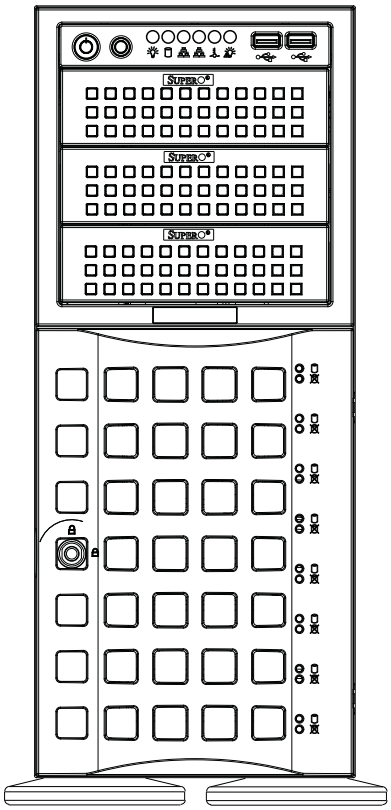
SUPERMICRO®

SUPERSERVER

7047R-3RF4+



USER'S MANUAL

1.0

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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.

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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-3RF4+. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 7047R-3RF4+ is a high-end server based on the SC745TQ-920B 4U tower/rackmountable chassis and the X9DR3-LN4F+ dual processor serverboard.

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 X9DR3-LN4F+ serverboard and the SC745TQ-920B chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 7047R-3RF4+ into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here 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 SuperServer 7047R-3RF4+.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DR3-LN4F+ serverboard, including the locations and functions of connections, 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 SC745TQ-920B server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS/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 Error Beep Codes

Appendix B: System Specifications

Notes

Table of Contents

Chapter 1

Introduction

1-1 Overview

The SuperServer 7047R-3RF4+ is a high-end server comprised of two main subsystems: the SC745TQ-R920B 4U/tower chassis and the X9DR3-LN4F+ dual 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 7047R-3RF4+, as listed below:

- Two passive CPU heatsinks (SNK-P0048P)
- Three 8-cm system fans (FAN-0074L4)
- Two 8-cm rear exhaust fans (FAN-0082L4)
- One air shroud (MCP-310-48001-0N)
- SAS/SATA Accessories
  One SAS/SATA backplane (BPN-SAS-743TQ)
  Eight drive carriers (CSE-PT17-B)
- One CD containing drivers and utilities
- One rackmount kit (CSE-PT26)
- SuperServer 7047R-3RF4+ User's Manual

1-2 Serverboard Features

The SuperServer 7047R-3RF4+ is built around the X9DR3-LN4F+, a dual processor serverboard based on the Intel C600 chipset and designed to provide maximum performance. Below are the main features of the X9DR3-LN4F+. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X9DR3-LN4F+ supports single or dual Intel® Xeon E5-2600 Series processors. Please refer to the serverboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9DR3-LN4F+ has 24 DIMM slots that can support up to 768 GB of ECC registered DDR3-1333/1066/800 SDRAM. Both 1.5V and 1.35V DIMMs are supported. Use of DDR3-1600 depends on memory configuration. See Chapter 5 for details.

SAS

A total of eight SAS ports are provided onboard, which are RAID 0, 1 and 10 capable.

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

Serial ATA

A SATA controller is also integrated into the chipset to provide two SATA 3 (6/Gbps) and four SATA 2 (3 Gbps) ports, which are RAID 0, 1, 5 and 10 supported. The SATA drives are hot-swappable units. RAID 5 supported with Windows OS only).

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

PCI Expansion Slots

The X9DR3-LN4F+ has four PCI-E 3.0 x16 slots, one PCI-E 3.0 x8 slot and one PCI-E 3.0 x4 (in a x8) slot.

Rear I/O Ports

The color-coded I/O ports include one COM port, a VGA port, four USB 2.0 ports (additional USB headers are included on the serverboard) and four gigabit Ethernet ports. A dedicated IPMI LAN port is also included.

1-3 Server Chassis Features

The following is a general outline of the main features of the SC745TQ-R920B server chassis.

System Power

The SC745TQ-R920B features a redundant 920W power supply composed of two separate power modules. This power redundancy feature allows you to replace a failed power supply module without shutting down the system.

Front Control Panel

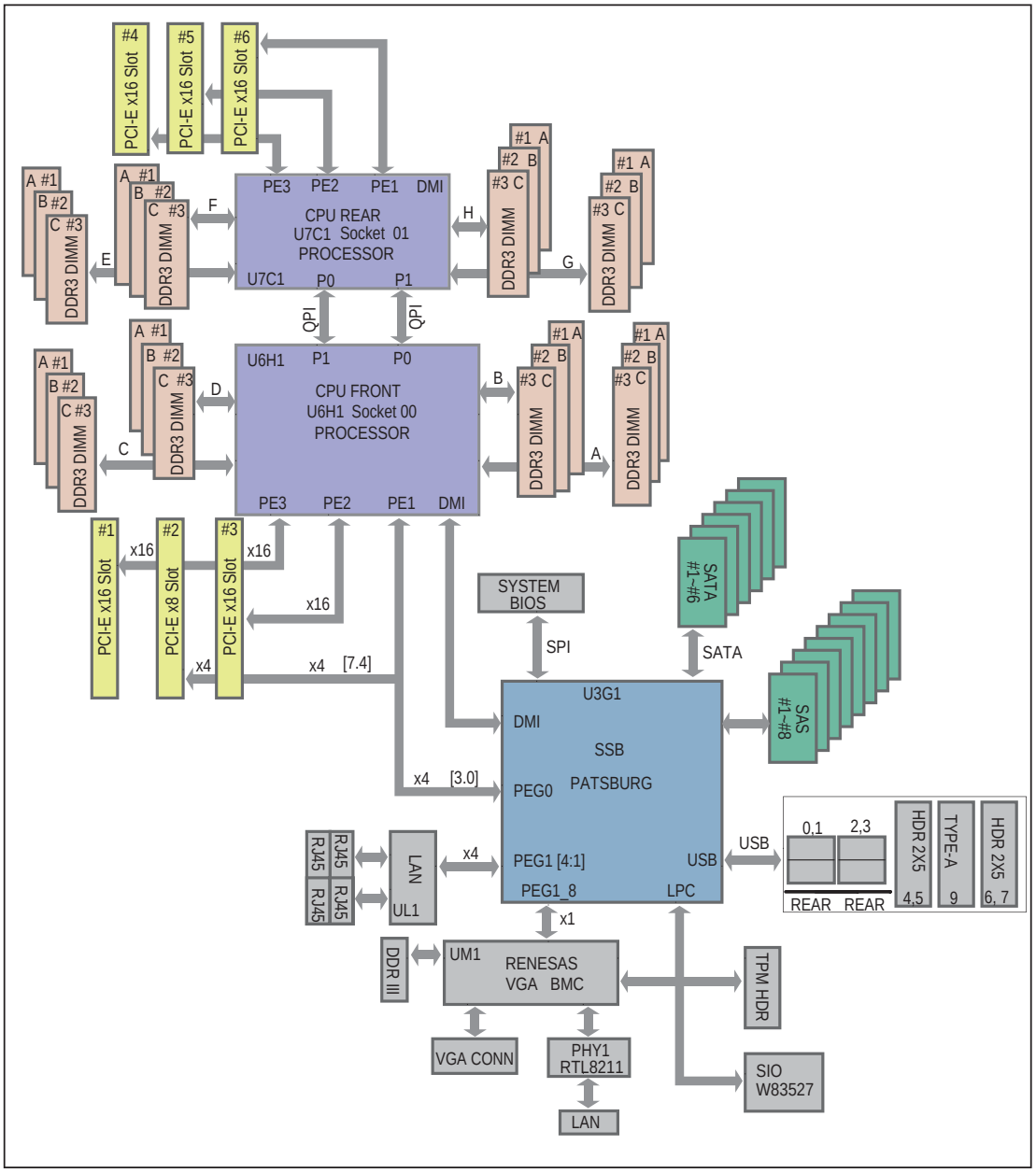
The control panel on the SuperServer 7047R-3RF4+ provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity, system overheat and power supply failure. A main power button and a system reset button are also included. In addition, two USB ports have been incorporated into the control panel to provide front side USB access.

Cooling System

The chassis has an innovative cooling design that includes three 8-cm hot-plug system cooling fans located in the middle section of the chassis as well as two 8-cm hot-plug exhaust fans located at the rear of the chassis. An air shroud channels the airflow from the system fans to efficiently cool the processor area of the system. The power supply module also includes a cooling fan.

Figure 1-1. Intel C600 Chipset:
System Block Diagram

Note: This is a general block diagram. Please see Chapter 5 for details.



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Web Site:	www.supermicro.com.tw
Technical Support:	
Email:	support@supermicro.com.tw
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Notes

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 7047R-3RF4+ up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

The 7047R-3RF4+ may be employed either as a tower or mounted in a rack as a 4U rackmount chassis.

2-2 Unpacking the System

You should inspect the box the system 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 the SuperServer 7047R-3RF4+. 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. Be sure to read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the system was shipped in may include two sets of rail assemblies, two rail mounting brackets and mounting screws needed for installing the system into a rack (optional kit). Follow the steps in the order given to complete the installation process in a minimum amount of time. 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) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

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.
- Slide/rail-mounted equipment is not to be used as a shelf or workspace.

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 SATA 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 System into a Rack

This section provides information on installing the system into a rack unit. Rack installation requires the use of the optional rackmount kit. If the system has already been mounted into a rack or if you are using it as a tower, you can skip ahead to Sections 2-5 and 2-6.

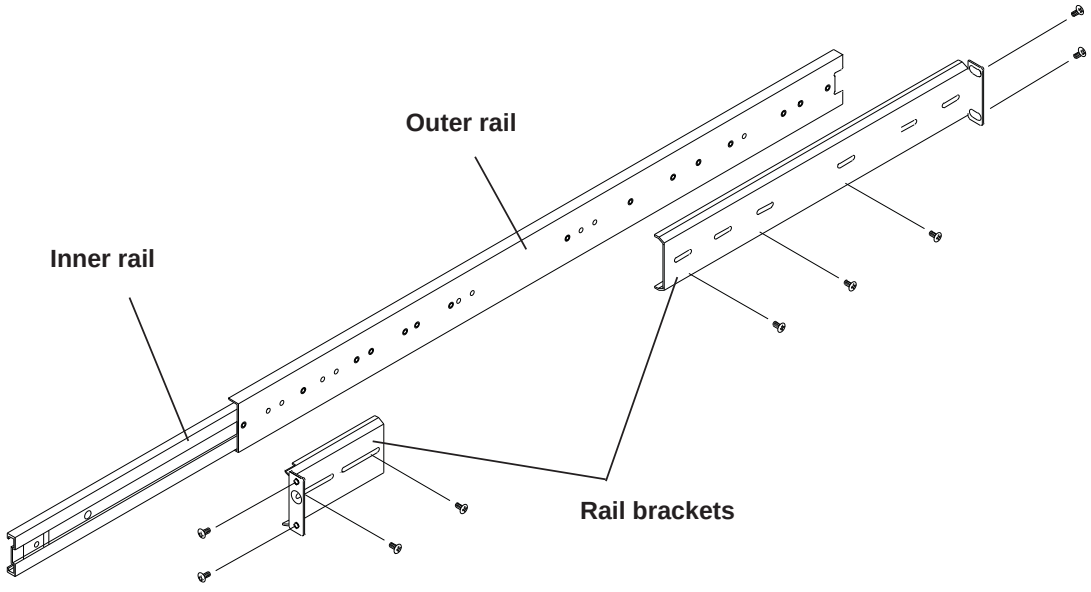
There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. The following is a guideline for installing the server into a rack with the rack rails provided in the rackmount kit. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

The optional rackmount kit includes two rack rail assemblies. Each of these assemblies consist of three sections: an inner fixed chassis rail that secures to the chassis, an outer rack rail that secures directly to the rack itself and two rail brackets, which also attach to the rack (see Figure 2-1.) The inner and outer rails must be detached from each other to install.

To remove the inner chassis rail, pull it out as far as possible - you should hear a "click" sound as a locking tab emerges from inside the rail assembly and locks the inner rail. Depress the locking tab to pull the inner rail completely out. Do this for both assemblies (one for each side).

Figure 2-1. Identifying the Sections of the Rack Rails



Installing the Chassis Rails

You will need to remove the top cover and the feet to add rack rails to the chassis. First, remove the top and right covers (top and left covers when standing as a tower chassis) by first removing the screws that secure them to the chassis. Depress the button on the top (side if tower) of the chassis to release the cover and then pull the cover off. Then unscrew the four feet and remove them from the chassis (see Figure 2-2).

