage Module
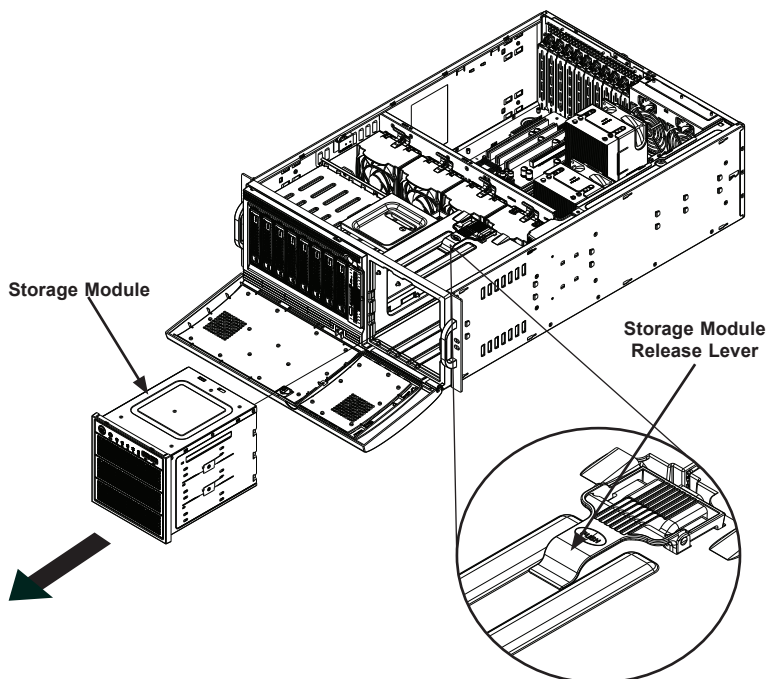
Rotating the Storage Module for Rack Mounting

1. Open the chassis cover.

2. Locate the storage module and disconnect any cables from the storage module to any component in the chassis.

3. Push the storage module release lever. This lever unlocks the storage module (see Figure 6-8).

4. Grasp the external edges of the storage module and pull the unit from the chassis.

5. Turn the storage module 90 degrees (as illustrated).

6. Reinsert the module into the chassis and reconnect the cords.

Installing Drives in the Storage Module

The storage module (Figure 6-9) includes three full sized drive bays and the front LED panel. The storage module can be configured in one of three ways:

● Add up to three extra hard drives to the drive trays.

● Add up to three peripheral drives (CD-ROM, DVD-ROM, etc.) drive trays.

● Add five hot-swappable hard drives to the storage module. This configuration requires a mobile rack. More information on mobile rack installation can be found in the appendices at the end of this manual.

Figure 6-9. Chassis Storage Module
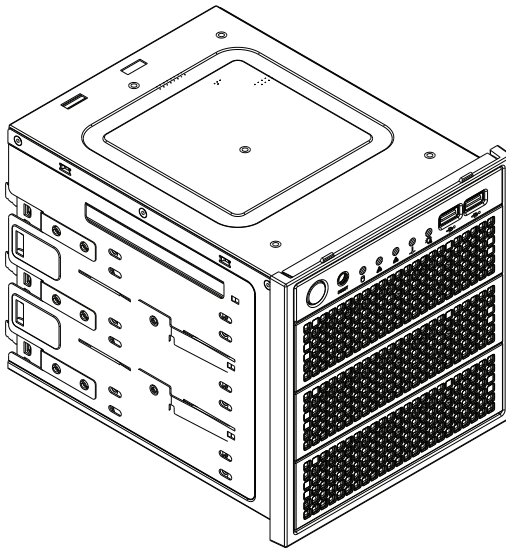
Removing a Drive Carrier

Use the procedure below to add hard drives to the drive carriers.

Adding Hard Drives to the Drive Carriers

1. Open the chassis cover.

2. Locate the drive tray release tab for the slot you want to place the peripheral drive (see Figure 6-10).

3. Push the drive tray toward the front of the chassis.

Figure 6-10. Removing a Drive Carrier

Drive Tray Release Tabs
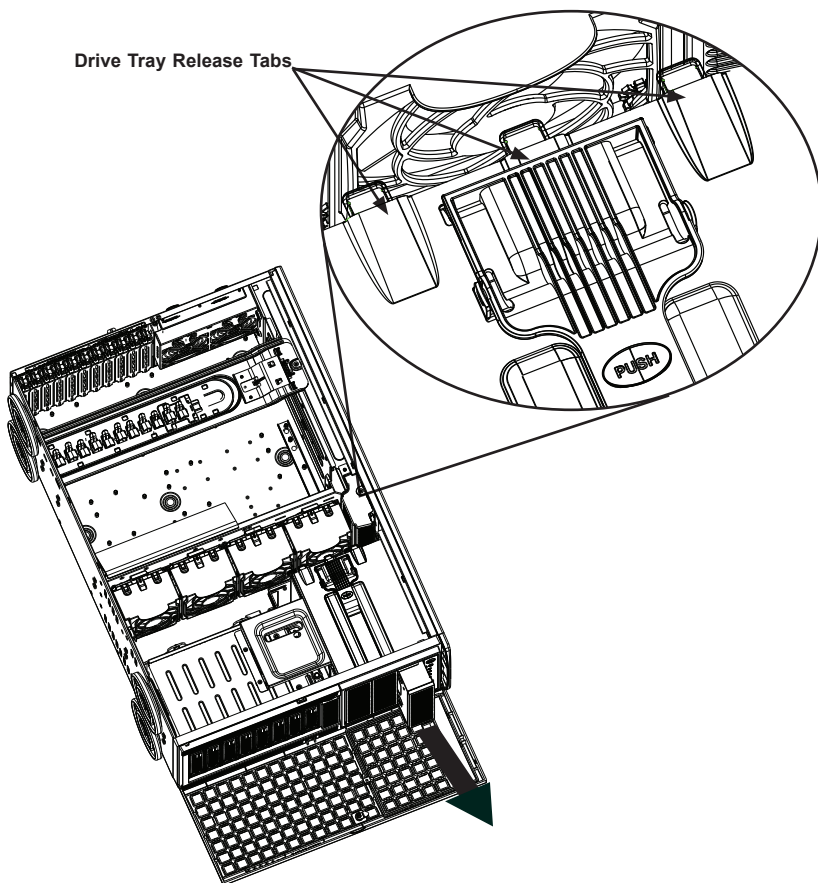
4. Place the hard drive to the hard drive tray. Make sure The hard drive can be SAS or SATA depending on your serverboard. The hard drive may not completely fill the tray. See Figure 6-11 for details.

