SUPER○®

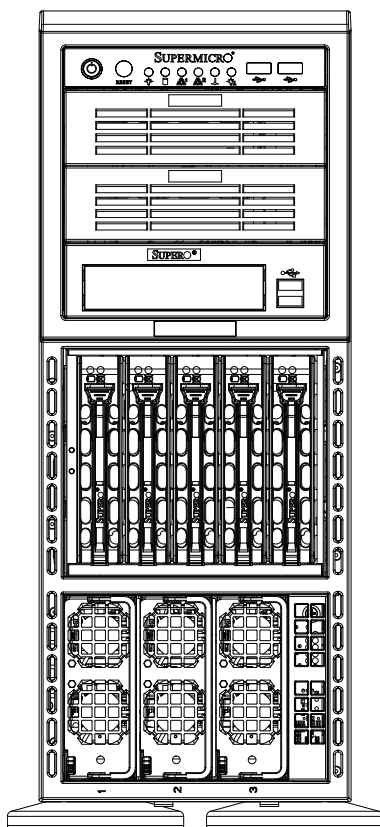## SUPERSERVER
8047R-TRF+
8047R-7RFT+

USER'S MANUAL

Revision 1.0a

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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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Release Date: September 24, 2012

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 8047R-TRF+/7RFT+ Installation and maintainance should be performed by experienced technicians only.

The SuperServer 8047R-TRF+/7RFT+ is a high-end server based on the SC748TQ-R1K43BP 4U rackmount chassis and the X9QRi-F+/X9QR7-TF+ dual processor serverboard. The only difference between the two server models is that the 8047R-7RFT+ server contains both SATA and SAS connections and the 8047R-TRF+ server only has SATA connections.

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 X9QRi-F+/X9QR7-TF+ serverboard and the SC748TQ-R1K43BP chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 8047R-TRF+/7RFT+ 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 8047R-TRF+/7RFT+.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9QRi-F+/X9QR7-TF+ 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 SC748TQ-R1K43BP 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 for the X9QRi-F+/X9QR7-TF+ serverboard.

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Chapter 1

Introduction

1-1   Overview

The SuperServer 8047R-TRF+/7RFT+ is a high-end server comprised of two main subsystems: the SC748TQ-R1K43BP 4U server chassis and the X9QRi-F+/X9QR7-TF+ 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 SuperServer 8047R-TRF+/7RFT+, as listed below:

- Four (4) 2U passive CPU heatsinks (SNK-P0048PS)

- One (1) air shroud for SC748 (MCP-310-74805-0B)

- Chassis Fans
  Three (3) 92x92x38 mm, 7.5K RPM, PWM fans for SC748 (FAN-0115L4)
  Three (3) 80x80x38-mm 8.2K RPM, PWM fans for SC748 (FAN-0116L4)

- One (1) 77-cm USB 2.0 10p to 10p cable (CBL-0263L)

- One (1) 50-cm round 16-to-16-pin ribbon front panel control cable (CBL-0087)

- SAS/SATA Accessories
  One (1) SAS/SATA backplane (CSE-SAS-M35TQ-O-P)
  Two (2) 61.5-cm 8pin to 8pin cables for SGPIO (CBL-0157L-01) (8047R-TRF+ only)
  Five (5) 61-cm SATA cables (CBL-0044L) (8047R-TRF+ only)
  Two (2) 30AWG 50-cm I-pass to 4 SATA connection cables (CBL-0097L-03) (8047R-7RFT+ only)
  Two (2) 5.25" drive trays without rail (horizontal pattern) (MCP-220-00010-01)
  One (1) 5.25" drive tray without rail (FDD opening) (MCP-220-00059-0B)
  One (1) black disk array mobile rack (CSE-M35BP) w/5 3.5" drive trays (MCP-220-00092-0B)

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

- SMCI product manuals: **http://www.supermicro.com/support/manuals/**

- Product drivers and utilities: **ftp://ftp.supermicro.com**

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

1-2 Serverboard Features

At the heart of the SuperServer 8047R-TRF+/7RFT+ lies the X9QRi-F+/X9QR7-TF+, a dual processor serverboard based on the Intel C602 chipset. Below are the main features of the X9QRi-F+/X9QR7-TF+. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X9QRi-F+/X9QR7-TF+ supports E5-4600 Series processors in Socket R-LGA 2011 type sockets. Each processor supports two full-width Intel QuickPath Interconnect (QPI) links (Data Transfer Rate of up to 8.0 GT/s per direction) Please refer to our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9QRi-F+/X9QR7-TF+ has thirty-two (32) single/dual/ tri/quad channel 240-pin DIMM sockets that can support up to 1024GB of Registered (RDIMM), Load Reduced (LRDIMM) ECC or Unbuffered (UDIMM) ECC/Non-ECC DDR3 1600/1333/1066/800 MHz speed SDRAM in a two-channel memory bus. Memory sizes of 1GB, 2GB, 4GB, 8GB, 16GB and 32GB size @ 1.35V/1.5V voltages are supported. Please refer to Chapter 5 for installing memory.

Note: LRDIMM (Reduced Load) memory supports only DDR3 1333/1066/800 MHz speeds.

Serial ATA

An on-chip (Intel C602) SATA controller is integrated into the X9QRi-F+/X9QR7-TF+ to provide a six-port SATA subsystem (two SATA 3.0 and four SATA 2.0 ports), which is either RAID 0 and 1 (SATA3) or RAID 0, 1, 5, and 10 (SATA2) Windows/ LINUX supported. The SATA drives are hot-swappable units.

Note: You must have RAID set up to enable the hot-swap capability of the SATA drives. Documentation on RAID setup guidelines can be found on our web site.

SAS (8047R-7RFT+ Server Only)

A LSI® 2208 SAS controller is integrated into the serverboard to provide an eight port SAS (Serial Attached SCSI) subsystem, which is RAID 0, 1, 5, 6 and 10 supported. The SAS drives are hot-swappable units.

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

Onboard Controllers/Ports

The color-coded I/O ports on the X9QRi-F+/X9QR7-TF+ include two COM ports (one header and one port), a VGA (monitor) port, seven USB 2.0 ports (four rear access I/O panel, front access (2x dual port connector and 1x single-connection header), 1x Type-A connection for the two front panel), two gigabit Ethernet ports and one dedicated IPMI LAN port.

Note 1: For more information on IPMI configuration, please refer to the IPMI User's Guide posted on our website at http://www.supermicro.com/support/manuals/

Graphics Controller

The X9QRi-F+/X9QR7-TF+ features an integrated Nuvoton (Winbond) BMC Video Controller (Matrox MGA200).

Other Features

Other onboard features that promote system health include onboard voltage monitors, auto-switching voltage regulators, chassis and CPU overheat sensors, ACPI/ACPM power management, PECI (Platform Environment Configuration Interface) 2.0 support, AC power loss recovery, virus protection and BIOS rescue.

1-3   Server Chassis Features

The SuperServer 8047R-TRF+/7RFT+ is built upon the SC748TQ-R1K43BP chassis. Details on the chassis and on servicing procedures can be found in Chapter 6. The following is a general outline of the main features of the chassis.

System Power

The SC748TQ-R1K43BP chassis features a redundant 1400 Watt Platinum level digital power supply consisting of two power modules. The system does not need to be shut down when replacing or removing a single power supply module.

Hard Drive Subsystem

The SC748TQ-R1K43BP chassis was designed to support five 3.5" hot-swap SATA or SAS hard drives in a M35 mobile rack, with an additional five 3.5" hard drives available with a second optional M35 mobile rack installed.

Mobile Rack

The SC748 chassis includes a CSE-M35BP mobile rack. The chassis contians a space in the front for an additional mobile rack to be installed also. For detailed specific to your mobile rack, information, see the appendices at the back of this manual.

Peripheral Drives

Each SC748 chassis provides three 5.25" peripheral drive bays for DVD-ROM/ CD-ROM drives, or additional hard drives. One of these drive bays may be used for a slim floppy drive.