You can now attach rack rails to the top and bottom (now the sides) of the chassis. First add the rack handles. Then position the inner chassis rail sections you just removed along the side of the chassis making sure the screw holes line up. Note that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-3). Repeat this procedure for the other rail on the other side of the chassis. You will also need to attach the rail brackets when installing into a telco rack.

Locking Tabs: As mentioned, the chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

Figure 2-2. Preparing to Install the Chassis Rails

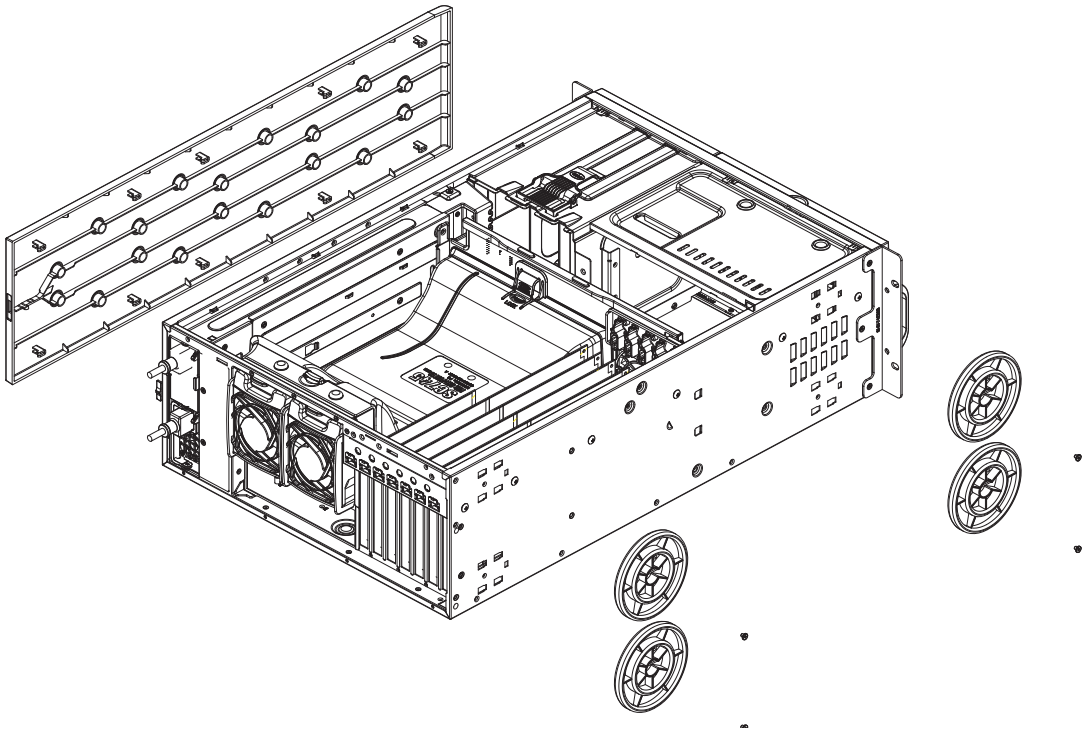
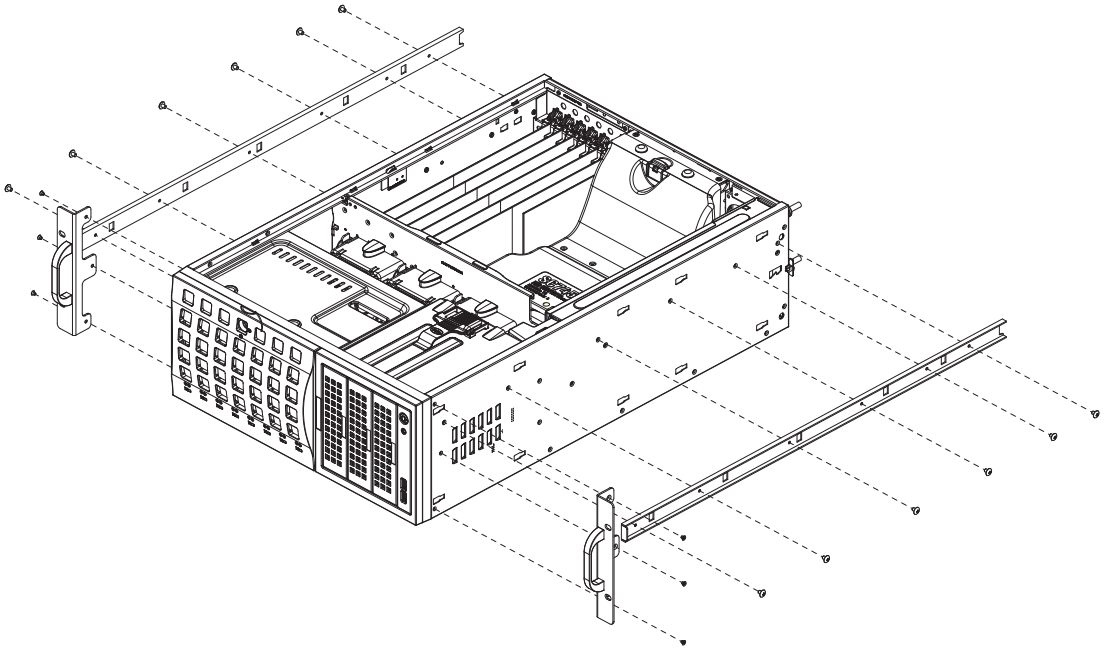


Figure 2-3. Installing the Rails to the Chassis



Installing the Rack Rails

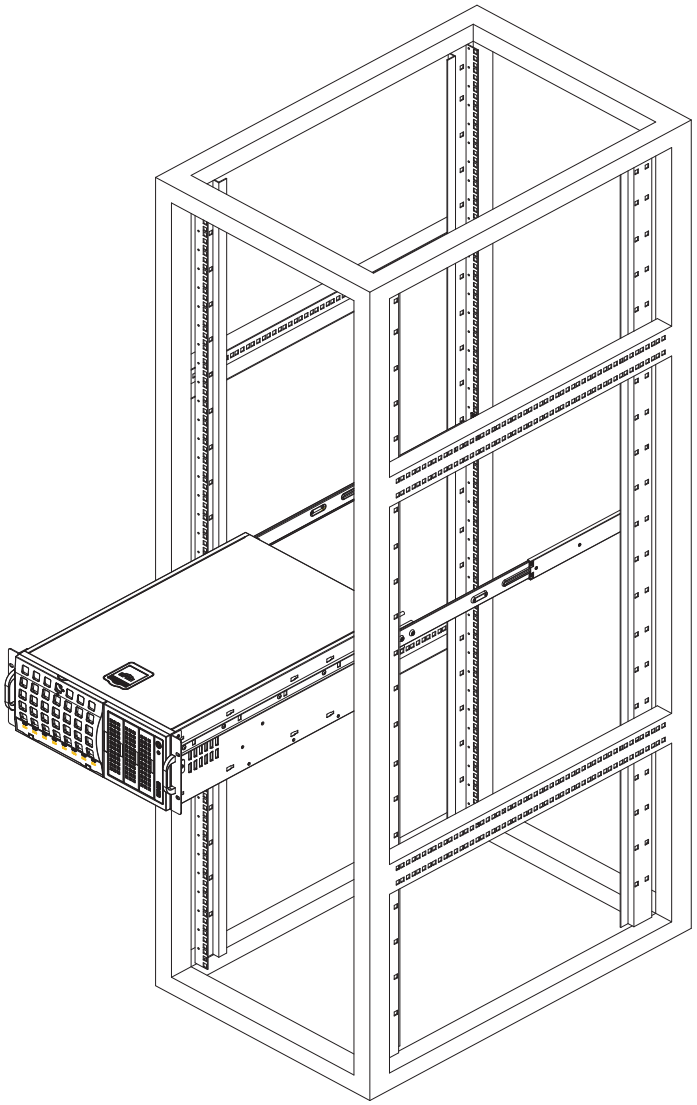
Determine where you want to place the SuperServer 7047R-3RF4+ in the rack. (See Rack and Server Precautions in Section 2-3.) Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure both are at the exact same height and with the rail guides facing inward.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. You should have two brackets in the rack mount kit. Install these first keeping in mind that they are left/right specific (marked with "L" and "R"). Then, line up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting).

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack (see Figure 2-4).

Figure 2-4. Installing the Server into a Rack



Notes

Chapter 3

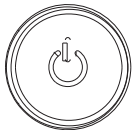
System Interface

3-1 Overview

The control panel on the 7047R-3RF4+ has several LEDs and two buttons. There are also two LEDs on each hard drive carrier. These LEDs keep you constantly informed of the overall status of the system and the activity and health of specific components.

3-2 Control Panel Buttons

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



Power

This is the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

Reset

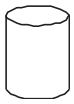
Use the reset button to reboot the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC745 chassis has six LEDs that 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.

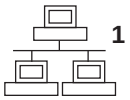
Power

Indicates power is being supplied to the system's power supply. This LED should normally be on when the system is operating.



HDD

Indicates hard disk drive activity when flashing.



NIC1

Indicates network activity on LAN1 when flashing.

NIC2

Indicates network activity on LAN2 when flashing.

Information LED

This LED will be solid blue when the UID function has been activated. When this LED flashes red, it indicates a fan failure. When red continuously 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 (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists.

Power Fail

This LED functions only when two power supply modules have been installed in the system and indicates a power supply module has failed (when illuminated). This should be accompanied by an audible alarm. A backup power supply module will take the load and keep the system running but the failed module will need to be replaced. Refer to Chapter 6 for details on replacing the power supply. This LED should be off when the system is operating normally.

3-4 Drive Carrier LEDs

- **Green:** Each hard drive carrier has a green LED. When illuminated, this green LED (on the front of the hard drive carrier) indicates drive activity. A connection to the backplane enables this LED to blink on and off when that particular drive is being accessed. Please refer to Chapter 6 for instructions on replacing failed hard drives.

- **Red:** The red LED to indicate a hard drive failure. If one of the hard drives fail, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed hard drives.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 7047R-3RF4+ 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 installing main system components, such as the serverboard and memory modules. When disconnecting power, you should first power down the operating system first and then unplug the power cords. The unit has more than one power supply cord. Disconnect both power supply cords before servicing to avoid electrical shock.

- 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 necessary.

- 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 7047R-3RF4+ clean and free of clutter.

- The 7047R-3RF4+ weighs approximately 70 lbs (31.8 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.

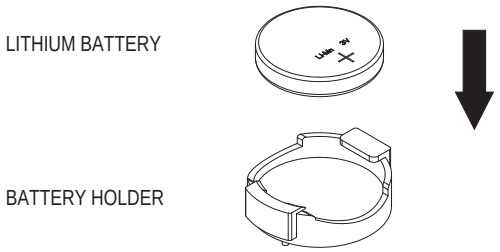
- Put the serverboard and peripherals back into their antistatic bags when not in use.

- 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 7047R-3RF4+ is operating to assure 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



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 X9DR3-LN4F+ 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 Serverboard Installation

This section explains the first step of physically mounting the X9DR3-LN4F+ into the SC745TQ-R920B chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the serverboard, follow the procedure in reverse order.

Installing to the Chassis

1. Access the inside of the system by removing the screws from the lip of the top cover of the chassis, then push the latch and pull the cover off.

2. Make sure that the I/O ports on the serverboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. Carefully mount the serverboard to the serverboard tray by aligning the board holes with the raised metal standoffs that are visible in the chassis.

4. Insert screws into all the mounting holes on your serverboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the serverboard ground to provide a continuous ground for the system.

5. Replace the top cover of the chassis whenever work inside the chassis has been completed.

Warning: To avoid damaging the motherboard and its components, do not apply any force greater than 8 lbs. per square inch when installing a screw into a mounting hole.

5-3 Connecting Cables

Now that the serverboard is installed, the next step is to connect the cables to the board. 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 layout on page 5-10 for connector locations.)

- SATA or SAS drive data cables (I-SATA0 ~ I-SATA5) (SAS0 ~ SAS7)
- Control Panel cable (JF1)
- USB cable for front side access (USB4/5)

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

Connecting Power Cables

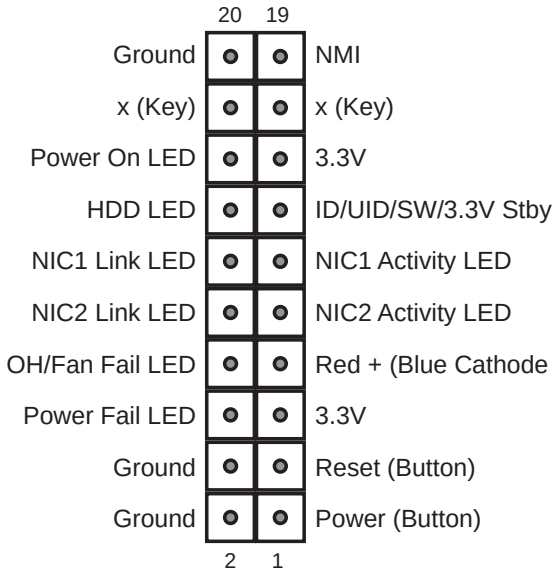
The X9DR3-LN4F+ has a 24-pin primary power supply connector (JPW1) for connection to the ATX power supply. In addition, there are two 8-pin 12V processor power connectors (JPW2 and JPW3) that must be connected to your power supply. See Section 5-9 for power connector pin definitions.