5. Secure the hard drive to the carrier with four screws from the bottom.

6. Slide the hard drive into the chassis until the carrier clicks into place.

7. Repeat these steps for each hard drive carrier.

> ⚠ **!** Warning: Except for short periods of time (swapping hard drives), do not operate the server with the hard drive carriers removed.

Figure 6-11. Adding a Hard Drive to the Drive Carrier
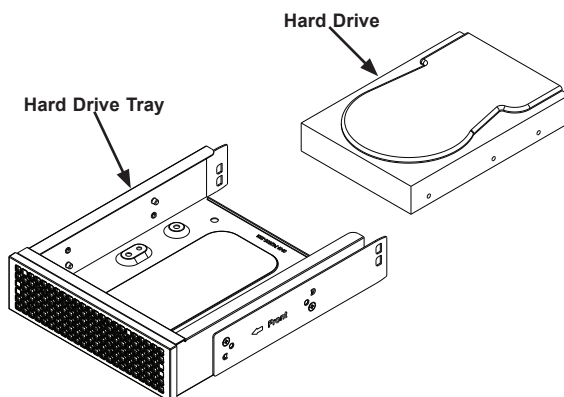
> ⚠ **!** **Warning!** Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/storage.cfm.

Adding Peripheral Drives

You can add up to three peripheral drives (DVD-ROM, CD-ROM, floppy drive, etc.) to the drive trays using the procedure below.

Adding Peripheral Drives

1. Open the chassis cover.

2. Locate the drive tray release tab for the slot you want to place the peripheral drive.

3. Push the drive tray toward the front of the chassis.

4. Remove the hard drive tray rails from the hard drive tray. To do this, you must remove two screws from each side (see Figure 6-12).

5. Attach the rails to a DVD-ROM, CD-ROM, floppy drive, or other peripheral. The rails should fit any standard sized peripherals.

6. Slide the peripheral into the chassis until the tray clicks into place.

7. Repeat these steps for each hard drive tray.

Figure 6-12. Adding Hard Drive Rails to the DVD-ROM Drive

Hard Drive Tray
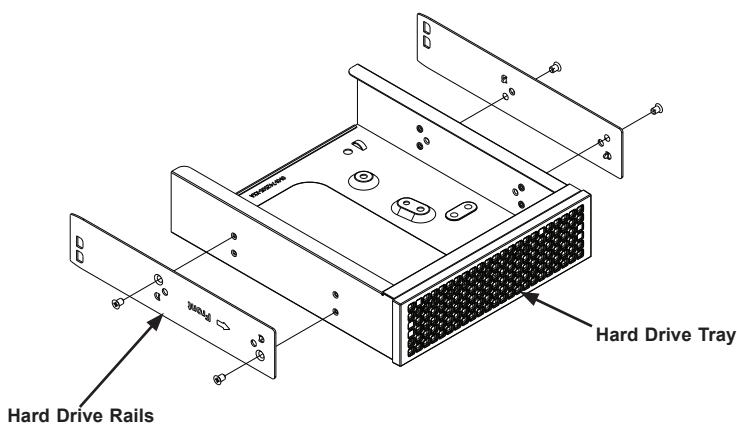
Hard Drive Rails

6-6　Installing Hard Drives in the Chassis

Chassis hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the drive bays.

Installing Hard Drives

1. Unlock and open the chassis cover.

2. Press the release button to extend the drive tray handle (see Figure 6-13).

3. Using the handle, pull the drive tray out by the handle. The drive is hot swappable; there are no cables to disconnect.

4. Remove the screws holding the drive tray to the dummy drive.

Figure 6-13. Installing Hard Drives
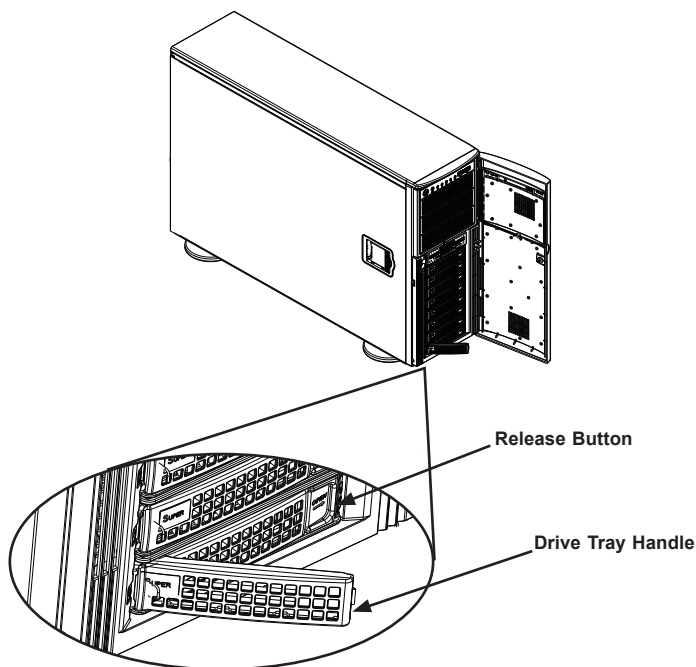
5. Place a hard drive in the drive tray (see Figure 6-14).