PCI Expansion Slots

Four PCI expansion card slots are available in the rear of the chassis for two (2) PCI Express 3.0 x16 slots (Slot3/Slot5) and two (2) PCI Express 3.0 x8 in x 16 slots (Slot2/Slot4). See our web site for details (http://www.supermicro.com/products/nfo/ UIO.cfm). See section 5-6 for further details.)

Front Control Panel

The control panel on the SuperServer 8047R-TRF+/7RFT+ 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.

I/O Backplane

The SC748TQ-R1K43BP 4U chassis contains an I/O backplane that provides four standard-size add-on card slots, one COM port, a VGA port, four USB 2.0 ports, a dedicated IPMI LAN port, two gigabit Ethernet ports and a UID switch.

Mounting Rails (optional)

The SC748 can be placed in a rack for secure storage and use. To setup your rack, follow the step-by-step instructions included in this manual.

Cooling System

The SC748TQ-R1K43BP chassis has an innovative cooling design that includes three 8-cm and three 9.2-cm hot-plug system cooling fans located in the middle section 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.

1-4   Advanced Power Management

Intel® Intelligent Power Node Manager (NM)

The Intel® Intelligent Power Node Manager (IPNM) provides your system with real-time thermal control and power management for maximum energy efficiency. Although IPNM Specification Version 1.5 is supported by the BMC (Baseboard Management Controller), your system must also have IPNM-compatible Manageability Engine (ME) firmware installed to use this feature.

Manageability Engine (ME)

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

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

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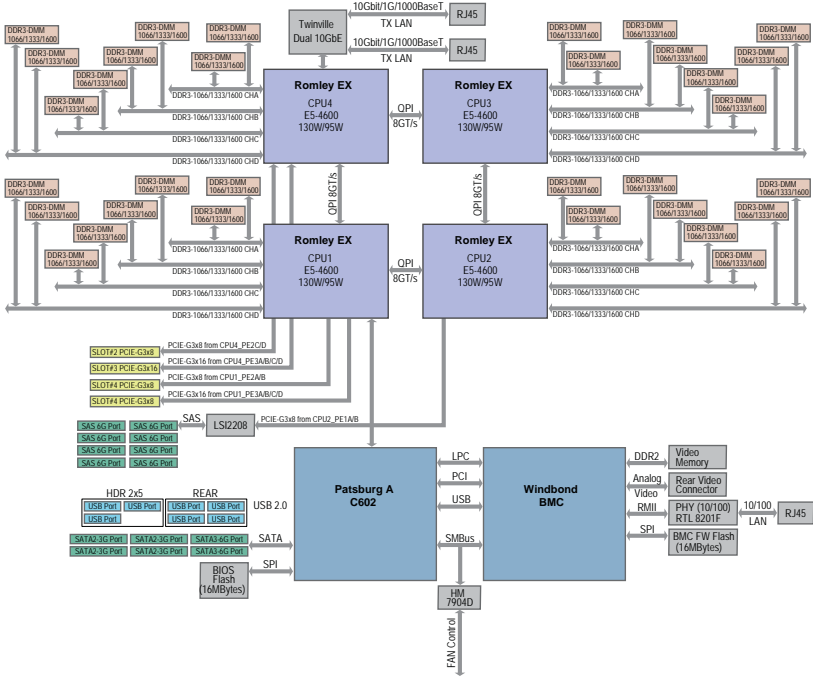
1-5   Contacting Supermicro

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Notes

Chapter 2

Server Installation

2-1   Overview

This chapter provides a quick setup checklist to get your SuperServer 8047R-TRF+/7RFT+ 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.

2-2   Unpacking the System

You should inspect the box the SuperServer 8047R-TRF+/7RFT+ 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 rack unit that will hold the SuperServer 8047R-TRF+/7RFT+. 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. Read the Rack and Server Precautions in the next section.

2-3   Preparing for Setup

The box the SuperServer 8047R-TRF+/7RFT+ was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. 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 for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- 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.

2-4   Cautions!

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.

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 any hot plug 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.).

2-5   Installing the System into a Rack

This section provides information on installing the SC748 chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

NOTE: The outer rail is adjustable from 26" to 38.25".

Removing the Feet

The SC748 chassis is shipped with the chassis cover and feet pre-installed. Both the feet and cover must be removed for before installing the rails (see Figure 2-1).

Removing the Chassis Top Cover

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

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

3. Lift the chassis top cover off the chassis.

Removing the Chassis Feet

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

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

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

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

Figure 2-1: Remove the Chassis Cover and Feet

Chassis Cover

Chassis Feet

Chassis Cover Lock
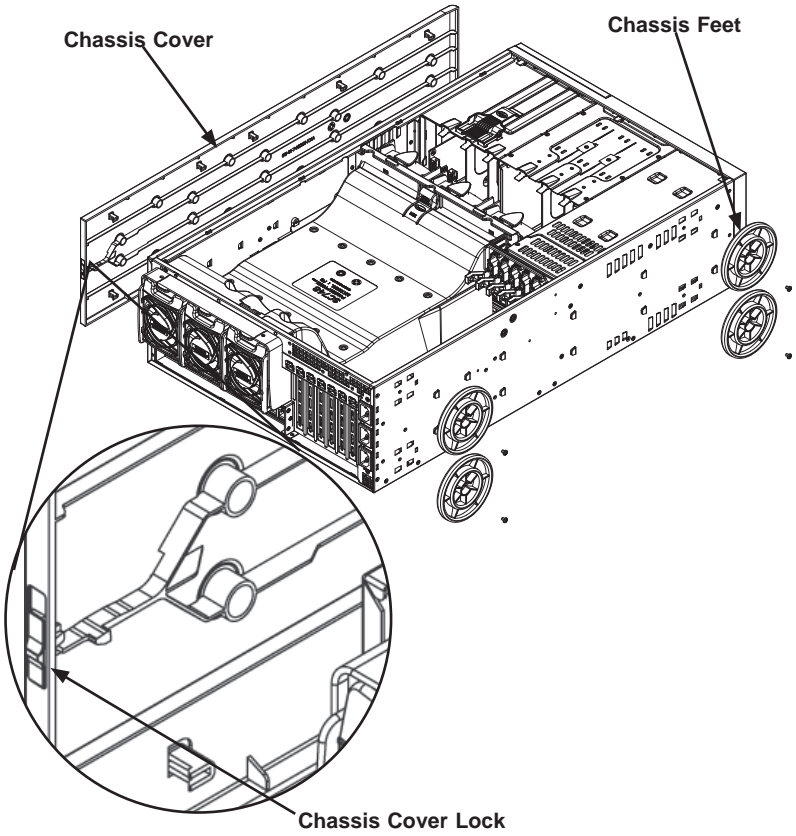
Identifying the Sections of the Rack Rails

The chassis package includes two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself (see Figure 2-2 for details).