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 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 Chapter 5 for details and pin descriptions.

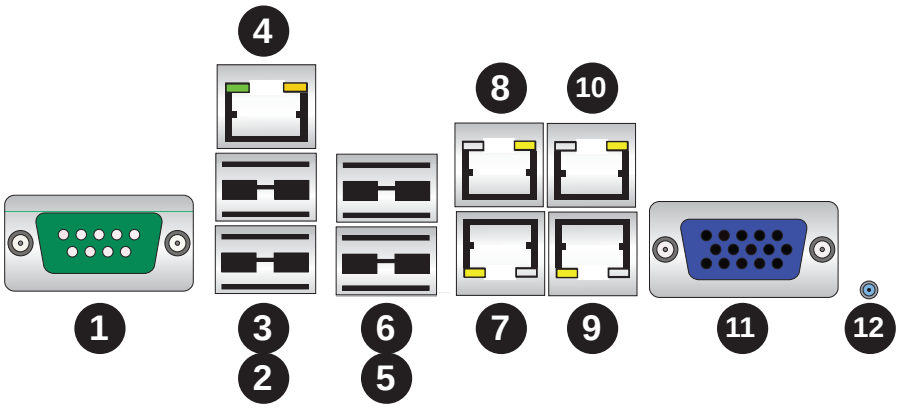
Figure 5-1. Control Panel Header Pins



5-4 Rear 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. Rear I/O Ports



Rear I/O Ports			
1	COM Port 1	7	LAN Port 1
2	USB Port 0	8	LAN Port 2
3	USB Port 1	9	LAN Port 3
4	Dedicated IPMI LAN	10	LAN Port 4
5	USB Port 2	11	VGA Port
6	USB Port 3	12	UID Switch

5-5 Installing the Processor and Heatsink

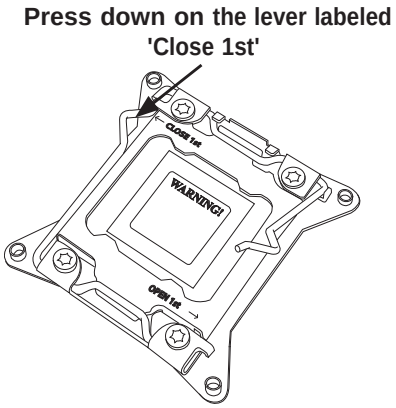
When handling the processor package, avoid placing direct pressure on the label area of the fan.

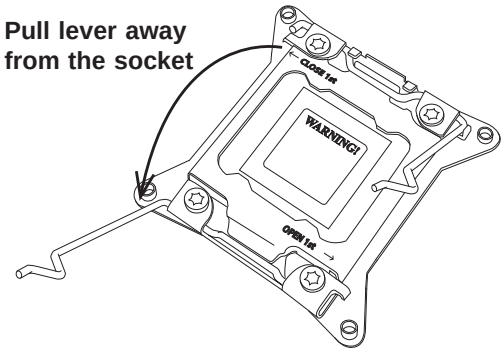
Notes:

- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the 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.

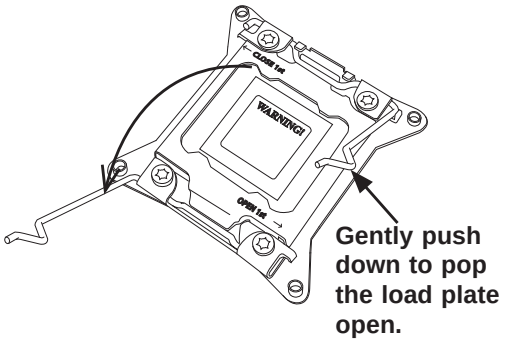
Installing an LGA2011 Processor

1. There are two levers on the LGA2011 socket. First press and release the load lever labeled 'Open 1st'.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.



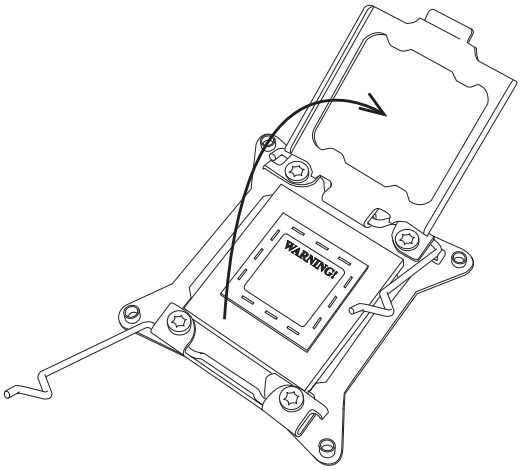


3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

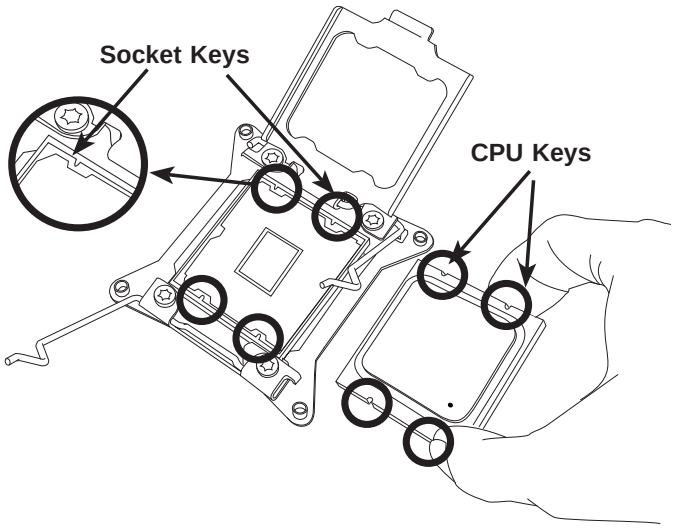


4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

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.



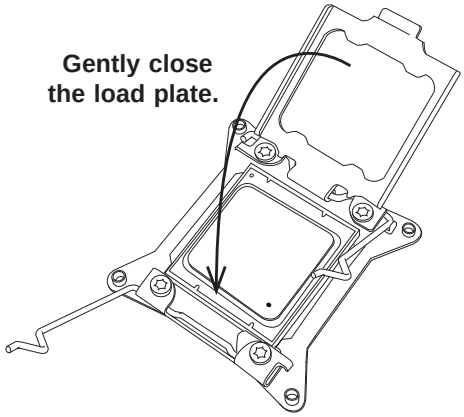
6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)

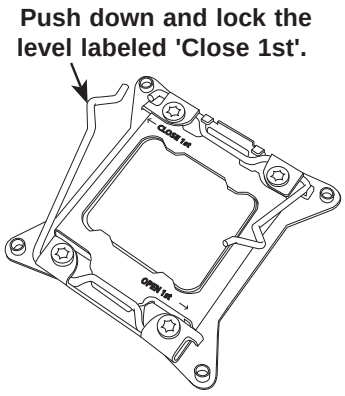


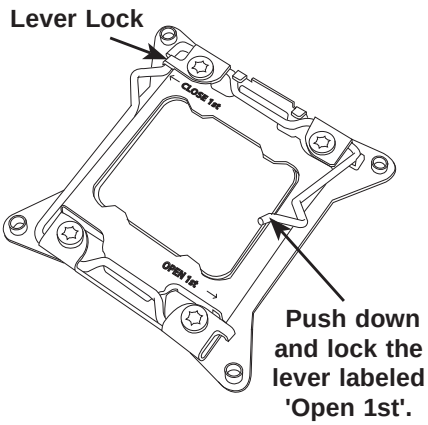
Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is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







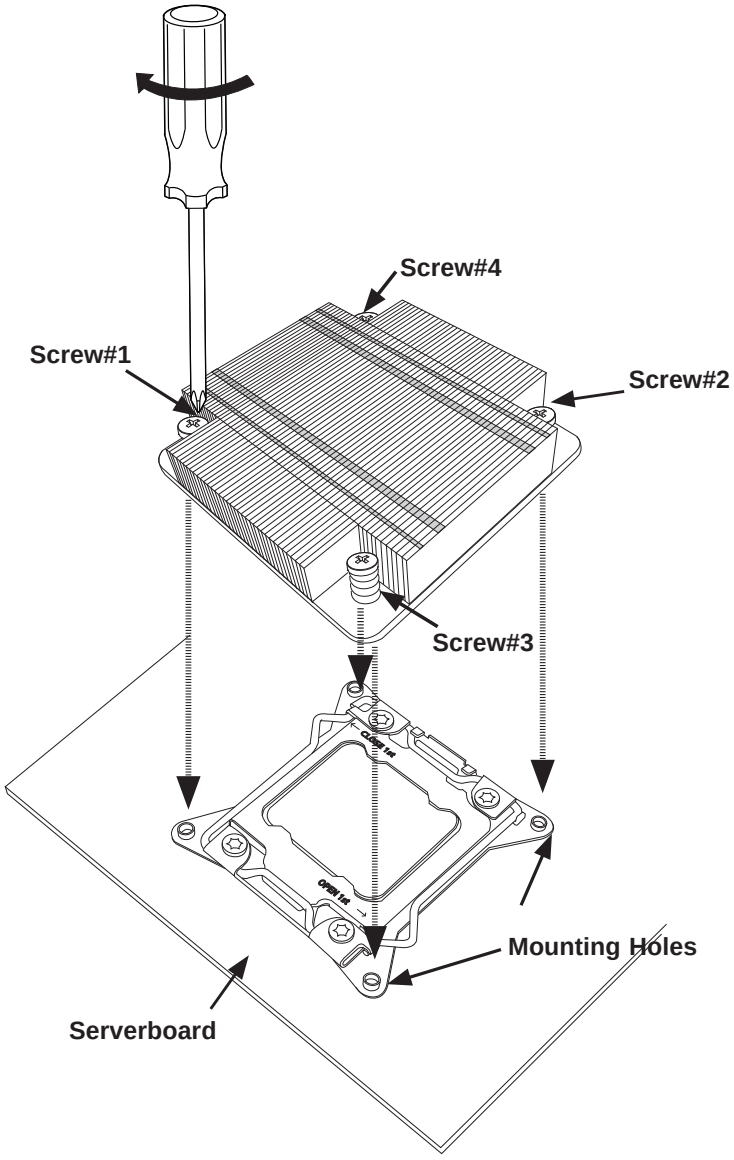
Installing a Passive CPU Heatsink

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

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

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

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



Removing the Heatsink

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

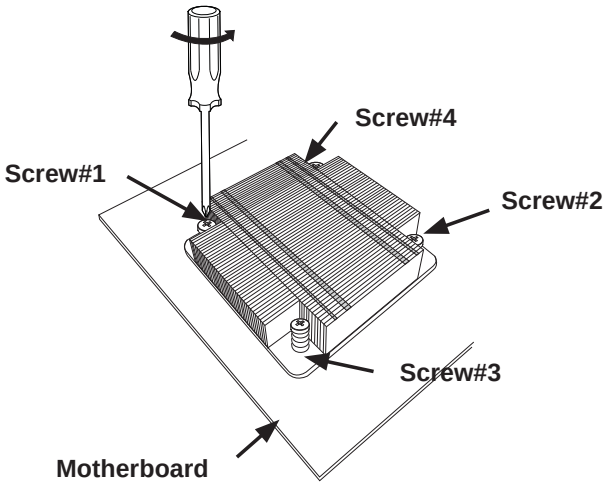
1. Unscrew the heatsink screws from the motherboard in the sequence as shown in the illustration below.

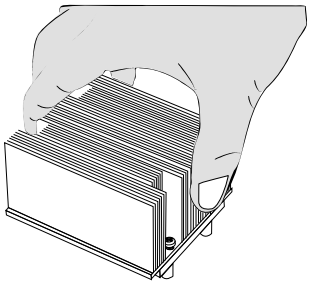
2. Gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!)

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

4. Remove the used thermal grease and clean the surface of the CPU and the heatsink, Reapply the proper amount of thermal grease on the surface before reinstalling the heatsink. (Do not reuse old thermal grease!)

Loosen screws in sequence as shown.





Warning: Do not reuse old thermal grease!