6. Secure the hard drive to the tray using four screws.

Figure 6-14. Removing a Dummy Drive Tray
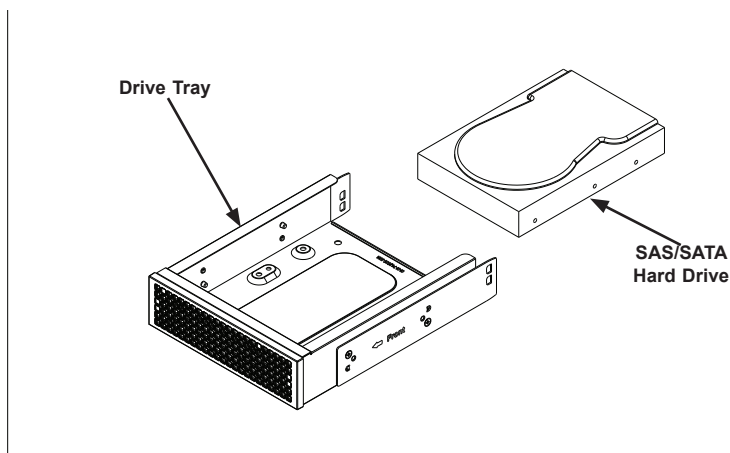
7. Insert the hard drive into the chassis. To do this:

    a. Press the hard drive release button to extend the drive tray handle.

    b. Insert the hard drive into the chassis and close the handle to lock the hard drive into place (see Figure 6-15).

Figure 6-15. Installing a Hard Drive
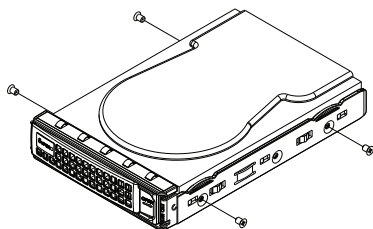
Chapter 7

BIOS

7-1   Introduction

This chapter describes the AMI BIOS Setup utility for the X9DRX+-F. It also provides the instructions on how to navigate the AMI BIOS Setup utility screens. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated.

Starting BIOS Setup Utility

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

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

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for 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. The manufacturer 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 setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

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

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

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <F2> at the appropriate time during system boot.

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

Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <F2> key to enter the main menu of the AMI BIOS Setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