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

Chassis Handle Screw

1

Chassis Rail Screw

Inner Rails

1

1
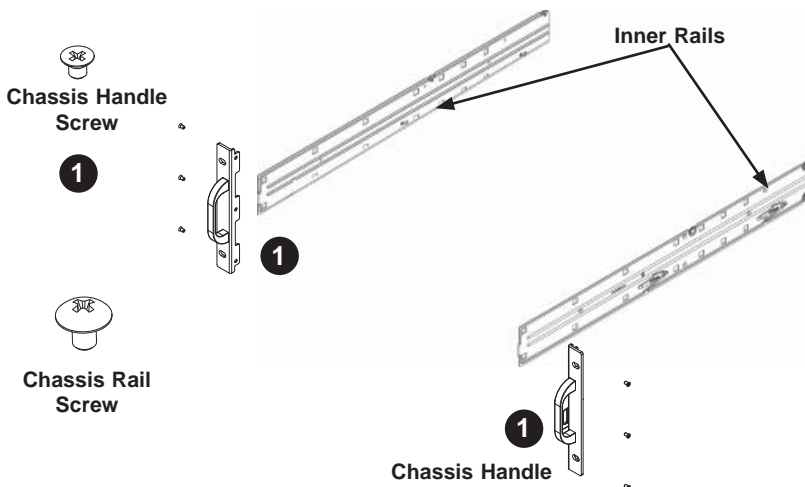
Chassis Handle

Installing the Chassis Handles and Inner Rails

1. Locate the chassis handles (2) and handle screws (6) (Figure 2-3).

Figure 2-3: Identifying the Inner Rails and Chassis Handles

2

3
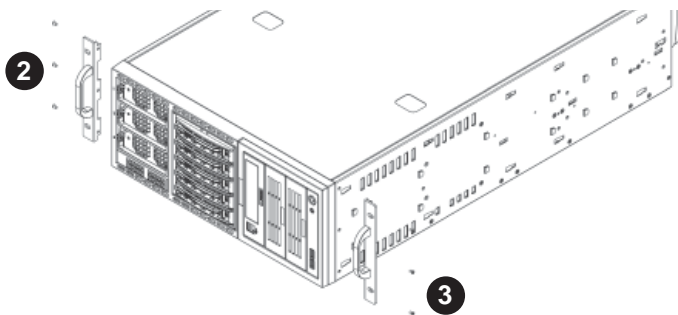
2. Align the chassis handle with the front of the chassis and secure with the three chassis handle screws.

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

4. Locate the inner rails (2) and screws (12) in the shipping package.

5. Align the inner rails against the chassis, as shown in Figure 2-4. Confirm that the rails are flushed against the edge of the chassis.

6. Tighten the screws. Do not over tighten.

Figure 2-4: Installing the Inner Rack Rails
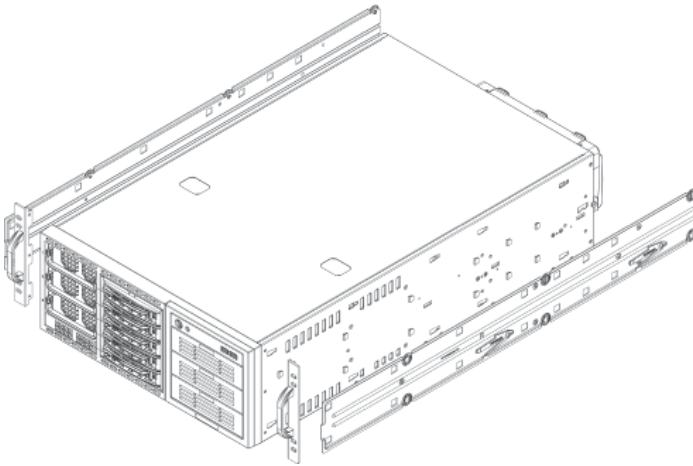
7. Repeat steps 5 and 6 with the other inner rail.

Installing the Outer Rails to the Rack (Figure 2-5)

1. Attach the front and rear short brackets to the outside of the long bracket. Both bracket ends must face the same direction.

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

3. Secure the front side of the outer rail with two M5 screws and the rear side of the outer rail with three M5 screws. **NOTE:** The outer rail is adjustable from approximately 26" to 38.25".

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

Figure 2-5: Assembling the Outer Rails

Secure to the Rear of the Rack

Attach to Rear Bracket

Secure to the Front of the Rack
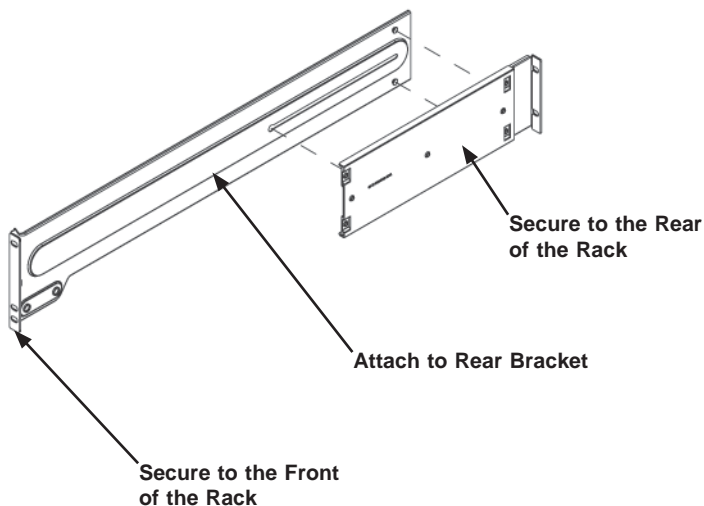
Installing the Chassis into a Rack

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

2. Line chassis rails with the front of the rack rails (Figure 2-6).

Figure 2-6. Installing the Rack Rails
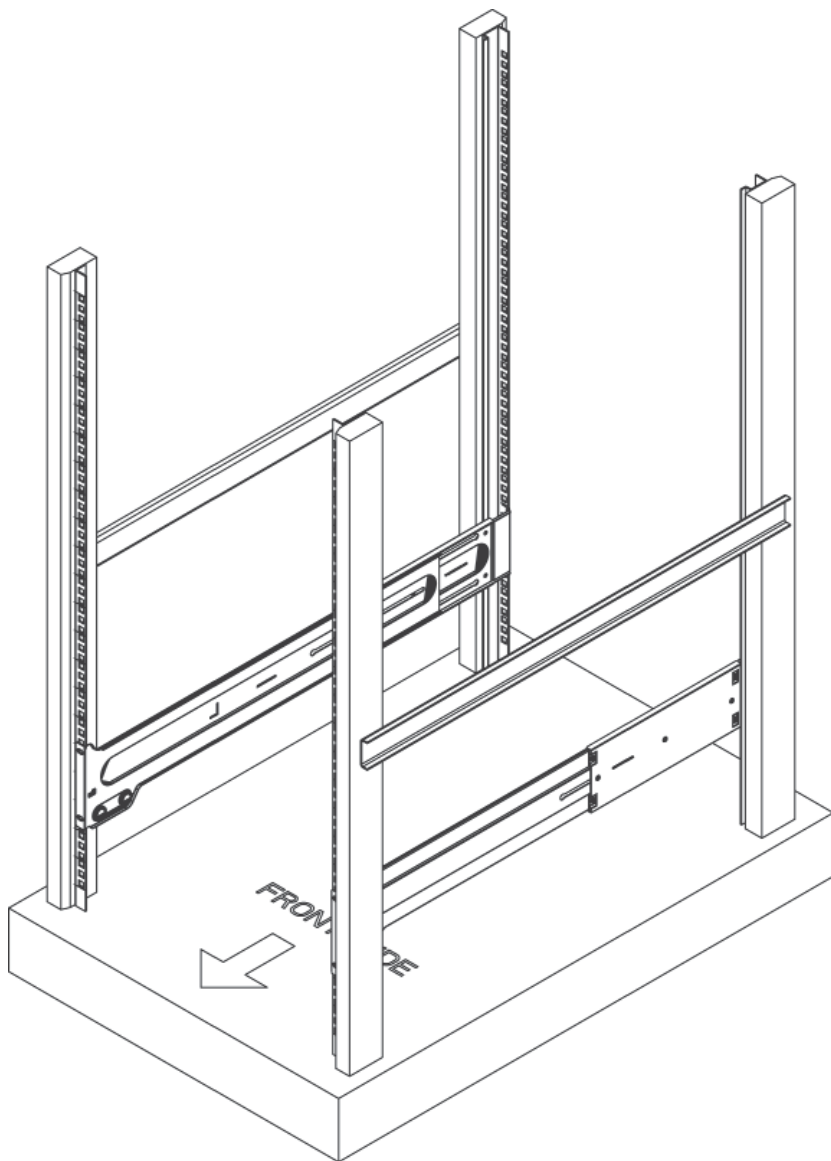
3. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). When the server has been pushed completely into the rack, you should hear the locking tabs "click" (Figure 2-7).