5-6 Installing Memory

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

Memory Support

The X9DR3-LN4F+ supports up to 768 GB of ECC registered DDR3-1600/1333/1066/800 SDRAM. Both 1.5V and 1.35V DIMMs are supported. For best performance, install pairs of memory modules of the same type and speed. Please refer to our web site for any updates to supported memory. All channels will run at the fastest common frequency. Memory may not run at the full 1600 MHz with DDR3-1600 DIMMs installed in all 24 slots.

DIMM Installation

Installing Memory Modules

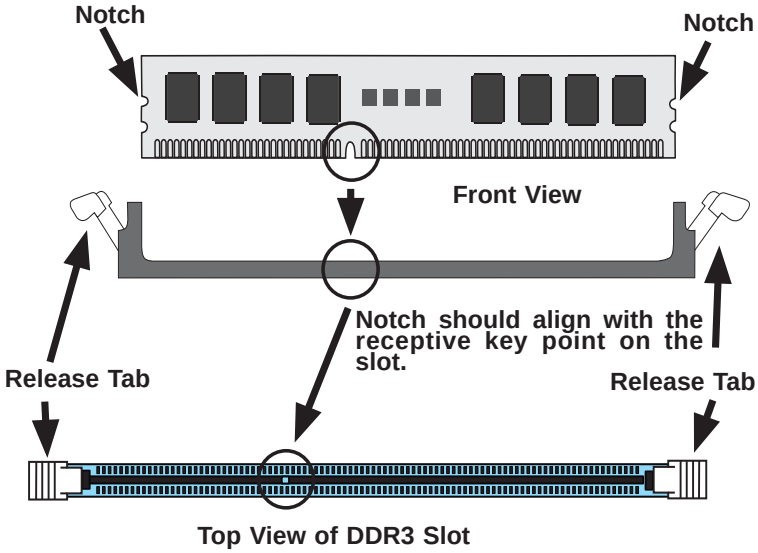
1. Insert the desired number of DIMMs into the memory slots starting with P1-DIMM1A. See the Memory Installation Tables below.

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. Use your thumbs to gently press down on both ends of the DIMM module until it snaps into place in the slot. Repeat for all modules.

4. Press the release tabs to the locked positions to secure the DIMM module into the slot.

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.

DIMM Module Population Table

Follow the table below when installing memory.

Processors and their Corresponding Memory Slots												
CPU#	**Corresponding Memory Slot**											
CPU 1 (P1-)	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3
CPU2 (P2-)	E1	F1	G1	H1	E2	F2	G2	H2	E3	F3	G3	H3

Processor and Memory Module Population	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table (For memory to work properly, please install DIMMs according to this table)**
1 CPU & 3 DIMMs	CPU1 P1-A1/P1-B1/P1-C1
1 CPU & 6 DIMMs	CPU1 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2
1 CPU & 9 DIMMs	CPU1 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2/P1-C2/P1-D2/P1-A3
1 CPU & 12 DIMMs	CPU1 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2/P1-C2/P1-D2/P1-A3/P1-B3/P1-C3/P1-D3
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1 P2-E1/P2-F1/P2-G1
2 CPUs & 12 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2 P2-E1/P2-F1/P2-G1/P2-H1/P2-E2/P2-F2
2 CPUs & 16 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2/P1-C2/P1-D2 P2-E1/P2-F1/P2-G1/P2-H1/P2-E2/P2-F2/P2-G2/P2-H2
2 CPUs & 18 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2/P1-C2/P1-D2/P1-A3 P2-E1/P2-F1/P2-G1/P2-H1/P2-E2/P2-F2/P2-G2/P2-H2/P2-E3
2 CPUs & 24 DIMMs	CPU1/CPU2 P1-A1/P1-B1/P1-C1/P1-D1/P1-A2/P1-B2/P1-C2/P1-D2/P1-A3/P1-B3/P1-C3/P1-D3 P2-E1/P2-F1/P2-G1/P2-H1/P2-E2/P2-F2/P2-G2/P2-H2/P2-E3/P2-F3/P2-G3/P2-H3

RDIMM Support POR on the Sandy Bridge-EP Series Processor Platform (To Be Updated)				
DIMM Slots per DDR Channel	**DIMMs Populated per DDR Channel**	**RDIMM Type (RDIMM: Reg.= Registered)**	**POR Speeds (in MHz)**	**Ranks per DIMM (Any Combination)**
1	1	Reg. ECC DDR3	800, 1066, 1333, 1600	SR, DR, or QR
2	1	Reg. ECC DDR3	800, 1066, 1333, 1600	SR, DR, or QR
2	2	Reg. ECC DDR3	800, 1066, 1333, 1600	Mixing SR, DR, QR

Population Rules:
1. Any combination of x4 and x8 RDIMMs with 1 Gb or 2 Gb DRAM density are supported.
2. Populate DIMMs starting with DIMM1A.
3. When mixing QR with SR or DR on the same DDR channel, put the QR in DIMM1A first.

5-7 Adding PCI Add-On Cards

The 7047R-3RF4+ can accommodate up to six full-length, low-profile PCI add-on cards (four x16 cards, one x8 card and one x4 card in a x8 slot).

Installing an Add-on Card

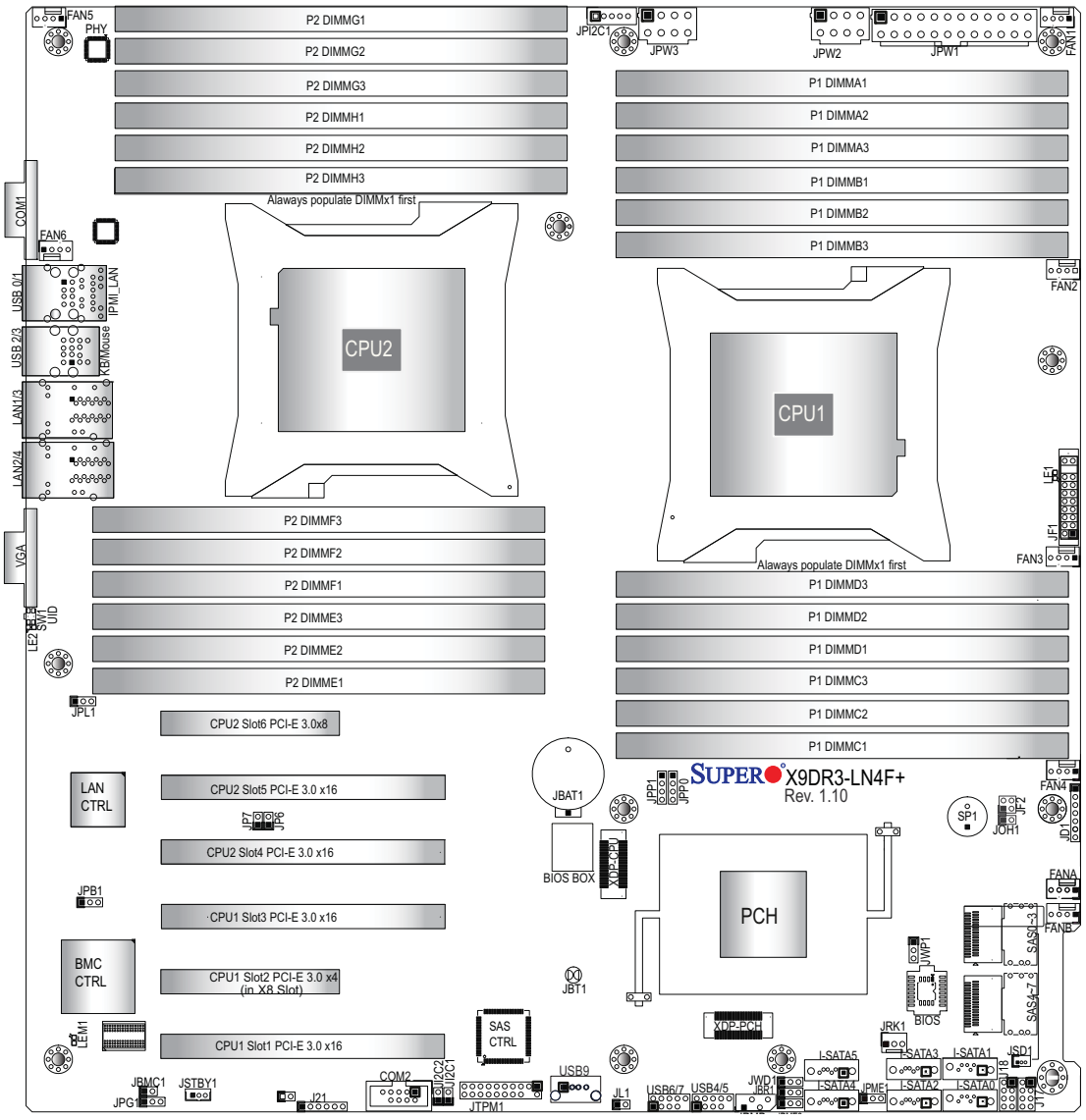
1. Begin by removing the shield for the PCI slot you wish to populate.

2. Fully seat the card into the slot, pushing down with your thumbs evenly on both sides of the card.

3. Finish by using a screw to secure the top of the card shield to the chassis. The PCI slot shields protect the serverboard and its components from EMI and aid in proper ventilation, so make sure there is always a shield covering each unused slot.

5-8 Serverboard Details

Figure 5-4. X9DR3-LN4F+ Layout



Note: jumpers not indicated are for test purposes only and should not have their settings changed.

X9DR3-LN4F+ Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-10
JI²C1/JI²C2	SMB to PCI-E Slots	Pins 2-3 (Normal)
JP6	XDP (Extended Debug Port)	Open (Disabled)
JPB1	BMC Enable/Disbable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPME1	ME Recovery	Pins 2-3 (Normal)
JPME2	Manufacture Mode Select	Pins 2-3 (Normal)
JPP0	JTAG Scan	Pins 2-3 (CPU 1 only)
JPP1	JTAG Scan	Pins 2-3 (CPU 2 only)
JWD	Watch Dog	Pins 1-2 (Reset)
JWP1	Write Protect Enable/Disable	Pins 1-2 (Enabled)

Connector	Description
COM1/COM2	Backplane COM Port1/Front Accessible COM2 Header
FAN1~6, FANA, B	CPU/System Fan Headers
IPMB	4-pin External BMC I²C Header (for an IPMI Card)
I-SATA 0~5	Intel SB SATA Ports 0~5
J17/J18	Serial-Link General_Purpose IO Headers (T-SGPIO 1/2)
JBAT1	Onboard Battery
JD1	Speaker/Power LED Indicator
JF1	Front Panel Control Header
JPI²C1	System Management SMBbus I²C Header
JITP0	XDP CPU
JL1	Chassis Intrusion
JOH1	Overheat/Fan Fail LED
JPI²C1	Power Supply SMBbus I²C Header
JPW1	ATX 24-Pin Power Connector

JPW2/JPW3	12V 8-Pin Power Connectors
JRK1	RAIDKey
JSD1	SATA DOM (Device On Module) Power Connector
JSTBY1	Standby Header
JTPM1	TPM (Trusted Platform Module)/Port 80
LAN1/3, LAN2/4	G-bit Ethernet Ports 1/3, 2/4
(IPMI) LAN	IPMI Dedicated LAN
SAS 0~3, 4~7	Serial Attached SCSI Ports 0~3, 4~7
SP1	Onboard Buzzer (Internal Speaker)
USB 0/1	Back Panel USB 0/1
USB 2/3	Back Panel USB 2/3
USB 4/5, USB 6/7	Front Panel Accessible USB Connections 4/5, 6/7
USB 9	Front Panel Type A USB 6, USB 7 Ports
UID Switch	UID (Unit Identifier) Switch
VGA	Backpanel VGA Port

LED	Description	State/Status
LE1	Standby PWR LED	Green On: SB Power On
LE2	UID LED	Blue On/Blinking: Unit Identified (Windows/Linux)
LEM1	BMC Heartbeat LED	Green Blinking: Normal

5-9 Connector Definitions

Power Connectors

A 24-pin main power supply connector (JPW1) and two 8-pin CPU power connectors (JPW2/3) must be connected to the power supply. These power connectors meet the SSI EPS 12V specification. See the table on the right for pin definitions.

Warning: To provide adequate power supply to the motherboard, be sure to connect JPW1 and both JPW2 and JPW3 to the power supply. Failure to do so will void the manufacturer warranty on your power supply and motherboard.

ATX Power 24-pin Connector Pin Definitions

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

Secondary Power Connector

JPW2 and JPW3 must also be connected to the power supply. See the table on the right for pin definitions.

+12V 8-pin Power Pin Definitions

Pins	Definition
1 - 4	Ground
5 - 8	+12V

Required Connection

Power Button

The Power On connection is on pins 1 and 2 of JF1. These should be connected to the chassis power button. See p. 5-4 and the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin#	Definition
1	Power Signal
2	Ground

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See p. 5-4 and the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)

Pin#	Definition
3	Reset
4	Ground

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. See p. 5-4 and the table on the right for pin definitions.