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

7-2   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.

```
               Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Main  Advanced  Event Logs  IPMI  Boot  Security  Save & Exit

                                                          Set the Date. Use Tab to
                                                          switch between Data
  System Date                      [Wed 02/29/2012]       elements.
  System Time                      [09:25:16]

  Supermicro X9DRX+-F
  Version                          1.00
  Build Date                       02/24/2012

  Memory Information
  Total Memory                     8192 MB (DDR3)

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

               Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

The AMI BIOS main menu displays the following information:

System Date

This item displays the system date in Day MM/DD/YY format (e.g. Wed 10/12/2011).

System Time

This item displays the system time in HH:MM:SS format (e.g. 15:32:52).

Supermicro X9DRX+-F

Version

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

Build Date

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

Memory Information

Total Memory

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

7-3   Advanced Setup Configurations

Use the arrow keys to select Advanced Setup and press <Enter> to access the following submenu items.
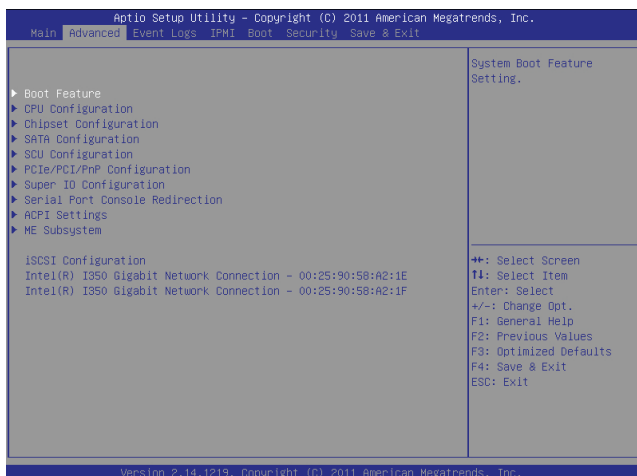
▶Boot Features

Quiet Boot

This feature allows the user to select bootup screen display between POST messages and the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

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

Bootup Num-Lock

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**.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Power Configuration

Watch Dog Function

If enabled, the Watch Dog timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

Power Button Function

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

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Stay 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 state before a power loss. The options are Power On, Stay Off, and **Last State**.

CPU Configuration

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

▶Socket 1 CPU Information/Socket 2 CPU Information

This submenu displays the following information regarding the CPUs installed in Socket 1/ Socket 2.

- Type of CPU

- CPU Signature

- Microcode Patch

- CPU Stepping

- Maximum CPU Speed

- Minimum CPU Speed

- Processor Cores

- Intel HT (Hyper-Threading) Technology

- Intel VT-x Technology

- Intel SMX Technology

- L1 Data Cache

- L1 Code Cache

- L2 Cache

- L3 Cache

CPU Speed

This item displays the speed of the CPU installed in Socket 1/Socket 2.

64-bit

This item indicates if the CPU installed in Socket 1 or Socket 2 supports 64-bit technology.

Clock Spread Spectrum

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

Hyper-threading

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

Active Processor Cores

Set to Enabled to use a processor's second core and above. (Please refer to Intel's website for more information.) The options are **All,** 1, 2, and 4.

Limit CPUID Maximum

This feature allows the user to set the maximum CPU ID value. Enable this function to boot the legacy operating systems that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS).

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

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

Intel® AES-NI

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

MLC Streamer Prefetcher (Available when supported by the CPU)

If set to Enabled, the MLC (mid-level cache) streamer prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disabled and **Enabled**.

MLC Spatial Prefetcher (Available when supported by the CPU)

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

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enabled to support Data Cache Unite (DCU) prefetch of L1 data to speed up data accessing and processing in the DCU to enhance CPU performance. The options are Disabled and **Enabled**.

DCU IP Prefetcher

Select Enabled for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Enabled** and Disabled.

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

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

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

► CPU Power Management Configuration

This submenu allows the user to configure the following CPU Power Management settings.

Power Technology

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disabled, **Energy Efficiency**, and Custom. If the option is set to Custom, the following items will display:

EIST (Available when Power Technology is set to Custom)

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 Disabled (GV3 Disabled), and **Enabled (GV3 Enabled)**. (**Note**: GV3 is Intel Speedstep support used on older platforms. Please refer to Intel's website for detailed information.)

Turbo Mode (Available when Power Technology is set to Custom)

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

C1E (Available when Power Technology is set to Custom)

Select Enabled to enable Enhanced C1 Power State to boost system performance. The options are **Enabled** and Disabled.

CPU C3 Report (Available when Power Technology is set to Custom)

Select Enabled 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 Enabled and **Disabled.**

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

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

CPU C7 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C7 State (ACPI C3) to the operating system. CPU C7 State is a processor-specific low C-State. The options are **Enabled** and Disabled.

Package C-State limit (Available when Power Technology is set to Custom)

This feature allows the user to set the limit on the C-State package register. The options are C0, C2, **C6,** and No Limit.

Energy Performance Bias

This setting allows the user to adjust the fan speed based on performance (maximum cooling) or energy efficiency (maximum energy savings). The options are Performance, **Balanced Performance**, Balanced Energy, and Energy Efficient.

Factory Long Duration Power Limit

This item displays the power limit set by the manufacturer during which long duration power is maintained.

Long Duration Power Limit

This item displays the power limit set by the user during which long duration power is maintained.

Factory Long Duration Maintained (Available when Power Technology is set to Custom)

This item displays the period of time set by the manufacturer during which long duration power is maintained.

Long Duration Maintained

This item displays the period of time during which long duration power is maintained.

Recommended Short Duration Power

This item displays the short duration power settings recommended by the manufacturer.

Short Duration Power Limit

This item displays the time period during which short duration power is maintained.

▶Chipset Configuration

▶North Bridge

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

▶Integrated IO Configuration

Intel VT-d

Select Enabled to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VWM (Virtual Working Memory) 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 **Enabled** and Disabled.

Data Direct I/O

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

DCA Support

Select Enabled to use Intel's DCA (Direct Cache Access) Technology to improve data transfer efficiency. The options are **Enabled** and Disabled.

IIO 1 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 1 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root Ports.

CPU1 Slot 3 PCI-E 3.0 x8 Link Speed

This feature allows the user to set the PCI-Exp bus speed for the slot specified above. The options are Gen1 (Generation 1), Gen2 and **Gen3**.

CPU1 Slot 1 PCI-E 3.0 x8 Link Speed

This feature allows the user to set the PCI-Exp bus speed for the slot specified above. The options are Gen1 (Generation 1), Gen2 and **Gen3**.

CPU1 Slot 2 PCI-E 3.0 x8 Link Speed

This feature allows the user to set the PCI-Exp bus speed for the slot specified above. The options are Gen1 (Generation 1), Gen2 and **Gen3**.

CPU1 Slot 4 PCI-E 3.0 x8 Link Speed