Figure 6-7: Installing the Chassis into a Rack
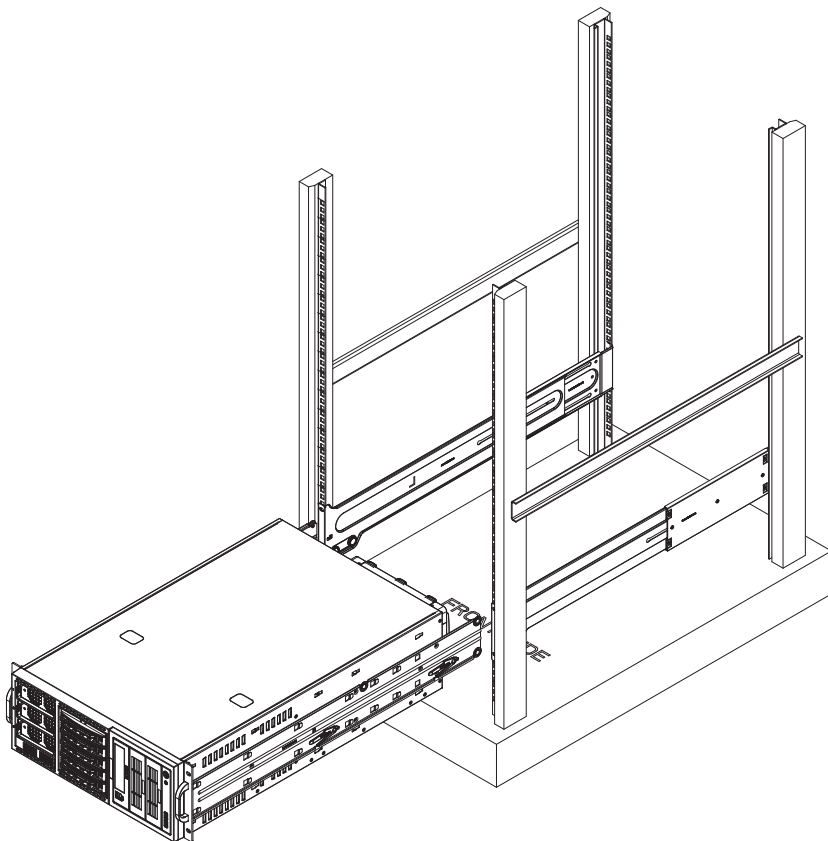
Note: The figure above is for illustration purposes only. Always install servers to the bottom of the rack first.

2-6   Tower Configuration Instructions

The SC748 chassis is shipped with the chassis cover and feet pre-installed. To use the chassis as a desktop server, no other installation is required.

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

Installing the Chassis Cover

1. Remove the rack mount ears.

2. Align the cover post with the corresponding holes on the top of the chassis and place the cover on top of the chassis. The cover should overhang approximately one-half inch over the front of the chassis (Figure 2-8).

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

Figure 2-8: Adding the Chassis Feet and Top Cover
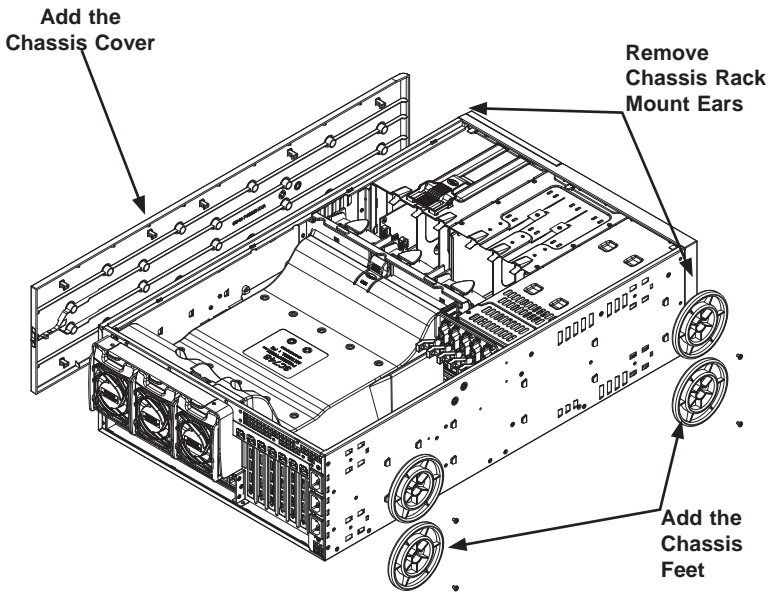
Placing the Chassis Feet (Figure 2-9)

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

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

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

Figure 2-9: Placing Chassis Feet
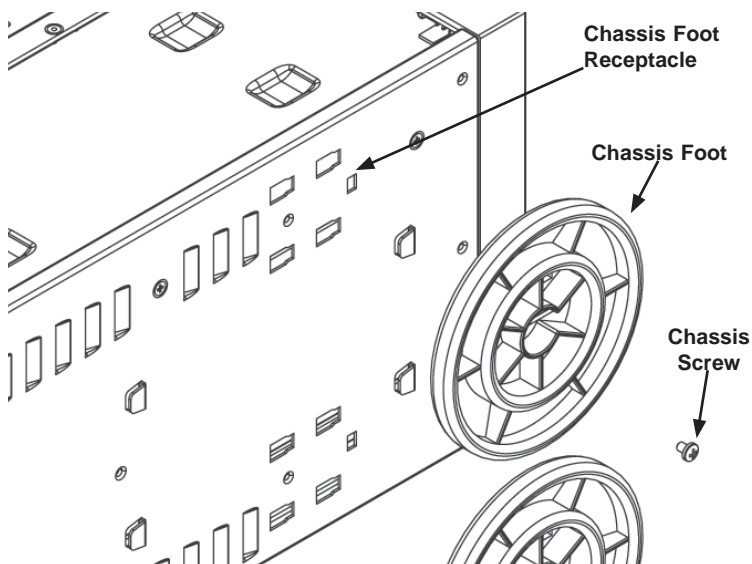
2-7 Checking the Serverboard Setup

After you setup the 8047R-TRF+/7RFT+ (in the rack or tower configuration), you will need to open the unit to make sure the serverboard is properly installed and all the connections have been made.

Removing the Chassis Cover (Figure 2-10)

1. Unplug the chassis from any power source

2. Remove the two screws securing the cover to the chassis.

3. Press the release tabs simultaneously.

4. Slide the cover forward.

Figure 5-1: Removing the Chassis Cover
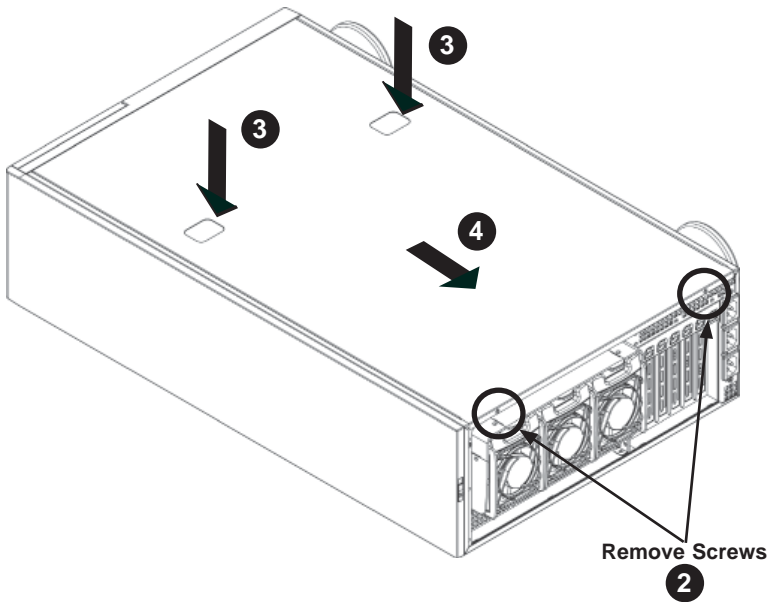
Checking the Components and Setup

1. You may have one or two processors already installed into the serverboard. Each processor needs its own heat sink. See Chapter 5 for instructions on processor and heat sink installation.