PWR Fail LED Pin Definitions (JF1)

Pin#	Definition
5	Vcc
6	Ground

Information LED

Connect an LED to the OH connection on pins 7 and 8 of JF1 for UID and to provide advanced warning of chassis overheating and fan fail. Refer to p. 5-4 and the table on the right for pin definitions. Refer to Chapter 3 for further details on the control panel LED.

OH/Fan Fail/UID LED Pin Definitions (JF1)

Pin#	Definition
7	Vcc
8	Ground

OH/Fan Fail Indicator Status

State	Definition
Off	Normal
On	Overheat
Flash-ing	Fan Fail

NIC2 (JLAN2) LED

The LED connections for JLAN2 are on pins 9 and 10 of JF1. Attach an LED cable to display network activity. See p. 5-4 and the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)

Pin#	Definition
9	Vcc
10	Ground

NIC1 (JLAN1) LED

The LED connections for JLAN1 are on pins 11 and 12 of JF1. Attach an LED cable to display network activity. See p. 5-4 and the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)

Pin#	Definition
11	Vcc
12	Ground

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. This LED is used to display all IDE/SAS/SATA activity. See p. 5-4 and the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)

Pin#	Definition
13	Vcc
14	HD Active

Power On LED

The Power On LED connector is located on pins 15 and 16 of JF1 (use JLED for a 3-pin connector). This connection is used to provide LED indication of power being supplied to the system. See p. 5-4 and the table on the right for pin definitions.

Power LED Pin Definitions (JF1)

Pin#	Definition
15	5V Stby
16	Control

NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. See p. 5-4 and the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)

Pin#	Definition
19	Control
20	Ground

Fan Headers

There are eight fan headers on the serverboard, all of which are 4-pin fans. Pins 1-3 of the fan headers are backward compatible with the traditional 3-pin fans. (Fan speed control is supported with 4-pin fans only.) See the table on the right for pin definitions. The onboard fan speeds are controlled by Thermal Management (via Hardware Monitoring) under the Advanced Section in the BIOS.

Fan Header Pin Definitions (FAN1-8)

Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWR Modulation

Serial Ports

Two serial ports are included on the serverboard. COM1 is a backpanel port and COM2 is a header located near the PCI-E slot 1. See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1/COM2)

Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Chassis Intrusion

The Chassis Intrusion header is designated JL1. Attach a chassis intrusion 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

Ethernet Ports

Four Ethernet ports are located on the I/O backplane. A dedicated IPMI LAN port is also included to provide KVM support for IPMI 2.0. These ports accept RJ45 type cables. Please refer to Section 5-11 for LAN LED information.

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..

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

Power LED/Speaker

On the JD1 header, pins 1-3 are for a power LED and pins 4-7 are for the speaker. Close pins 4-7 with a jumper to use an external speaker. If you wish to use the onboard speaker, please close pins 6-7. See the table on the right for speaker pin definitions.

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

Overheat/Fan Fail LED

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 table on the right for pin definitions.

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

Universal Serial Bus (USB)

There are four Universal Serial Bus ports located on the I/O panel. In addition, there is one Type A port and two headers located on the serverboard. The headers can be used to provide front side USB access (cables not included). See the table on the right for pin definitions.

Back Panel USB (USB 0/1/2/3)

Pin#	Definitions
1	+5V
2	PO-
3	PO+
4	Ground
5	N/A

Type A USB Ports (USB9)

Pin#	Definition
1	Vcc
2	Data-
3	Data+
4	Ground
5	NA

USB Header Pin Definitions

USB4/6		USB5/7	
Pin #	Definition	Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	N/A	5	Key

SGPIO Headers

The SGPIO (Serial General Purpose Input/Output) headers are used to communicate with the enclosure management chip on the backplane. See the table on the right for pin definitions.

SGPIO Header Pin Definitions

Pin#	Definition	Pin	Definition
1	NC	2	NC
3	Ground	4	DATA Out
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

Overheat LED/Fan Fail (JOH1)

The JOH1 header is used to connect an LED to provide warning of chassis overheating or fan failure. This LED will blink to indicate a fan failure. Refer to the tables on right for LED status and pin definitions.

OH/Fan Fail LED States

State	Message
Solid	Overheat
Blinking	Fan Fail

Overheat LED Pin Definitions

Pin#	Definition
1	5vDC
2	OH Active

IPMB

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

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

IPMB I²C Header

An SMB header for the IPMI (Intelligent Platform Management Interface) slot is designated J5. Connect the appropriate cable here to utilize this management feature on your system.

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

DOM 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 DOM devices.

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

RAIDKey Header (Optional)

A RAIDKey header provides RAID 5 support to enhance the performance of Intel HostRAID and LSI MegaRAID.

Note: RAIDKey: SMCI Part# AOC-IMRRAKey-2008-LSI

RAIDKey Pin Definitions	
Pin#	Definition
1	Ground
2	Signal
3	Ground

Power Supply SMBus I²C Header

The power System Management Bus header at JPI²C1 is used to monitor the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

PWR SMBus Header Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

Unit Identifier Switch

The UID Switch is located next to the LAN 2/4 ports on the backplane. The Rear UID LED (LE2) is located next to the UID switch. The control panel UID LED connection is on pins 7/8 of JF1. Connect a cable to pin 8 on JF1 for Front Panel UID LED indication. When you press the UID switch, both the rear UID LED and control panel UID LED indicators will be turned on. Press the UID switch again to turn off both LED Indicators. These indicators provide easy identification of a system unit that may be in need of service.

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

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

Power SMB (I^2C) Connector

Power System Management Bus (I^2C) Connector (JPI^2C1) 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

TPM Header/Port 80

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

TPM/Port 80 Header Pin Definitions

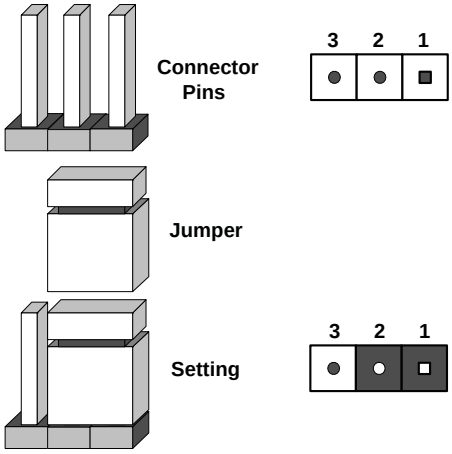
Pin #	Definition	Pin #	Definition
1	LCLK	2	GND
3	LFRAME#	4	<(KEY)>
5	LRESET#	6	+5V (X)
7	LAD 3	8	LAD 2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4	14	SMB_DAT4
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)

5-10 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

LAN Enable/Disable

JPL1 enables or disables the LAN ports on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

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

I²C Bus to PCI-Exp. Slots

Jumpers JI²C1 and JI²C2 allow you to connect the System Management Bus (I²C) to the PCI-Express slots. The default setting is pins 2-3 (Disabled.) Both jumpers must be set to the same setting See the table on the right for jumper settings.

I²C to PCI-E Slots Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Write_Protect Enable

Close pins 1/2 of JWP1 to enable write protect support via software-control. Enabling this jumper will enhance system security and data integrity. See the table on the right for jumper settings.

Write_Protect (JWP1) Jumper Settings	
Jumper Setting	Definition
Open	Write_Protect Disabled
Pins 1/2	Write Protect via Software Control (Default)
Pins 2/3	Write_Protect Enabled

BMC Enable

Jumper JPB1 allows you to enable the embedded the Winbond WPCM450R BMC (Baseboard Management) Controller to provide IPMI 2.0/KVM support on the motherboard. 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)

Manufacturer's Mode

Jumper JPME2 allows the user to flash the system firmware from a host server in order to modify system settings. Close this jumper to bypass SPI flash security, and force ME into recovery mode in order to use recov-

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

ME Recovery

Close Jumper JPME1 to use ME Firmware Recovery mode, which will limit system activities to support essential functions only. There will be no power use restrictions. In single operational mode, online upgrade will be available via the Recovery mode. See the table on the right for jumper settings.

ME Recovery Jumper Settings	
Jumper Setting	Definition
On	ME Recovery
Off	Normal (Default)

XDP Clock Enable

Close Jumper JP6 to enable XDP (Extended Debug Port) support, which will increase system debug resources and extend JTAG by using two separate clock domain scan chains for system scan optimization. If this jumper is set to "Off", CPU1 clock domain chain will be used in system scanning. See the table on the right for jumper settings.

XDP Clock Enable Jumper Settings	
Jumper Setting	Definition
On	Enabled (Two separate clock scan chains used in system scan)
Off	Disabled (CUP1 Clock Scan Chain is used in system scan) (Default: Normal)

Watch Dog Enable/Disable

Jumper 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.

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

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

JTAG Scan

The JTAG scan jumpers (JPP0/ JPP1) allow the user to configure JTAG scan settings for system debugging. See the tables on the right for jumper settings.

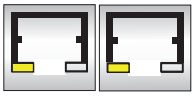
JTAG Scan (JPP0) Jumper Settings	
Jumper Setting	Definition
Pins 1/2, 3/4	including CPU2 in JTAG Scan
Pins 2/3 (Default)	JTAG Scan: CPU1 only

JTAG Scan (JPP1) Jumper Settings	
Jumper Setting	Definition
Pins 1/2, 3/4	including CPU1 in JTAG Scan
Pins 2/3 (Default)	JTAG Scan: CPU2 only

5-11 Onboard Indicators

LAN LEDs

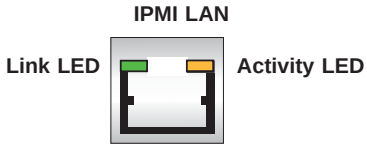
The Ethernet ports (located beside the VGA port) have two LEDs. On each port, the yellow LED flashes to indicate activity while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.



JLAN1/2 LED (Connection Speed Indicator)	
LED Color	Definition
Off	NC or 10 Mbps
Green	100 Mbps
Amber	1 Gbps

IPMI Dedicated LAN LEDs

An additional IPMI Dedicated LAN is also located on the I/O backplane. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the table at right for more information.



IPMI LAN Link LED (Left) & Activity LED (Right)		
LED	Status	Definition
Link (Left)	Green: Solid	100 Mbps
Activity (Right)	Amber: Blinking	Active

Onboard Power LED (LE1)

An Onboard Power LED is located at LE1. This LED Indicator is lit when the system is on. Be sure to unplug the power cable before removing or adding any components. See the table on the right for more details.

Onboard PWR LED Indicator	
LED Color	Status
Off	System Off (PWR cable not connected)
Green	System On
Green: Flashing Quickly	ACPI S1 State
Green: Flashing Slowly	ACPI S3 (STR) State

Rear UID LED

The rear UID LED is designated LE2. This LED is used in conjunction with the rear UID switch to provide easy identification of a system.

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

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEM1 on the motherboard. When blinking, BMC is functioning normally.

BMC Heartbeat LED	
LED	Definition
D1	Blinking: BMC: Normal

5-12 SATA and SAS Ports

Serial ATA Ports

There are six Serial ATA Ports (I-SATA0~I-SATA 5) located on the motherboard, including four SATA2 ports and two SATA3 ports. These ports provide serial-link signal connections, which are faster than Parallel ATA. See the table on the right for pin definitions.

SATA Port Pin Definitions

Pin#	Definition	Pin	Definition
1	Ground	2	TXP
3	TXN	4	Ground
5	RXN	6	RXP
7	Ground		

SAS Ports

Eight Serial Attached SCSI ports (SAS 0~3, 4~7) provide serial link connections. These ports are supported by the Intel PCH chip. See the table on the right for pin definitions.

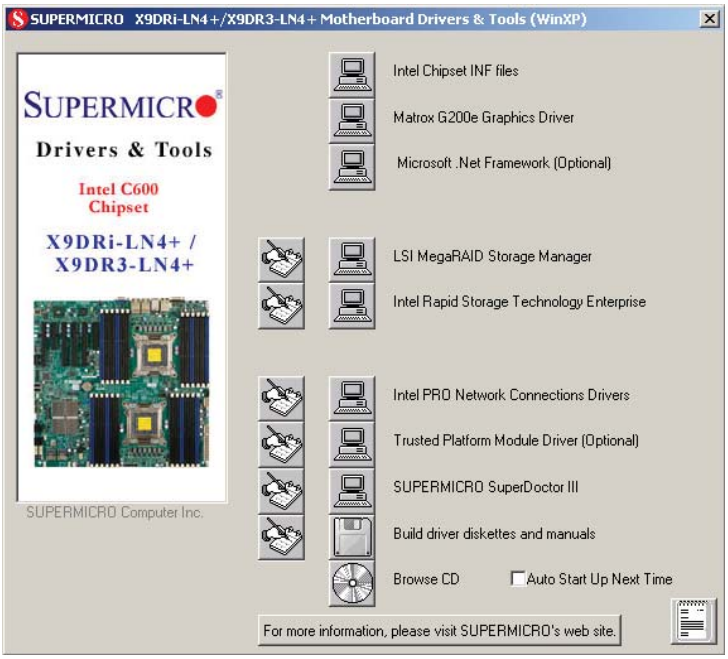
SAS Port Pin Definitions

Pin#	Definition	Pin	Definition
1	Ground	2	TXP
3	TXN	4	Ground
5	RXN	6	RXP
7	Ground		

Note: For more information on SATA HostRAID configuration, please refer to the Intel SATA HostRAID User's Guide posted on our Website @ http://www.supermicro.com..