This feature allows the user to set the PCI-Exp bus speed for the slot specified above. The options are Gen1 (Generation 1), Gen2 and **Gen3**.

CPU1 Slot 8 PCI-E 3.0 x8 Link Speed

This feature allows the user to set the PCI-Exp bus speed for the slot specified above. The options are Gen1 (Generation 1), Gen2 and **Gen3**.

IIO 2 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 2 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root Ports.

▶QPI Configuration

Current QPI Link

This item displays the current status of the QPI Link.

Current QPI Frequency

This item displays the frequency of the QPI Link.

Isoc

Select Enabled to enable Ischronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enabled and **Disabled**.

QPI (Quick Path Interconnect) Link Speed Mode

Use this feature to select data transfer speed for QPI Link connections. The options are **Fast** and Slow.

QPI Link Frequency Select

Use this feature to select the desired QPI frequency. The options are **Auto**, 6.4 GT/s, 7.2 GT/s, and 8.0 GT/s.

▶DIMM Configuration

This section displays the following DIMM information.

Current Memory Mode

This item displays the current memory mode.

Current Memory Speed

This item displays the current memory speed.

Mirroring

This item displays if memory mirroring is supported by the motherboard. Memory mirroring creates a duplicate copy of the data stored in the memory to enhance data security.

Sparing

This item displays if memory sparing is supported by the motherboard. Memory sparing enhances system performance.

▶DIMM Information

CPU Socket 1 DIMM Information/ CPU Socket 2 DIMM Information

The status of the memory modules detected by the BIOS will be displayed as detected by the BIOS.

Memory Mode

When Independent is selected, all DIMMs are available to the operating system. When Mirroring is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lockstep is selected, the motherboard uses two areas of memory to run the same set of operations in parallel. The options are **Independent**, Mirroring, and Lockstep.

DRAM RAPL Mode

RAPL (Running Average Power Limit) provides mechanisms to enforce power consumption limits on supported processors The options are DRAM RAPL MODE0 , **DRAM RAPL MODE1**, and Disabled.

DDR Speed

Use this feature to force a DDR3 memory module to run at a frequency other than what is specified in the specification. The options are **Auto**, Force DDR3-800, Force DDR3-1066, Force DDR3-1333, Force DDR3-1600 and Force SPD.

Channel Interleaving

This feature selects from the different channel interleaving methods. The options are **Auto**, 1 Way, 2 Way, 3, Way, and 4 Way.

Rank Interleaving

This feature allows the user to select a rank memory interleaving method. The options are **Auto**, 1 Way, 2 Way, 4, Way, and 8 Way.

Patrol Scrub

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

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 Enabled to use Demand Scrubbing for ECC memory correction. The options are Enabled and **Disabled**.

Data Scrambling

Select Enabled to enable data scrambling to ensure data security and integrity. The options are Disabled and **Enabled**.

Device Tagging

Select Enabled to support device tagging. The options are **Disabled** and Enabled.

Thermal Throttling

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

▶South Bridge Configuration

This feature allows the user to configure the settings for the Intel PCH chip.

PCH Information

This feature displays the following PCH information.

Name: This item displays the name of the PCH chip.

Stepping: This item displays the status of the PCH stepping.

USB Devices: This item displays the USB devices detected by the BIOS.

All USB Devices

This feature enables all USB ports/devices. The options are Disabled and **Enabled**. (If set to Enabled, EHCI Controller 1 and Controller 2 will appear.)

EHCI Controller 1/EHCI Controller 2 (Available when All USB Devices is set to Enabled)

Select Enabled to enable EHCI (Enhanced Host Controller Interface) Controller 1 or Controller 2. The options are Disabled and **Enabled**.

Legacy USB Support (Available when USB Functions is not Disabled)

Select Enabled to support legacy USB devices. Select Auto to disable legacy support if USB devices are not present. Select Disable to have USB devices available for EFI (Extensive Firmware Interface) applications only. The settings are Disabled, **Enabled** and Auto.

Port 60/64 Emulation

Select Enabled to enable I/O port 60h/64h emulation support for the legacy USB keyboard so that it can be fully supported by the operating systems that does not recognize a USB device. The options are Disabled and **Enabled**.

EHCI Hand-Off

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

▶SATA Configuration

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

SATA Port0~SATA Port5: The AMI BIOS displays the status of each SATA port as detected by the BIOS.

SATA Mode

Use this feature to configure SATA mode for a selected SATA port. The options are Disabled, IDE Mode, **AHCI Mode** and RAID Mode. The following are displayed depending on your selection:

IDE Mode

The following items are displayed when IDE Mode is selected:

Serial-ATA (SATA) Controller 0~1

Use this feature to activate or deactivate the SATA controller, and set the compatibility mode. The options are Disabled, Enhanced, and Compatible. The default for Controller 0 is **Compatible.** The default of SATA Controller 1 is **Enhanced**.

AHCI Mode

The following items are displayed when the AHCI Mode is selected.

Aggressive Link Power Management

Select Enabled to enable Aggressive Link Power Management support for Cougar Point B0 stepping and beyond. The options are **Enabled** and Disabled.

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for a particular port, which will allow the user to change a hardware component or device without shutting down the system. The options are **Enabled** and Disabled.

Staggered Spin Up

Select Enabled to enable Staggered Spin-up support to prevent excessive power consumption caused by multiple HDDs spinning-up simultaneously. The options are Enabled and **Disabled**.

RAID Mode

The following items are displayed when RAID Mode is selected:

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for the particular port. The options are **Enabled** and Disabled.

▶SCU (Storage Control Unit) Configuration

Storage Controller Unit

Select Enabled to enable PCH SCU storage devices. The options are Disabled and **Enabled**.

OnChip SCU Option ROM

Select Enabled to support the onboard SCU Option ROM to boot up the system via a storage device. The options are Disabled and **Enabled**.

SCU Port 0~SCU Port 3: The AMI BIOS will automatically detect the onboard SCU devices and display the status of each SCU device as detected.

▶PCIe/PCI/PnP Configuration

PCI ROM Priority

Use this feature to select the Option ROM to boot the system when there are multiple Option ROMs available in the system. The options are EFI Compatible ROM and **Legacy ROM**.

PCI Latency Timer

Use this feature to set the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

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**.

PERR# Generation

Select Enabled to allow a PCI device to generate a PERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

SERR# Generation

Select Enabled to allow a PCI device to generate an SERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

Maximum Payload

Select Auto to allow 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 to allow the system BIOS to automatically set the maximum Read Request size 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

This feature allows the user to set the Active State Power Management (ASPM) level for a PCI-E device. Select Force L0 to force all PCI-E links to operate at L0 state. Select Auto to allow the system BIOS to automatically set the ASPM level for the system. Select Disabled to disable ASPM support. The options are **Disabled**, Force L0, and Auto.

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

CPU1 PCIe Slot 1 x8 OPROM/ CPU1 PCIe Slot 2 x8 OPROM/ CPU1 PCIe Slot 3 x8 OPROM/ CPU1 PCIe Slot 4 x8 OPROM/ CPU2 PCIe Slot 5 x8 OPROM/ CPU2 PCIe Slot 6 x8 OPROM/ CPU2 PCIe Slot 7 x8 OPROM/ CPU1 PCIe Slot 8 x8 OPROM/ CPU2 PCIe Slot 9 x8 OPROM/ CPU2 PCIe Slot 10 x8 OPROM/ CPU2 PCIe Slot 11 x4 OPROM