2. Your 8047R-TRF+/7RFT+ server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

3. If desired, you can install add-on cards to the system. See Chapter 5 for details on installing PCI add-on cards.

4. Make sure all power and data cables are properly connected and not blocking the chassis airflow. Also make sure that no cables are positioned in front of the fans. See Chapter 5 for details on cable connections.

2-8   Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the SAS/SATA drives have been properly installed and all connections have been made.

Checking the Drives

1. All drives are accessable from the front of the server. For servicing the DVD-ROM, you will need to remove the top chassis cover. The hard drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. A slim DVD-ROM may be preinstalled in your server. Refer to Chapter 6 if you need to install a DVD-ROM drive to the system.

3. Depending upon your system's configuration, your system may have one or more drives already installed. If you need to install hard drives, please refer to Chapter 6.

Checking the Airflow

1. Make sure there are no objects obstructing the airflow in and out of the server. In addition, if you are using a front bezel, make sure the bezel's filter is replaced periodically.

2. Do not operate the server without drives or drive trays in the drive bays. Use only recommended server parts.

3. Make sure no wires or foreign objects obstruct air flow through the chassis. Pull all excess cabling out of the airflow path or use shorter cables.

Providing Power

1. Plug the power cord(s) from the power supply unit(s) into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS).

2. Depress the power on button on the front of the chassis.

Chapter 3

System Interface

3-1   Overview

There are several LEDs on the control panel as well as others on the drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. Most SC748 models have two buttons on the chassis a control panel; a reset button and an on/off switch. This chapter explains the meanings of all LED indicators and the appropriate responses you may need to take.

Figure 4-1: Front LEDs
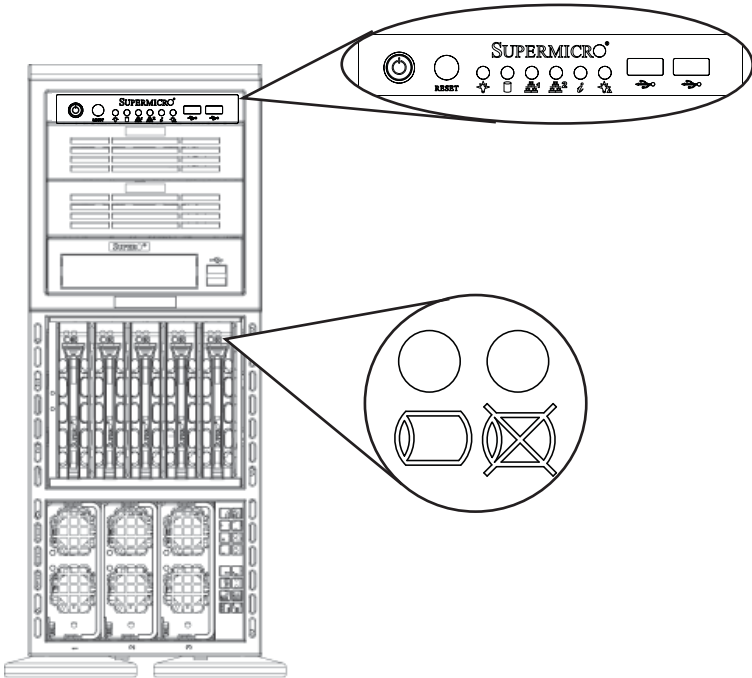
3-2   Control Panel Buttons

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

Power

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

RESET

Reset

Use the reset button to reboot the system.

3-3   Control Panel LEDs

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

Power LED

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

Universal Information LED

When this LED blinks red quickly, it indicates a fan failure and when blinking red slowly a power failure. The LED will be blue when used for UID (Unit Identifier). When on 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. See the table below for descriptions of the LED states.

HDD LED

This indicates the IDE channel activity. It also indicates SAS/SATA drive, SCSI drive, and/or DVD-ROM drive activity when flashing.

NIC2 LED

Indicates network activity on the LAN2 port when flashing.

NIC1 LED

Indicates network activity on the LAN1 port when flashing.

Power Fail LED

This indicates a power failure to the system's power supply units.

3-4   Drive Carrier LEDs

Each drive carrier has two LEDs:

SATA Drives

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

- **Red:** When this LED flashes it indicates the drive is rebuilding. When solid on it indicates a SATA drive failure. If a drive fails, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed drives.

SAS Drives

- **Green:** When illuminated, the green LED on the drive carrier indicates the SAS drive is powered on. If this LED is not lit, it means no power is being provided for the drive. Please refer to Chapter 6 for instructions on replacing failed drives.

- **Red:** When this LED flashes it indicates the drive is rebuilding. When solid on it indicates a SAS drive failure. If a drive fails, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed drives.

Chapter 4

System Safety

4-1   Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 8047R-TRF+/7RFT+ 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, memory modules and add-on cards. 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 two 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 CR2032 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. Dispose of used batteries according to the manufacturer's instructions.

- 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 SuperServer 8047R-TRF+/7RFT+ clean and free of clutter.

- The SuperServer 8047R-TRF+/7RFT+ weighs approximately 85 lbs (38.6kg) 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 SuperServer 8047R-TRF+/7RFT+ 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 CR2032 Battery
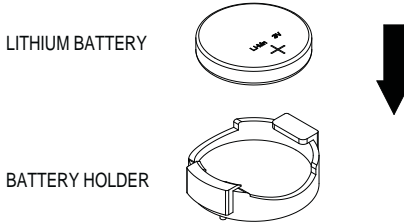
LITHIUM BATTERY

BATTERY HOLDER

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

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install the X9QRi-F+/X9QR7-TF+ serverboard into the chassis, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the serverboard to better cool and protect the system.

5-1   Handling the Serverboard

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

Precautions

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

Unpacking

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

5-2   Connecting Cables

Now that the serverboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon 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 5-9 for connector locations.)

- Front panel USB connection cable (USB4)
- SGPIO cables (T-SGPIO1/2) (8047R-TRF+ only)
- SATA drive data cables (I-SATA0 ~ 2) (8047R-TRF+ only)
- I-pass to 4 SATA data cables (SAS0~3, 4~7) (8047R-7RFT+ only)
- Control Panel cable (JF1)

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

Connecting Power Cables

The X9QRi-F+/X9QR7-TF+ serverboard has a 24-pin primary power supply connector (JPW1) for connection to the ATX power supply. In addition, there are four 8-pin secondary power connectors (JPW2-5), which must be connected to your power supply.

Connecting the Control Panel

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

All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Chapter 5 for details and pin descriptions.

Figure 5-1. Control Panel Header Pins

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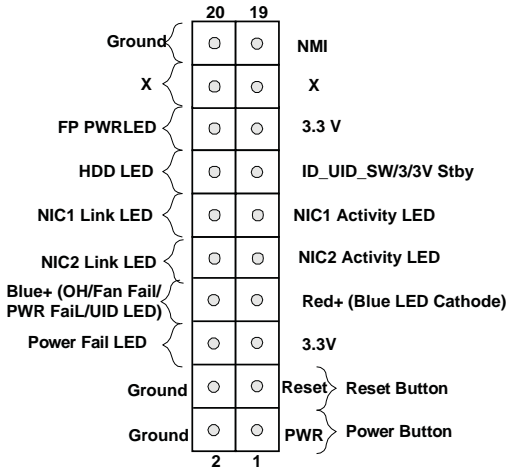
5-3   I/O Ports

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

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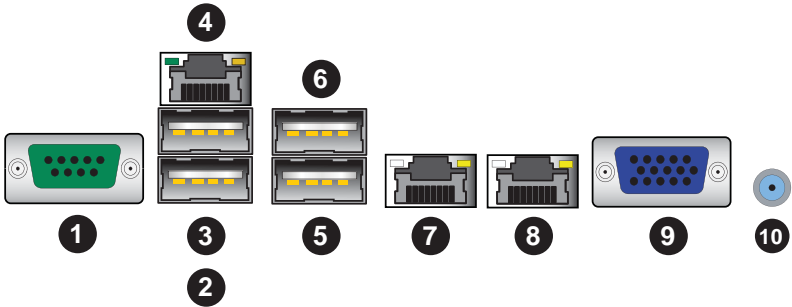
I/O Ports			
1	COM Port	6	USB3 Port
2	USB0 Port	7	LAN Port 1
3	USB1 Port	8	LAN Port 2
4	Dedicated IPMI LAN Port	9	VGA Port
5	USB2 Port	10	UID Switch

5-4   Installing the Processor and Heatsink

Caution! Avoid placing direct pressure to the top of the processor package. Always remove the power cord first before adding, removing or changing any hardware components.