5-13 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 motherboard.



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.

SuperDoctor III

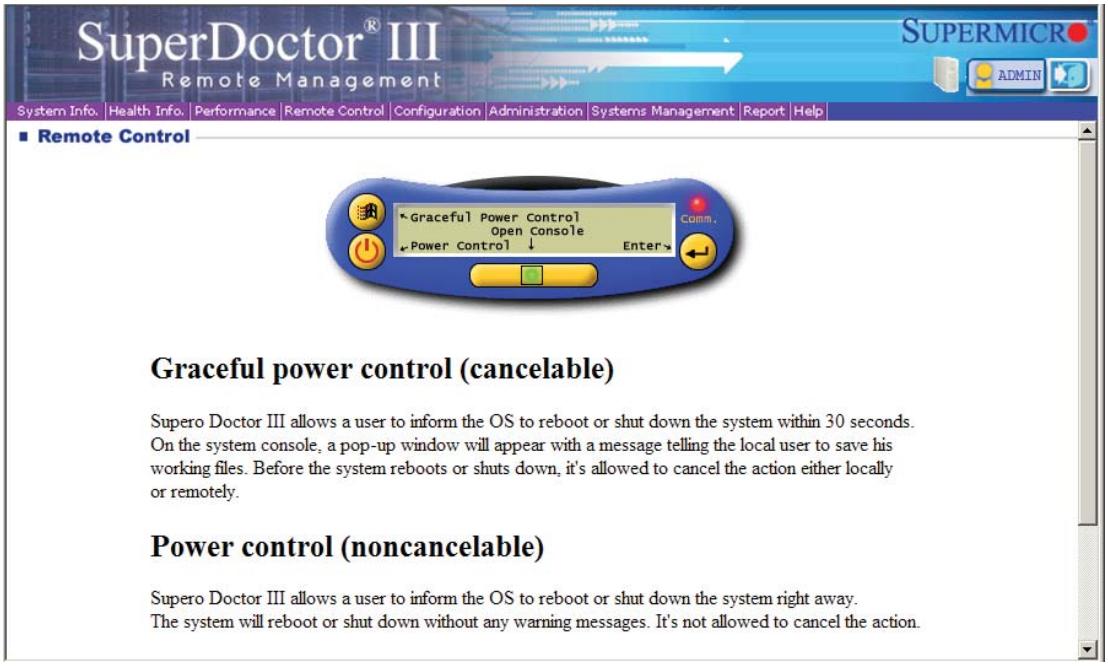
The SuperDoctor® III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The SuperDoctor III program included on the CD-ROM that came with your motherboard allows you to monitor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

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

Note: When SuperDoctor 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 SuperDoctor, as the SuperDoctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor.

Supero Doctor III Interface Display Screen (Health Information)

Supero Doctor III Interface Display Screen (Remote Control)



Note: The SuperDoctor III program and User's Manual can be downloaded from the Supermicro web site at http://www.supermicro.com/products/accessories/software/SuperDoctorIII.cfm.

For Linux, we recommend using SuperDoctor II.

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform simple maintenance on the SC745TQ-R920B chassis. Following the component installation steps in the order given will eliminate most common problems. If some steps are unnecessary, skip ahead to the step that follows. Refer to Chapter 2 for instructions on installing the system as a 4U rackmount.

Tools Required: The only tool you will need is a Philips screwdriver.

6-1 Static-Sensitive Devices

Static electrical discharge 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 static discharge.

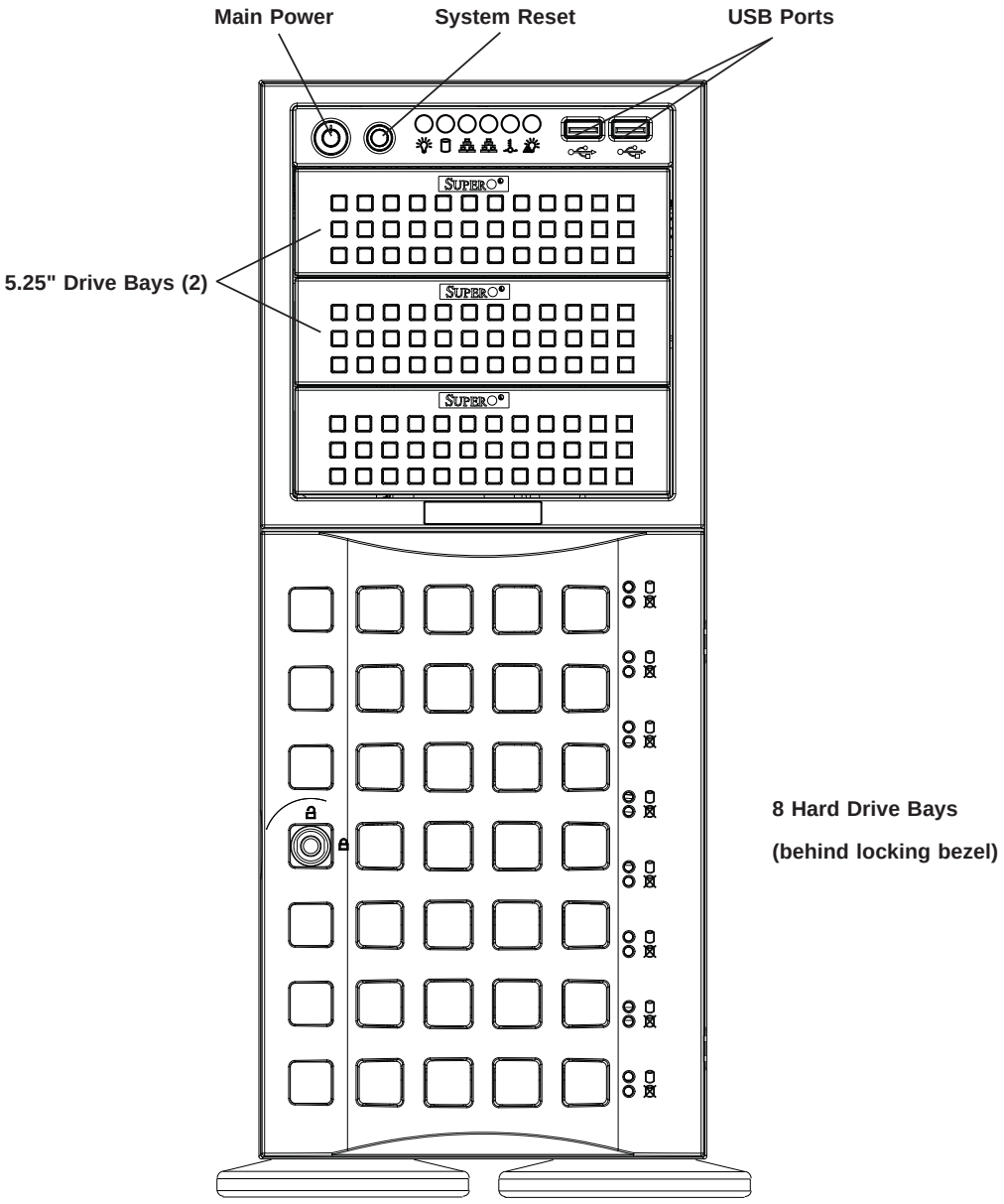
Precautions

- 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.

Unpacking

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

Figure 6-1. Chassis Front View



6-2 Front Control Panel

The front control panel must be connected to the JF1 connector on the serverboard to provide you with system status and alarm indications. A ribbon cable has bundled these wires together to simplify this connection. Connect the cable from JF1 on the serverboard (making sure the red wire plugs into pin 1) to the appropriate comnnector on the front control panel PCB (printed circuit board). Pull all excess cabling over to the control panel side of the chassis. The LEDs on the control panel inform you of system status -See Figure 6-2 for details. See Chapter 5 for details on JF1.

Figure 6-2. Front Control Panel LEDs

Power  Indicates power is being supplied to the system.

HDD  On the SC745TQ-R920B, this LED indicates hard drive activity when flashing.

NIC1  Indicates network activity on LAN port 1.

NIC2  Indicates network activity on LAN port 2

Overheat/Fan Fail  This LED will be solid blue when the UID function has been activated. When flashing red it indicates a fan failure and when solid red it indicates an overheat condition (see Chapter 3 for details).

Power Fail  Indicates a power supply failure. This LED is functional only when two power supply modules are installed in the system.

6-3 System Fans

Three 8-cm chassis cooling fans (located in the center of the chassis) provide cooling airflow while two 8-cm exhaust fans expel hot air from the chassis. The chassis is also fitted with an air shroud to concentrate the flow of cooling air over the areas of highest generated heat. The fans should all be connected to headers on the serverboard (see Chapter 5). Each power supply module also has a cooling fan.

Fan Failure

Under normal operation, all three chassis fans, both exhaust fans and the power supply fans run continuously. The chassis fans and the exhaust fans are hot-swappable and can be replaced without powering down the system.

Accessing the Inside of the System

1. If rack mounted, first release the screws that secure the unit to the rack.
2. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").
3. There are two screws that secure the cover to the chassis - remove these first.
4. Locate the latch on the top (side if tower) of the chassis - depress where it says "push" then lift the latch to release the cover.
5. Lift the cover from the chassis to gain full access to the inside of the server.

Replacing Chassis Cooling Fans

1. First, remove the top/left chassis cover (see Chapter 2 for details on removing the cover) to locate the fan that has stopped working.
2. Depress the locking tab on the failed fan: on a chassis fan, push the tab on the side of the housing inward, on the exhaust fan push down on the colored tab. With the tab depressed, pull the unit straight out (see Figure 6-3). The wiring for these fans has been designed to detach automatically.
3. Replace the failed fan with an identical one. Install it in the same position and orientation as the one you removed; it should click into place when fully inserted. Check that the fan is working then replace the top/left side chassis panel.

Removing the Air Shroud

Under most circumstances you will not need to remove the air shroud to perform any service on the system. However, if you wish to temporarily remove it (the air shroud should always be in place when the system is operating), please follow this procedure.

1. Begin by depressing the tabs at the front and rear of the shroud to unlock it.
2. Lift the air shroud up and out of the chassis (see Figure 6-4).
3. To reinstall, simply position the air shroud in its proper place and push it in until you hear it click.

Figure 6-3. Removing a Chassis Fan

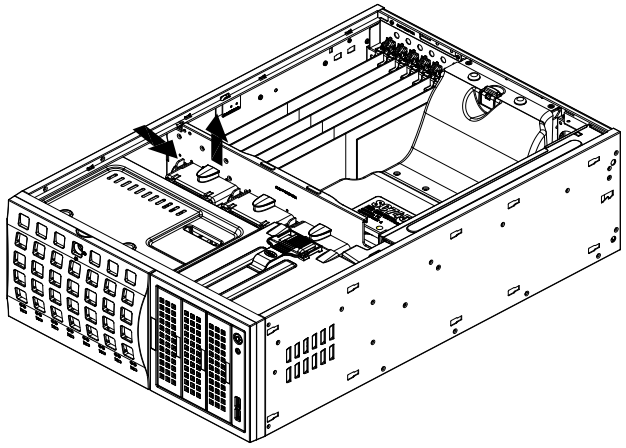
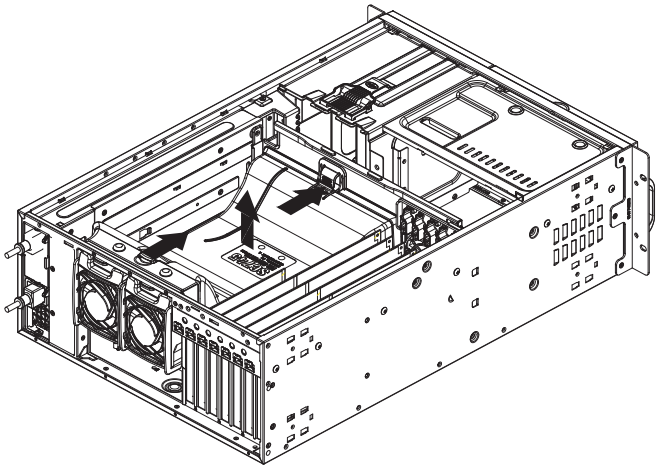


Figure 6-4. Removing the Air Shroud



6-4 Drive Bay Installation

SAS/SATA Hard Drives

A total of eight SAS or SATA drives may be housed in the SC745 chassis. The drive IDs are preconfigured as 0 through 7 in order from bottom to top (or from left to right if rackmounted). A bezel covers the drive area but does not need to be removed to access the drives; simply swing open the bezel. If you wish to remove the bezel piece, push on the three tabs on the inside of the left lip of the front chassis cover. Then slightly swing out the same (left) side of the cover - about ½ inch only. Remove by pushing on the open side of the cover to remove it from the chassis (do not try to swing or pull it straight out after opening the left side).