Select Enabled to enable Option ROM support to boot the computer using a network interface from the slots specified above. The options are **Enabled** and Disabled.

Onboard LAN Option ROM Select

Select iSCSI to use the iSCSI Option ROM to boot the computer using a network device. Select PXE (Preboot Execution Environment) to use an PXE Option ROM to boot the computer using a network device. The options are iSCSI and **PXE**.

Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM

Select Enabled to enable the onboard LAN1 Option ROM~LAN2 Option ROM. This is to boot the computer using a network device. The default setting for LAN1 Option ROM is **Enabled**, and the default setting for LAN2 Option ROM is **Disabled**.

Load Onboard SAS Option ROM

Select Enabled to use the SAS Option ROM to boot the computer using a network device. The options are **Enabled** and Disabled.

VGA Priority

This feature allows the user to select the graphics adapter to be used as the primary boot device. The options are **Onboard**, and Offboard.

Network Stack

Select Enabled 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: This item displays the Super IO chip used in the motherboard.

▶Serial Port 1 Configuration

Serial Port

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

Device Settings

This item displays the settings of Serial Port 1.

Change Settings

Use this feature to set the optimal Environment Control Interface (PECI) setting for a serial port specified. The default setting is **Auto**, which will allow the AMI BIOS to automatically select the best setting for the PECI platform.

Device Mode

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

▶Serial Port 2 Configuration

Serial Port

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

Device Settings

This item displays the settings of Serial Port 2.

Change Settings

Use this feature to set the optimal Environment Control Interface (PECI) setting for a serial port specified. The default setting is **Auto**, which will allow the AMI BIOS to automatically select the best setting for the PECI platform.

Device Mode

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

Serial Port 2 Attribute

Use this feature to select the attribute for serial port 2. The options are **SOL** (Serial On LAN), and COM.

▶Serial Port Console Redirection

COM 1/COM 2/SOL

These two submenus allow the user to configure the following Console Redirection settings for a COM Port specified by the user.

Console Redirection

Select Enabled to use a COM Port selected by the user for Console Redirection. The options are Enabled and Disabled. The default setting for COM1 is **Disabled**, and for COM2 is **Enabled**.

▶Console Redirection Settings

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

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

Putty KeyPad

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

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.

Console Redirection

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

▶Console Redirection Settings

This feature allows the user 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 used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote server. The options are COM1 and COM2.SOL.

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

This item sets 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, 57600, and **115200** (bits per second).

Flow Control

This feature allows the user 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,** Hardware RTS/CTS, and Software Xon/Xoff.

▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

ACPI Sleep State

Use this feature to select the ACPI State when the system is in sleep mode. Select S1 (CPU_Stop_Clock) to erase all CPU caches and stop executing instructions. Power to the CPU(s) and RAM is maintained, but RAM is refreshed. Select Suspend to use power-reduced mode. Power will only be supplied to limited components (such as RAMs) to maintain the most critical functions of the system. The options are **S1 (CPU_Stop_Clock)**, and Suspend Disabled.

High Precision Event Timer

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

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

Configuration

TPM Support

Select Enabled on this item and enable the TPM jumper on the motherboard to enable TPM support to improve data integrity and network security. The options are **Enabled** and Disabled.

TPM State

Select Enabled to enable TPM security settings to improve data integrity and network security. The options are **Disabled** and Enabled.

Pending Operation: This item displays the status of a pending operation.

Current Status Information: This item displays the information regarding the current TPM status.

TPM Enable Status

This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

TPM Active Status

This item displays the status of TPM Support to indicate if TPM is currently active or deactivated.

TPM Owner Status

This item displays the status of TPM Ownership.

▶Intel TXT (LT-SX) Configuration

Intel TXT (LT-SX) Hardware Support

This feature indicates if the following hardware components support the Intel Trusted Execution Technology.

CPU: TXT (Trusted Execution Technology) Feature

Chipset: TXT (Trusted Execution Technology) Feature

Intel TXT (LT-SX) Configuration

This feature displays the following TXT configuration setting.

TXT (LT-SX) Support: This item indicated if the Intel TXT support is enabled or disabled.

Intel TXT (LT-SX) Dependencies

This feature displays the features that need to be enabled for the Intel Trusted Execution Technology to work properly in the system.

VT-d Support: Intel Virtualization Technology with Direct I/O support

VT Support: Intel Virtualization Technology support

TPM Support: Trusted Platform support

TPM State: Trusted Platform state

▶Intel ME Subsystem Configuration

This feature displays the following ME Subsystem Configuration settings.

- **ME BIOS Interface Version**

- **ME Version**

iSCSI Configuration: This item displays iSCSI configuration information:

   iSCSI Initiator Name: This item displays the name of the iSCSI Initiator, which is a unique name used in the world.

Intel® I350 Gigabit Network Connections: These items display the following information on the Intel I350 LAN connections.

▶NIC Configuration

Link Speed

Use this feature to change the link speed and duplex for the current port. The options are **AutoNeg**, 10Mbps Half, 10Mbps Full, 100Mbps Half, and 100Mbps full.

Wake on LAN

Select enabled to wake the system with a magic packet. The options are **Enabled** and Disabled.

Blink LEDs

This feature allows the user to specify the duration for LEDs to blink. The range is from 0 ~ 15 seconds.

PORT CONFIGURATION INFORMATION

This section displays the following port information:

- UEFI Driver

- Adapter PBA

- Chip Type

- PCI Device ID

- PCI Bus:Device:Function

- Link Status

- Factory MAC Address

- Alternate MAC Address

7-4   Event Logs

Use this feature to configure Event Log settings.
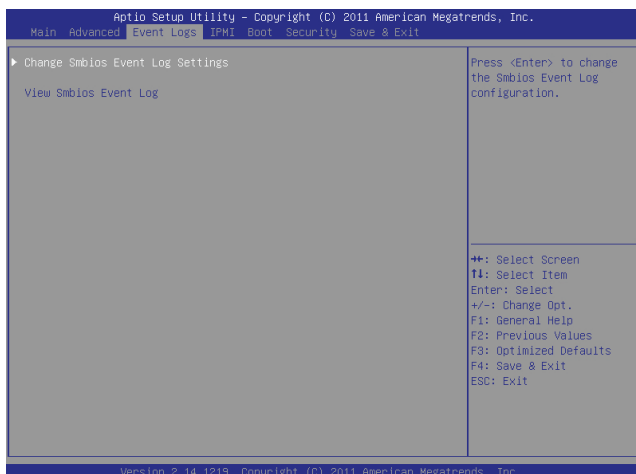
▶Change SMBIOS Event Log Settings

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.

Memory Correctable Error Threshold

This feature allows the user to enter the threshold value for correctable memory errors. The default setting is **10**.

PCI Error Logging Support

Select Enabled to support error event logging for PCI slots. The options are Enabled and **Disabled**.

Erasing Settings

Erase Event Log

Select Enabled to erase the SMBIOS (System Management BIOS) Event Log, which is completed before a event logging is initialized upon system reboot. The options are **No** and Yes.

When Log is Full

Select Erase Immediately to immediately erase SMBIOS error event logs that exceed the limit when the SMBIOS 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 allows the user to decide 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**.

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.

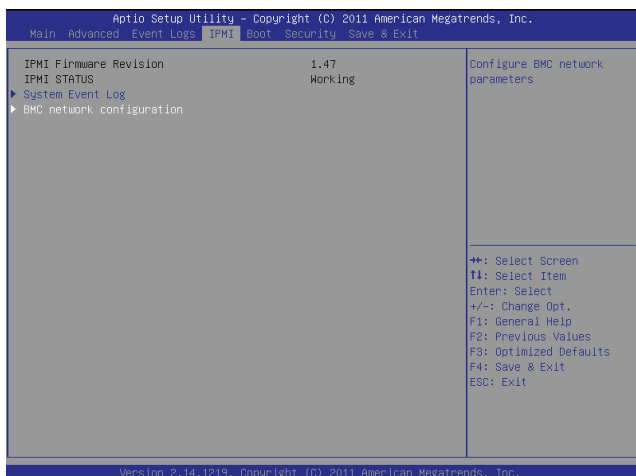Date/Time/Error Code/Severity

View System Event Log

This item allows the user to view the event in the system event log. Select this item and press <Enter> to view the status of an event in the log.

Date/Time/Sensor/Type

7-5 IPMI

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