Caution: The Quad MB (4 CPU socket) was recommended to install all the 4 CPU to make sure every function can work properly. Some MB function may not work under the 1/2/3 CPU configuration. For example: PCIE slot, on board LAN port and others.

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 the LGA2011 Processor

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

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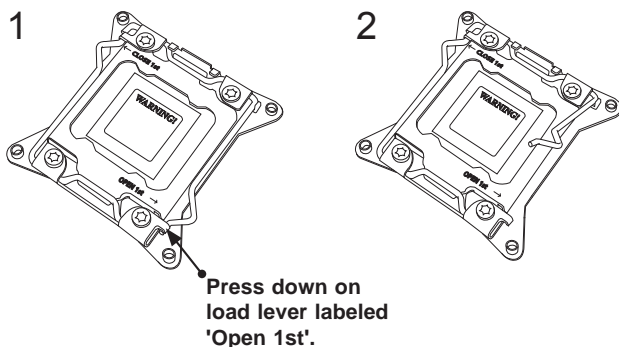
2. Press the second load lever labeled 'Close 1st' to release the load plate that covers the CPU socket from its locking position.

Press down on the load lever labeled 'Close 1st'

Pull the lever away from the socket

1

2
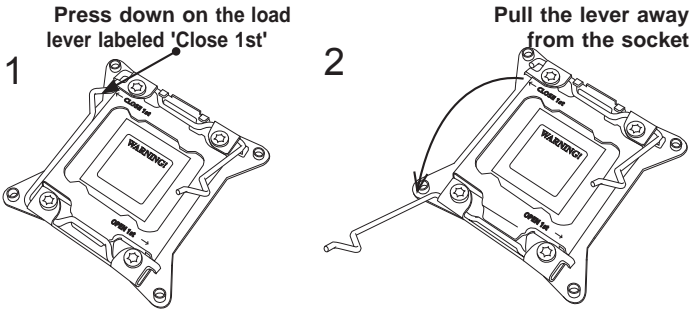
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the lever marked 'Open 1st' to open the load plate. Lift the load plate to open it completely.

1

2

Gently push to pop the load plate open.
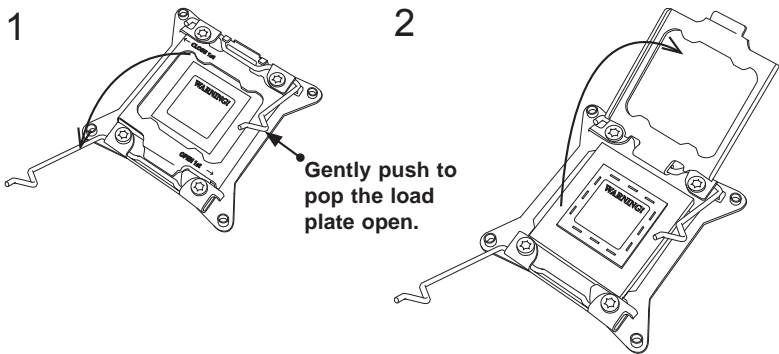
4. Use your index fingers to loosen the lever and open the load plate.
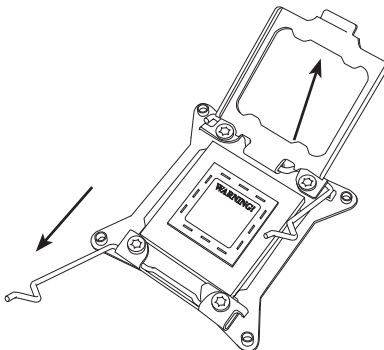
5. Use your thumb and index finger to hold the CPU on its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.
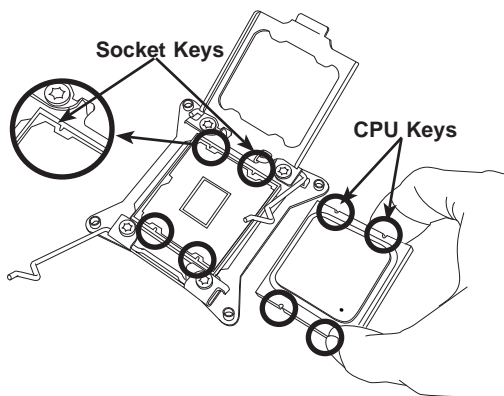
6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.)
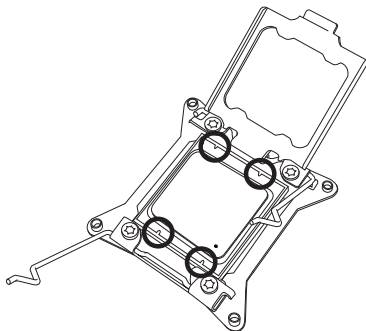
Caution: You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

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

8. Close the load plate with the CPU inside the socket. Lock the lever labeled 'Close 1st' first, then lock the lever labeled 'Open 1st' second. Use your thumb to gently push the load levers down to the lever locks.

Push down and lock the level labeled 'Close 1st'.

1

Gently close the load plate.

2

Lever Lock

3

Push down and lock the lever labeled 'Open 1st'

4

Lever Lock
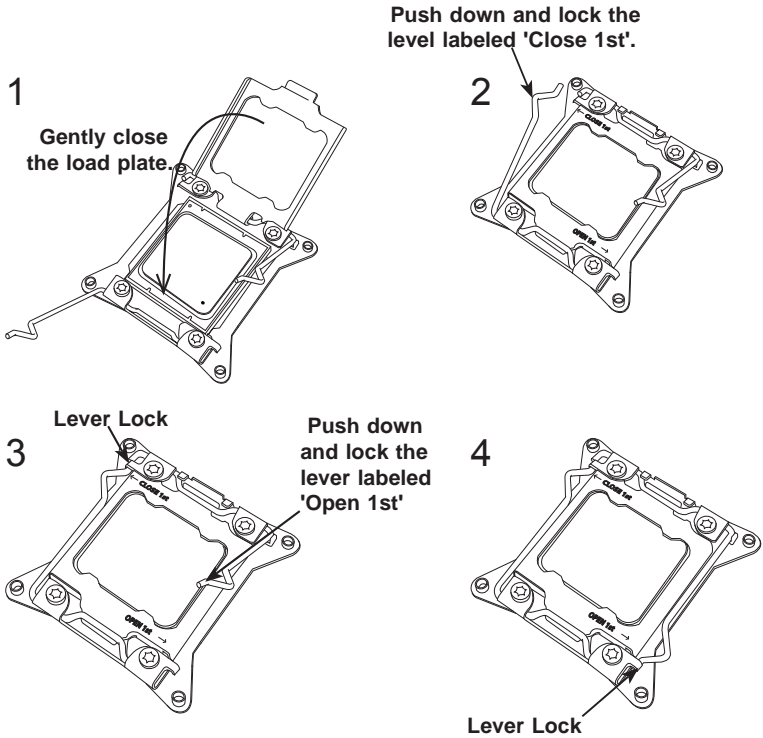
Caution: Save the plastic cap. The serverboard must be shipped with the plastic cap properly installed to protect the CPU socket pins. Shipment without the plastic cap properly installed may cause damage to the socket pins.