The drives are mounted in drive carriers to simplify their installation and removal from the chassis. These drives are hot-swappable, meaning they can be removed and installed without powering down the system. The carriers also work to promote proper airflow for the system. For this reason, even carriers without drives must remain in the server.

Regardless of how many drives are installed, all drive carriers must remain in the drive bays to promote proper airflow.

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

Installing/Removing Hard Drives

1. To remove a carrier, first open the front bezel.
2. Push the release button located beside the drive LEDs (See Figure 6-5).
3. Swing the handle fully out and then use it to pull the unit straight out.

Note: Your operating system must have RAID support to enable the hot-swap capability of the drives.

Mounting a Hard Drive in a Drive Carrier

1. Insert the drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
2. Secure the drive to the carrier with four screws (see Figure 6-6).

Figure 6-5. Removing a Drive Carrier

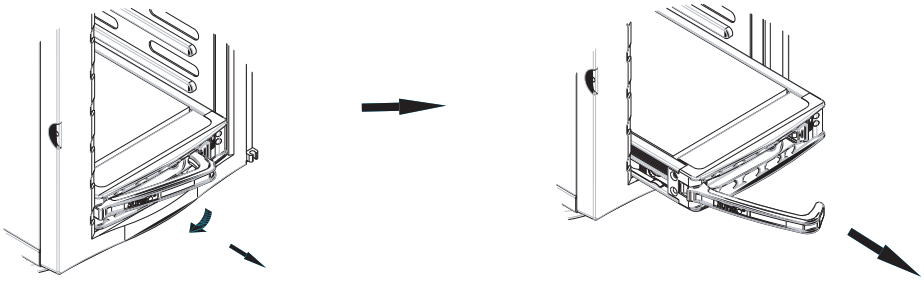
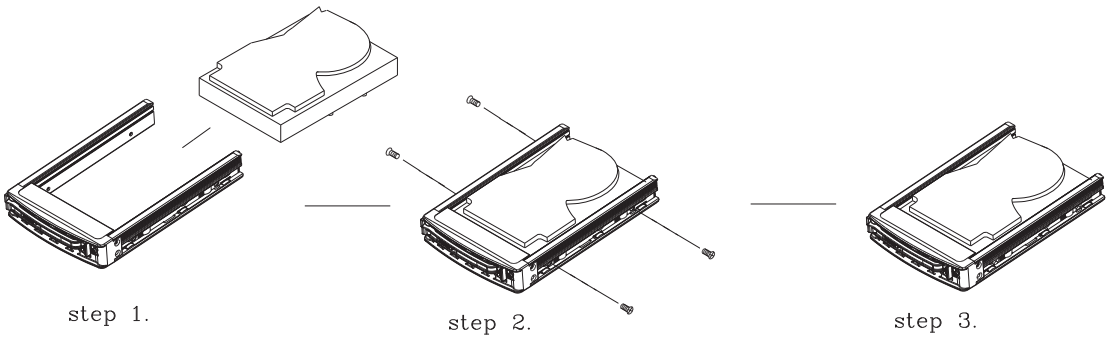


Figure 6-6. Mounting a Drive in a Carrier



Important! Use extreme caution when working around the SAS/SATA backplane. Do not touch the backplane with any metal objects and make sure no cables touch the backplane or obstruct the airflow holes.

SAS/SATA Backplane

The SAS/SATA drives plug into a backplane. Two cables need to be connected from the serverboard to the appropriate connectors on the backplane to support eight SAS or SATA drives. You cannot cascade the backplane.

Installing Components in the 5.25" Drive Bays

The 7047R-3RF4+ has two 5.25" drive bays. DVD-ROM drives can be installed into these 5.25" drive bays.

1. First power down the system and then remove the top/left chassis cover to access the drive components.

2. With the cover off, remove the two or four screws that secure the drive carrier to the chassis (one side only) then push the entire empty drive carrier out from the back.

Adding a DVD-ROM Drive

1. Remove the guide plates (one on each side) from the empty drive carrier and screw them into both sides of the DVD-ROM drive using the holes provided.

2. Slide the DVD-ROM into the bay and secure it to the chassis with the drive carrier screws you first removed.

3. Attach the power and data cables to the drive.

4. Replace the top/left chassis cover before restoring power to the system.

Storage Module

If the 7047R-3RF4+ is to be used in a rack configuration, you must turn the storage module 90 degrees. This can be done before, during, or after setup.

Rotating the Storage Module

1. Open the chassis cover.

2. Disconnect any cables from the storage module to any components in the chassis.

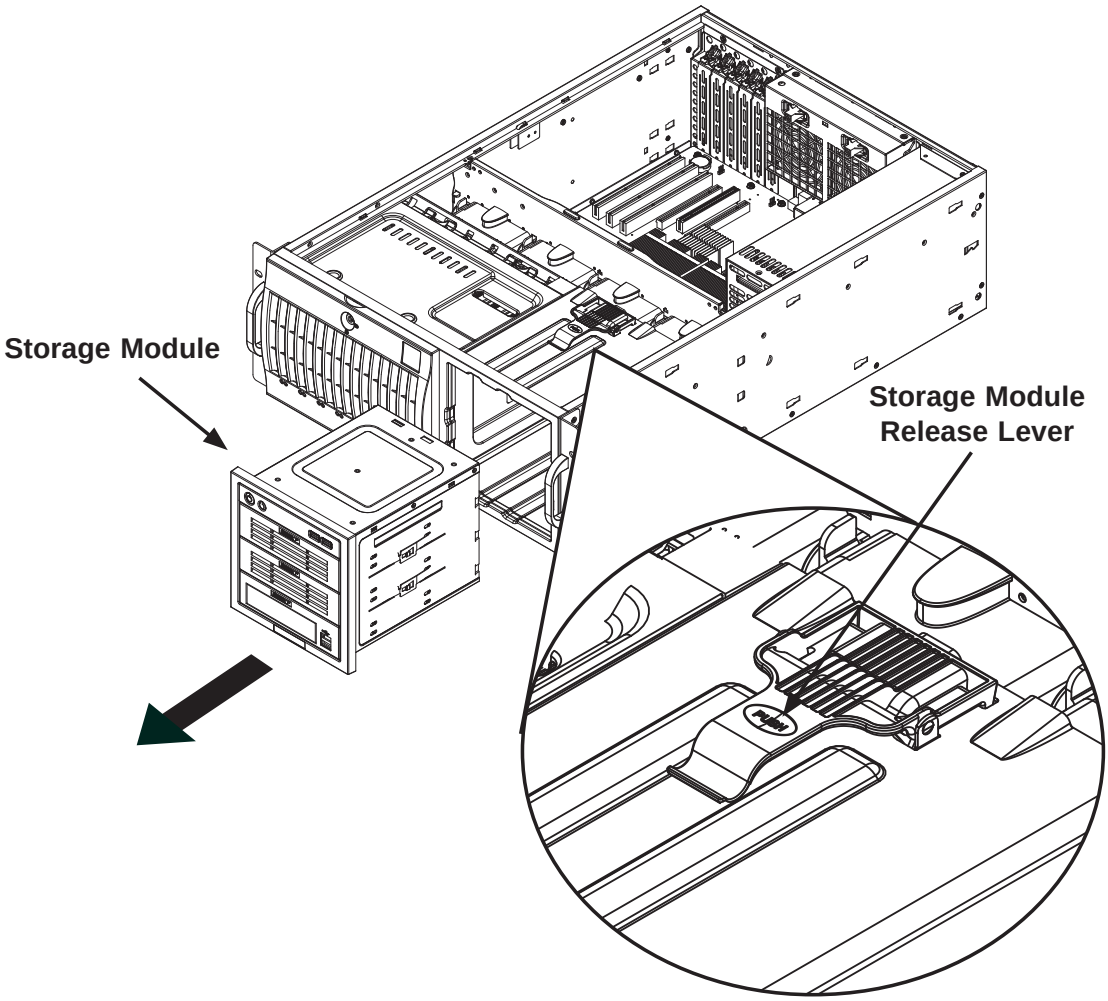
3. Push the storage module release lever to unlock the storage module.

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

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

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

Figure 6-7. Rotating the Storage Module



6-5 Power Supply

The SuperServer 7047R-3RF4+ has a redundant 920 watt power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100V - 240V input voltage.

Power Supply Failure

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The PWR Fail LED will illuminate and remain on until the failed unit has been replaced. Replacement units can be ordered directly from Supermicro (see contact information in the Preface). The hot-swap capability of the power supply modules allows you to replace the failed module without powering down the system.

Replacing the Power Supply

You do not need to shut down the system to replace a power supply module. The redundant feature will keep the system up and running while you replace the failed hot-swap unit. Replace with the exact same model (see Appendix B).

1. Unplug the AC power cord from the failed power supply module.
2. Remove the chassis left-top cover as described in Section 6-3.
3. Remove the screws that secure the power module to the chassis then pull it completely out.
4. Replace the failed unit with another unit of the exact same part number (see Appendix C).
5. Gently but firmly push the new unit all the way into the open bay.
6. Secure it to the chassis using the screws you previously removed.
7. Finish by replacing the chassis left/top cover and then plugging the AC power cord back into the new module you just added.

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup utility for the X9DR3-LN4F+/X9DRi-LN4F+. 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.

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 X9DRi-LN4+/X9DR3-LN4+

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.

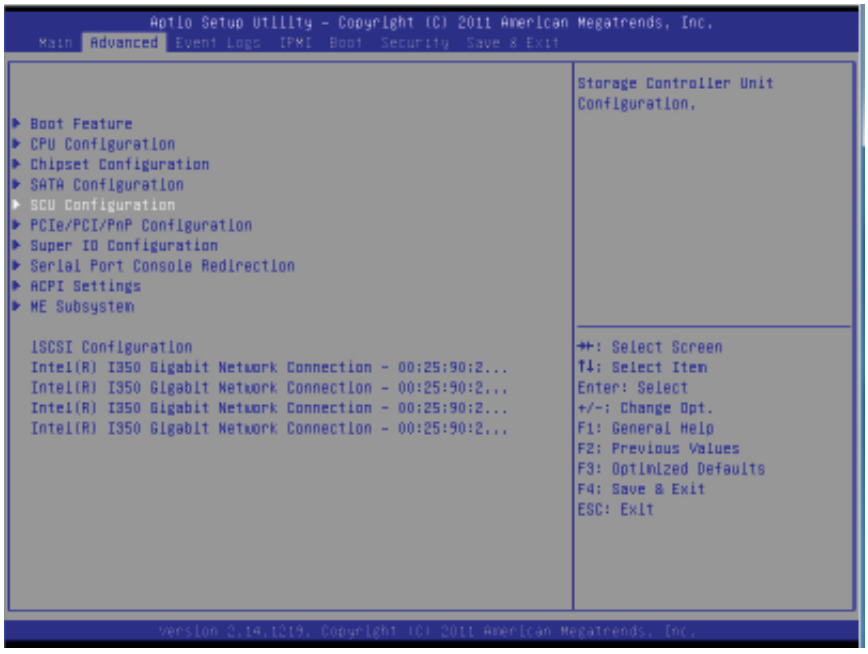
Memory Information

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 Power-Off for the system power to remain off after a power loss. Select Power-On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power-On, Power-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 and 2.

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 Capability (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.

Hardware Prefetcher (Available when supported by the CPU)

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

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

The CPU prefetches the cache line for 64 bytes if this feature is set to Disabled. The CPU prefetches both cache lines for 128 bytes as comprised if this feature is set to **Enabled**.

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enabled to support Data Cache Unite (DCU) prefetch 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.

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 manufacturer 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.

Intel I/OAT

The Intel I/OAT (I/O Acceleration Technology) significantly reduces CPU overhead by leveraging CPU architectural improvements, 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.

Uplink Link Speed

This feature allows the user to select target link speed. The options are **Gen1 (Generation 1)**, Gen2 and Gen3.