```
              Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
     Main  Advanced  Event Logs  IPMI  Boot  Security  Save & Exit

     IPMI Firmware Revision              1.47              Configure BMC network
     IPMI STATUS                         Working           parameters
   ▶ System Event Log
   ▶ BMC network configuration



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



              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

IPMI Firmware Revision

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

IPMI Status

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

▶System Event Log

Enabling/Disabling Options

SEL Components

Select Enabled for all system event logging at bootup. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

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

When SEL is Full

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

Custom EFI Logging Options

Log EFI Status Codes

Select Enabled to log EFI (Extensible Firmware Interface) Status Codes, Error Codes or Progress Codes. The options are **Enabled** and Disabled.

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

▶BMC Network Configuration

LAN Channel 1: This feature allows the user to configure the settings for LAN1 Port.

Update IPMI LAN Configuration

This feature allows the user to decide if the BIOS should configure the IPMI setting at next system boot. The options are **No** and Yes. If the option is set to Yes, the user is allow to configure the IPMI settings at next system boot:

Configuration Address Source

This feature allows the user to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server in the network that is attached to and request the next available IP address for this computer. The options are **DHCP** and Static. The following items are assigned IP addresses automatically if DHCP is selected.

Station IP Address

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

Subnet Mask

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

Station MAC Address

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

Gateway IP Address

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

7-6   Boot

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

Boot Option Priorities

Boot Option #1/ Boot Option #2/ Boot Option #3, etc.

Use this feature to specify the sequence of boot device priority.

USB Device BBS Priorities, Network Device BBS Priorities

This option sets the order of the legacy network and USB devices detected by the motherboard.
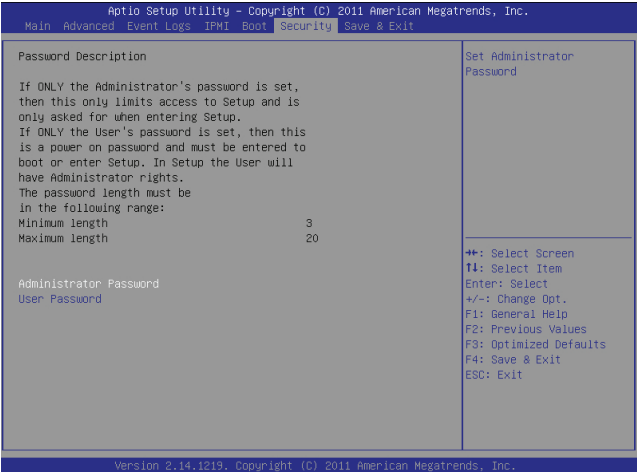
Add New Boot Option

This feature allows the user to add a new EFI boot option to the boot order.

▶**Delete Boot Option**

This feature allows the user to select a boot device to delete from the boot priority list.