Installing a Passive CPU Heatsink

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

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

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

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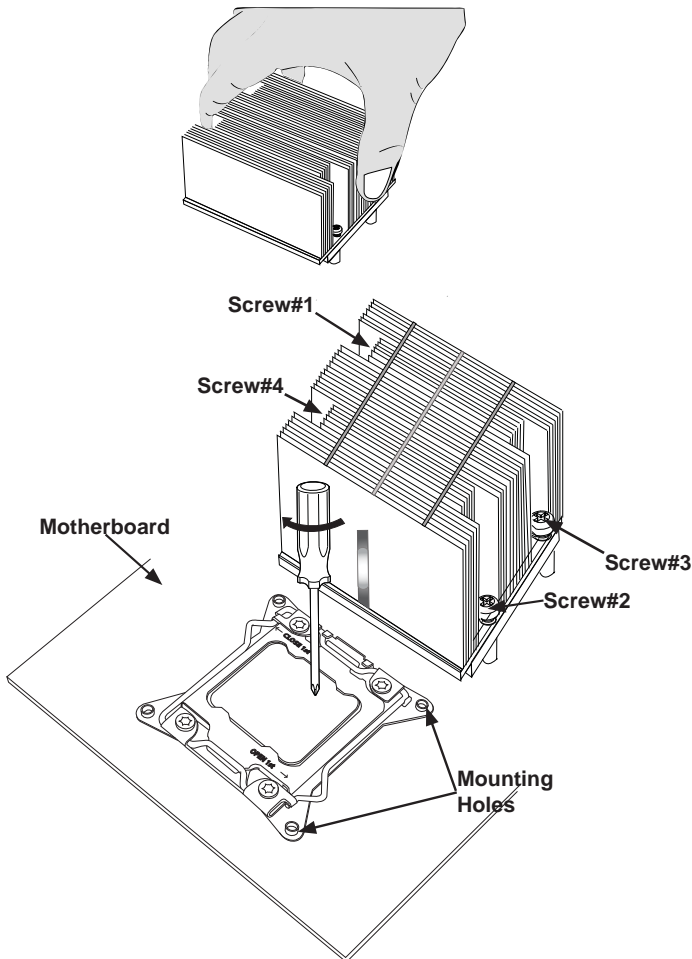
Removing the Heatsink

Caution: 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. <u>Gently</u> wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!)

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

4. Remove the used thermal grease and clean the surface of the CPU and the heatsink, Reapply the proper amount of thermal grease on the surface before reinstalling the CPU and the heatsink.
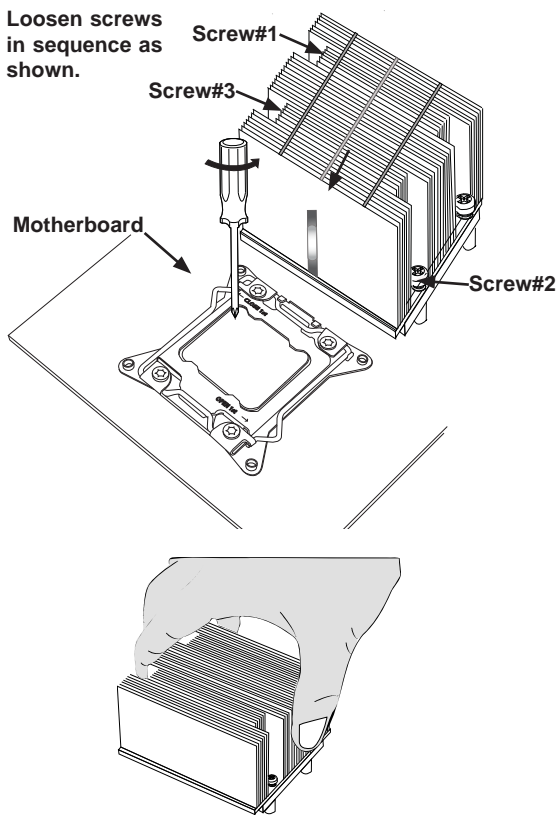
5-5   Installing Memory

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

Memory Support

The X9QRi-F+/X9QR7-TF+ has thirty-two (32) 240-pin DIMM sockets that can support up to 1024GB of Registered (RDIMM), Load Reduced (LRDIMM) ECC or Unbuffered (UDIMM) ECC/Non-ECC DDR3 1600/1333/1066/800 MHz speed SDRAM in a two-channel memory bus. Memory sizes of 1GB, 2GB, 4GB, 8GB, 16GB and 32GB size @ 1.35V/1.5V voltage are supported. Use memory modules of the same type, speed, timing and same on a serverboard. Please refer to the product page on our web site for possible updates to memory support.

Note: See the table belows for memory installation.

Installing Memory Modules (Figure 5-3)

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMM #A1. The release tabs on the slot should be pushed outward.

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

3. Gently press down on the DIMM module until it snaps into place in the slot. Make sure that the side notches of the DIMM modules align with the lock/release tabs of the slot when pressed in. Repeat for all modules.

4. Reverse the steps above to remove the DIMM modules from the serverboard.

Figure 5-3. Installing DIMMs
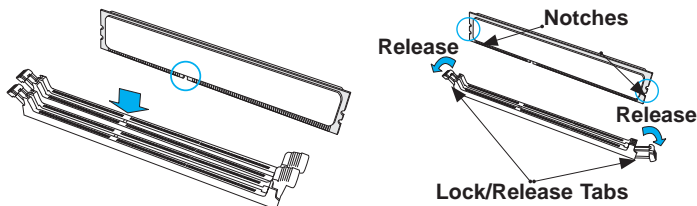
Processor & Memory Module Population Configuration

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

Processors and their Corresponding Memory Modules							
CPU#	**Corresponding DIMM Modules**						
CPU1	P1-A1	P1-A2	P1-B1	P1-B2	P1-C1	P1-C2	P1-D1	P1-D2
CPU2	P2-E1	P2-E2	P2-F1	P2-F2	P2-G1	P2-G2	P2-H1	P2-H2
CPU3	P3-J1	P3-J2	P3-K1	P3-K2	P3-L1	P3-L2	P3-M1	P3-M2
CPU4	P4-N1	P4-N2	P4-P1	P4-P2	P4-R1	P4-R2	P4-T1	P4-T2

Processor and Memory Module Population	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table (For memory to work properly, please populate as shown below.)**
1 CPU & 2 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & 4 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
1 CPU & 5~8 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1
2 CPUs & 8 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & 10~16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots
2 CPUs & 16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMA2, P1-DIMMB1/P1-DIMMB2, P1-DIMMC1/P1-DIMMC2, P1-DIMMD1/P1-DIMMD2, P2-DIMME1/P2-DIMME2, P2-DIMMF1/P2-DIMMF2, P2-DIMMG1/P2-DIMMG2, P2-DIMMH1/P2-DIMMH2
4 CPUs & 18~32 DIMMs	CPU1/CPU2/CPU3/CPU4 P1-DIMMA1/P1-DIMMA2/P1-DIMMB1/P1-DIMMB2, P2-DIMME1/P2-DIMME2/P2-DIMMF1/P2-DIMMF2, P3-DIMMJ1/P3-DIMMJ2/P3-DIMMK1/P3-DIMMK2, P4-DIMMN1/P4-DIMMN2/P4-DIMMP1/P4-DIMMP2 + any pairs in the other DIMM slots

Populating Memory Modules

Intel E5-4600 Series Processor UDIMM Memory Support									
Ranks Per DIMM & Data Width	**Memory Capacity Per DIMM** (See the Note below)			**Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)**					
				1 Slot Per Channel		**2 Slots Per Channel**			
				1DPC		**1DPC**		**2DPC**	
				1.35V	**1.5V**	**1.35V**	**1.5V**	**1.35V**	**1.5V**
SRx8 Non-ECC	1 GB	2 GB	4 GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
DRx8 Non-ECC	2 GB	4 GB	8 GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx16 Non-ECC	512 MB	1 GB	2 GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx8 ECC	1 GB	2 GB	4 GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333
DRx8 ECC	2 GB	4 GB	8 GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333

Note: For detailed information on memory support and updates, please refer to the SMC Recommended Memory List posted on our website at http://www.supermicro.com/support/resources/mem.cfm.