CPU1 Slot2 PCI-E 3.0 x4 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 Slot3 PCI-E 3.0 x16 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 Slot1 PCI-E 3.0 x16 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.

CPU2 Slot6 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**.

CPU2 Slot5 PCI-E 3.0 x 16 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**.

CPU2 Slot4 PCI-E 3.0 x 16 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**.

▶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

P1/P2-DIMMA1~3, P1/P2-DIMMB1~3, P1/P2-DIMMC1~3, P1/P2-DIMMD1~3

The status of the memory modules specified above 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 scrubbing 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:

SATA (Serial-ATA) Controller 0~1

Use this feature to activate or deactivate the SATA controller, and set the compatibility mode. The options for Controller 0 are Enhanced and **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 7: 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, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 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 Slot 1 PCI-E 3.0 x16 OPROM/CPU1 Slot 2 PCI-E 3.0 x4 OPROM/CPU1 Slot 3 PCI-E 3.0 x16 OPROM/CPU2 Slot 1 PCI-E 3.0 x16 OPROM/CPU2 Slot 2 PCI-E 3.0 x16 OPROM/CPU1 Slot 1 PCI-E 3.0 x8 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/ Load Onboard LAN3 Option ROM/Load Onboard LAN4 Option ROM

Select Enabled to enable the onboard LAN1 Option ROM~LAN4 Option ROM. This is to boot the computer using a network device. The default setting for LAN1 Option ROM is **Enabled**, and the default settings for LAN2 Option ROM/ LAN3 Option ROM/LAN4 Option ROM are **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 High Speed.

▶Serial Port Console Redirection

- **COM 1/COM 2**

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, 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**, Hardware RTS/CTS, and Software Xon/Xoff.

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.

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.

▶ACPI Setting

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)**, Suspend and Disabled.

NUMA (NON-Uniform Memory Access)

This feature enables the Non-Uniform Memory Access ACPI support. The options are **Enabled** and Disabled.

RTID (Record Types IDs)

This feature displays the total number of Record Type IDs for local and remote pools. The options are **Optimal** and Alternate.

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.

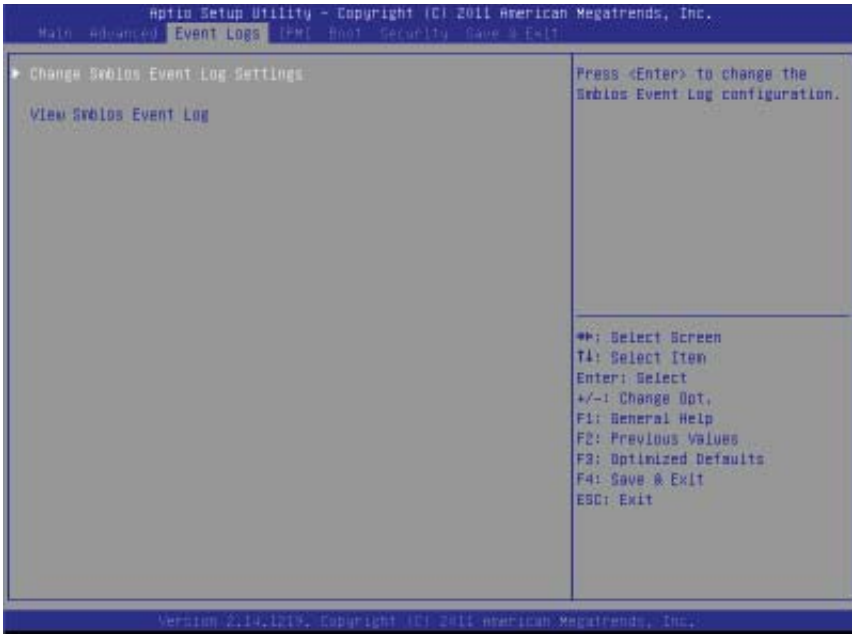
PORT CONFIGURATION INFORMATION

This section displays the following port information:

- UEFI Driver
- Adapter PBA
- Chip Type
- PCI Device ID
- PCI Bus:Device:Function
- Factory MAC Address
- Alternate MAC Address

7-3 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

7-4 IPMI

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

IPMI Firmware Revision

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

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.

Customize 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

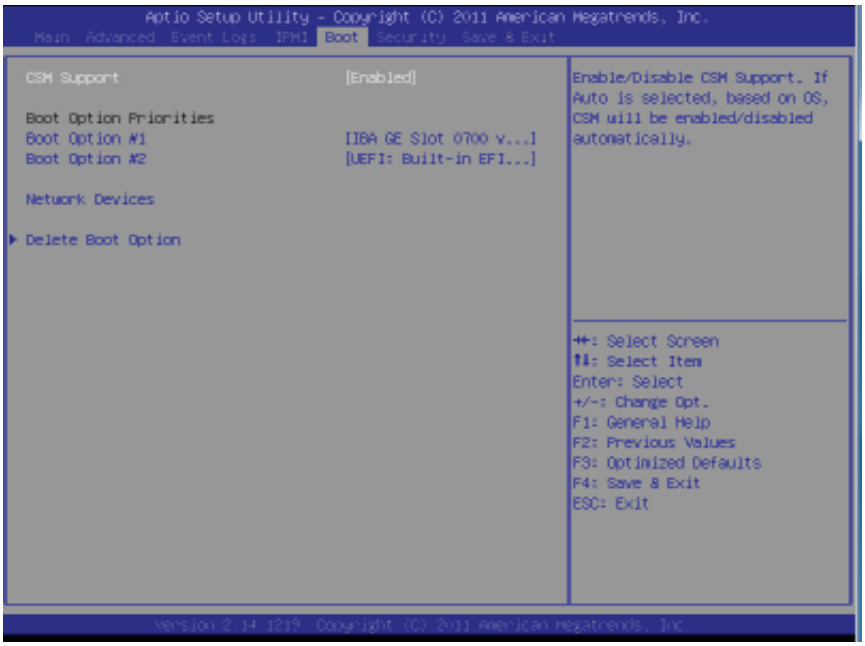
This item displays the Station MAC address for this computer. MAC addresses are 6 two-digit hexadecimal numbers.

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).

7-5 Boot

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



CSM Support

Select Enabled to support the EFI Compatibility Support Module (CSM), which provides compatibility support for traditional legacy BIOS for system boot. The options are **Enabled** and Disabled.

Boot Option Priorities

Boot Option #1

This item allows the user to select the first boot drive. Select a LAN device to boot the system from the network connection. Select UEFI to boot the system from the UEFI: Built-in EFI Shell. The options are **LAN Device**, UEFI: Built-in EFI Shell, and Disabled.

Boot Option #2

This item allows the user to select the first boot device. Select a LAN device to boot the system from the network connection. Select UEFI to boot the system from the UEFI: Built-in EFI Shell. The options are LAN Device, **UEFI: Built-in EFI Shell**, and Disabled.

Network Devices

Boot Option #1

This item displays the first boot device.

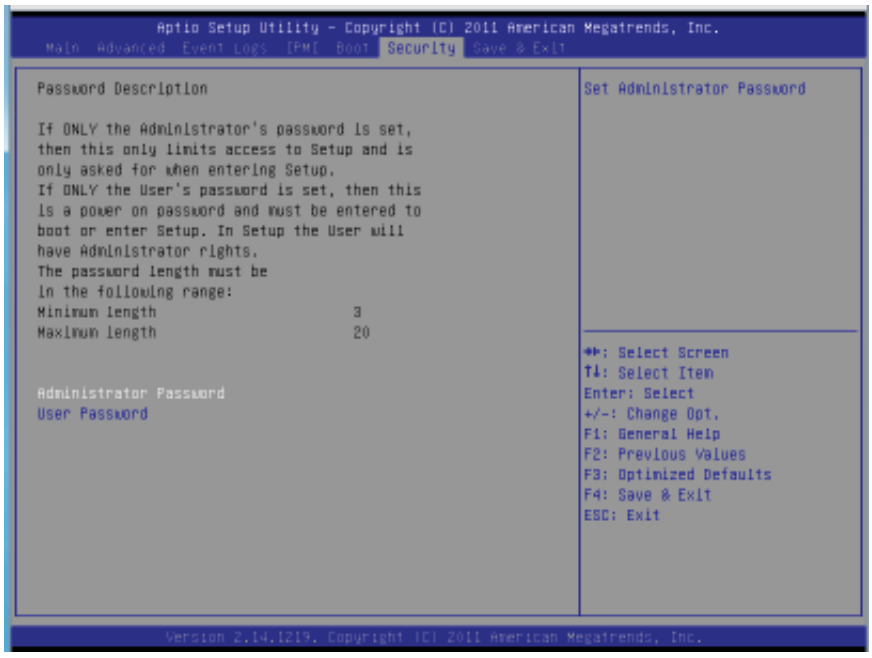
▶Delete Boot Options

Delete Boot Option

This item allows the user to select a boot device to delete from the boot priority list. Select UEFI: Built-in EFI Shell to delete it from the boot priority list which will prevent system boot from the UEFI Shell. The options are Select One to Delete and **UEFI: Built-in EFI Shell**.

7-6 Security

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



Administrator Password

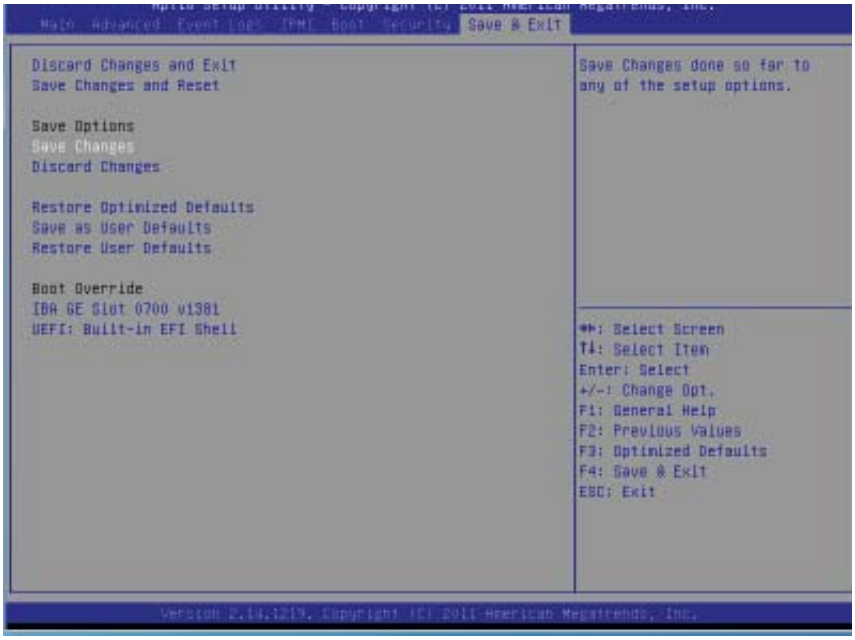
Use this feature to set the Administrator Password which is required to enter the BIOS setup utility. The length of the password should be from 3-characters to 8-characters long.

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 8-characters long.

7-7 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 following devices:

- LAN Device
- UEFI: Built-in EFI Shell

Appendix A

BIOS Error Beep Codes

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

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

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

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

BIOS Error Beep Codes

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

Notes

Appendix B

System Specifications

Processors
Single or dual Intel® Xeon E5-2600 Series processors

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

Chipset
Intel C600 chipset

BIOS
32 Mb AMI® SPI Flash ROM

Memory Capacity
Twenty-four DIMM sockets supporting up to 768 GB of registered ECC DDR3-1333/1066/800 SDRAM

Note: see Section 5-6 for details.

Drive Bays
Eight hot-swap drive bays to house eight SAS or SATA drives

Peripheral Drive Bays
Three 5.25" drive bays

Expansion Slots
Four PCI-E 3.0 x16 slots, one PCI-E 3.0 x8 slot and one PCI-E 3.0 x4 (in a x8) slot

Serverboard
X9DR3-LN4F+ (Extended ATX form factor)
Dimensions: 13.68 x 13 in (347 x 330 mm)

Chassis
SC745TQ-R920B, tower/4U rackmount
Dimensions (as tower): (WxHxD) 7 x 19 x 27 in. (178 x 483 x 686 mm)

Weight
Gross (Bare Bone): 70 lbs. (31.8 kg.)

System Cooling
Three (3) 8-cm system cooling fans
Two (2) 8-cm rear exhaust fans
One (1) air shroud

System Input Requirements
AC Input Voltage: 100 - 240V AC auto-range
Rated Input Current: 13 - 4A max
Rated Input Frequency: 50 to 60 Hz

Power Supply
Rated Output Power: 920W (Part# PWS-920P-1R)
Rated Output Voltages: +12V (75A), +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: 20% 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

(continued from front)

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