7-7   Security

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

```
          Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
   Main  Advanced  Event Logs  IPMI  Boot  Security  Save & Exit

   Password Description                                    Set Administrator
                                                           Password
   If ONLY the Administrator's password is set,
   then this only limits access to Setup and is
   only asked for when entering Setup.
   If ONLY the User's password is set, then this
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will
   have Administrator rights.
   The password length must be
   in the following range:
   Minimum length                   3
   Maximum length                  20
                                                          ↔: Select Screen
                                                          ↑↓: Select Item
   Administrator Password                                 Enter: Select
   User Password                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Administrator Password

Use this feature to set the Administrator Password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 8 characters long.

User Password

Use this feature to set a User Password which is required to log into the system and to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

7-8   Save & Exit

This submenu allows the user to configure the Save and Exit settings for the system.
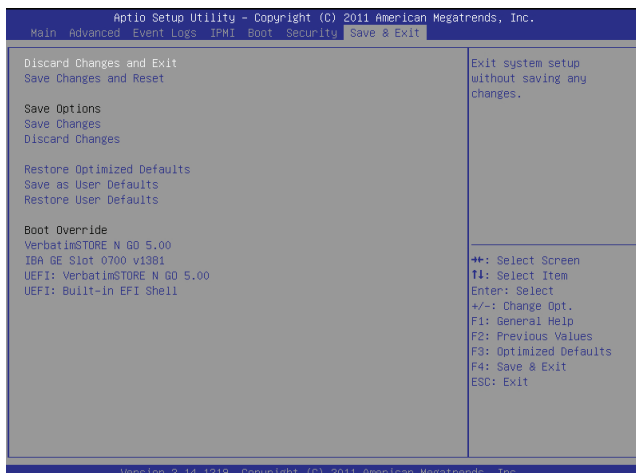
Discard Changes and Exit

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, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, click **Yes** to quit BIOS without saving the changes, or click No to quit the BIOS and save changes.

Save Changes and Reset

When you have completed the system configuration changes, select this option to save the changes and reboot the computer so that the new system configuration settings can take effect. Select Save Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, click **Yes** to quit BIOS without saving the changes, or click No to quit the BIOS and save changes.

Save Options

Save Changes

Select this option and press <Enter> to save all changes you've done so far and return to the AMI BIOS utility Program. When the dialog box appears, asking you if you want to save configuration, click **Yes** to save the changes, or click No to return to the BIOS without making changes.

Discard Changes

Select this feature and press <Enter> to discard all the changes and return to the BIOS setup. When the dialog box appears, asking you if you want to load previous values, click **Yes** to load the values previous saved, or click No to keep the changes you've made so far.

Restore Optimized Defaults

Select this feature and press <Enter> to load the optimized default settings that help optimize system performance. When the dialog box appears, asking you if you want to load optimized defaults, click **Yes** to load the optimized default settings, or click No to abandon optimized defaults.

Save as User Defaults

Select this feature and press <Enter> to save the current settings as the user's defaults. When the dialog box appears, asking you if you want to save values as user's defaults, click **Yes** to save the current values as user's default settings, or click No to keep the defaults previously saved as the user's defaults.

Restore User Defaults

Select this feature and press <Enter> to load the user's defaults previously saved in the system. When the dialog box appears, asking you if you want to restore user's defaults, click **Yes** to restore the user's defaults previously saved in the system, or click No to abandon the user's defaults that were previously saved.

Boot Override

This feature allows the user to enter a new setting to overwrite the original setting that was saved for the devices listed:

Appendix A

BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

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

Fatal errors are those which will not allow the system to continue the boot-up 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 (on the following page) correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

Beep Code	Error Message	Description
1 beep	Refresh	Circuits have been reset (Ready to power up)
5 short beeps and 1 long beep	Memory error	No memory detected in the system
5 beeps	No Con-In or Con-Out devices	Con-In includes USB or PS/2 keyboard, PCI or serial console redirection, IPMI KVM or SOL. Con-Out includes video controller, PCI or serial console redirection, IPMI SOL.
1 Continuous beep	System OH	System Overheat

Notes

Appendix B

System Specifications

Processors

Two E5-2600 Series processors in LGA 2011 sockets

Note: Please refer to our web site for a complete listing of supported processors.

Chipset

Intel C602 chipset

BIOS

128 Mb AMIBIOS® SPI Flash ROM

Memory Capacity

Sixteen DIMM slots that can support up to 512 GB of DDR3-1333/1066/800 RDIMM, LRDIMM or UDIMM ECC/non-ECC memory

Note: See the memory section in Chapter 5 for details.

SATA Controller

Intel on-chip controller for 10 SATA ports (RAID 0, 1, 5 and 10 supported)

Drive Bays

Eight hot-swap drive bays to house standard SATA drives

Peripheral drive bays for three (3) 5.25" drive bays in storage module and one (1) 3.5" fixed drive bay

Expansion Slots

Ten PCI-E 3.0 x8 and one PCI-E 2.0 x4 (in x8) slots for a total of eleven PCI expansion slots

Serverboard

X9DRX+-F

Dimensions: 15.20" (L) x 13.20" (W) (386 mm x 335 mm)

Chassis

SC747TQ-R1K28NBP (4U/Tower rackmount)

Dimensions: (WxHxD) 11.8 x 7 x 29.4 in. (452 x 178 x 746 mm)

Weight

Gross (Bare Bone): 76 lbs. (34.5 kg.)

System Cooling

Four 9.2x3.8-cm and two 3.8-cm cooling fans (fan speed controlled by IPMI)

System Input Requirements

AC Input Voltage: 100 - 240V AC auto-range
Rated Input Current: 12-8A (100-140 V); 8-6A (180-240V)
Rated Input Frequency: 50 to 60 Hz

Power Supply

Rated Output Power: 1280W (Part# PWS-1K28P-SQ)

Rated Output Voltages: 1000W: +12V (83A), +5Vsb (4A) / 1280W: +12V (106.7A), +5Vsb (4A)

Operating Environment

Operating Temperature: 10º to 35º C (32º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 95% (non-condensing)
Non-operating Relative Humidity: 5% to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

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

Notes