Intel E5-4600 Series Processor RDIMM Memory Support									
Ranks Per DIMM & Data Width	**Memory Capacity Per DIMM** (See the Note Below)			**Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)**					
				1 Slot Per Channel		**2 Slots Per Channel**			
				1DPC		**1DPC**		**2DPC**	
				1.35V	**1.5V**	**1.35V**	**1.5V**	**1.35V**	**1.5V**
SRx8	1 GB	2 GB	4 GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx8	2 GB	4 GB	8 GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
SRx4	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx4	4GB	8GB	16GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
QRx4	8GB	16GB	32GB	800	1066	800	1066	800	800
QRx8	4GB	8GB	16GB	800	1066	800	1066	800	800

Note: For detailed information on memory support and updates, please refer to the SMC Recommended Memory List posted on our website at http://www.supermicro.com/support/resources/mem.cfm.

Intel E5-4600 Series Processor LRDIMM Memory Support						
Ranks Per DIMM & Data Width (See the Note Below)	Memory Capacity Per DIMM		Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)			
			1 Slot Per Channel		2 Slots Per Channel	
			1DPC		1DPC and 2DPC	
			1.35V	1.5V	1.35V	1.5V
QRx4 (DDP)	16 GB	32 GB	1066, 1333	1066, 1333	1066	1066, 1333
QRx8 (P)	8 GB	16 GB	1066, 1333	1066, 1333	1066	1066, 1333
Note: For detailed information on memory support and updates, please refer to the SMC Recommended Memory List posted on our website at http://www.supermicro.com/support/resources/mem.cfm.						

Other Important Notes and Restrictions

- For the memory modules to work properly, please install DIMM modules of the same type, same speed and same operating frequency on the motherboard. Mixing of RDIMMs, UDIMMs or LRDIMMs is not allowed. Do not install both ECC and Non-ECC memory modules on the same motherboard.

- Using DDR3 DIMMs with different operating frequencies is not allowed. All channels in a system will run at the lowest common frequency.

5-6   Adding PCI-E Add-On Cards

The SC748TQ-R1K43BP chassis can accommodate all the card slots of the X9QRi-F+/X9QR7-TF+ serverboard (two (2) PCI Express 3.0 x16 slots and two (2) PCI Express 3.0 x8 in x 16 slots).

Installing an Add-on Card

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

2. Fully seat the card into the riser card 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.

5-7 Serverboard Details

Figure 5-4. X9QRi-F+/X9QR7-TF+ Layout
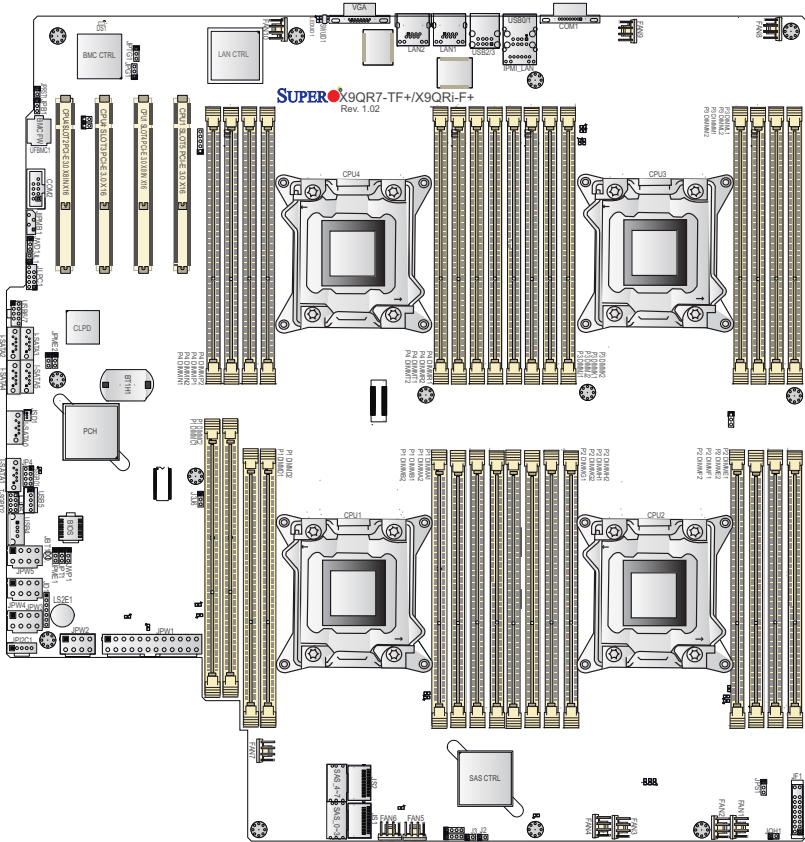
Notes:

1. Jumpers not indicated are for test purposes only. Components that are not documented are reserved for internal testing only.

2. SAS ports are not included on the X9QRi-F+.

3. PCI slots are controlled by the CPUs, without a CPU installed some slots will not be enabled. (CPU1: PCI-E slots 4 and 5. CPU4: PCI-E slots 2 and 3.)

X9QRi-F+/X9QR7-TF+ Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPRST1	BMC Reset	Off (Normal)
JPS1	SAS Enable/Disable	Pins 1-2 (Enabled)
JPT1	TPM Enable/Disable	Pins 1-2 (Enabled)
JPTG1	GLAN1/GLAN2 Enable/Disable	Pins 1-2 (Enabled)
JWD1	Watch Dog Timer	Pins 1-2 (Reset)

Connector	Description
COM1/COM2	Backplane COM Port1/Front Accessible COM2 Header
FAN1~10	CPU/System Fan Headers
I-SATA 0/1	Intel SB SATA 3.0 Connectors 0/1 (Color: White)
I-SATA 2-5	Intel SB SATA 2.0 Connectors 2~5 (Color: Black)
JIPMB1	4-pin External BMC I^{2}C Header (for an IPMI Card)
JD1	Speaker/Power LED Indicator
JF1	Front Panel Control Header
JL1	Chassis Intrusion Header
JOH1	Overheat LED Indicator
JPI^{2}C1	Power Supply SMBbus I^{2}C Header
JPW1	ATX 24-Pin Power Connector
JPW2~5	12V 8-Pin Power Connectors
JSD1	SATA DOM (Device on Module) Device Power Connector
LAN1/LAN2	Gb Ethernet Ports 1/2
LS2E1	Internal Speaker (Buzzer)
(IPMI) LAN	Dedicated IPMI LAN
SAS0~3, 4~7	SAS (Serial Attached SCSI) Connections 0~3, 4~7 (JS1/2) (for X9QR7-TF+ only)
SWUID	UID (Unit Identification) Switch
T-SGPIO1/2	Serial_Link General Purpose I/O Headers (JP4/JP5)
USB0/1, 2/3	Back Panel USB Ports
USB4	Type A USB Connector for Front Access
USB5/6/7	Front Accessible USB Headers

LED	Description	State	Status
DS1	BMC Heartbeat LED	Green	BMC Normal
LEDUID1	Rear UID (Unit Identification) LED		

5-8   Connector Definitions

Main ATX Power Supply Connector

A 24-pin main power supply connector(JPW1) and four 8-pin CPU PWR connectors (JPW2/3/4/5) are located on the motherboard. These power connectors meet the SSI EPS 12V specification. You must also connect the 8-pin processor power connectors to your power supply (see below).

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

Processor Power Connector

JPW2, JPW3, JPW4 and JPW5 provide power for the processors. All four should be connected to your 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 button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS). To turn off the power when the system is set to suspend mode, press the button for at least 4 seconds. Refer to the table on the right for pin definitions.

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

Reset Button

Pins 3 and 4 of JF1 attaches to the reset button on the computer chassis. See the table on the right for pin definitions.

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

Overheat/Fan/Pwr Fail/UID LED

Connect an LED to pins 7 and 8 of JF1 to use the Overheat/Fan Fail/Power Fail/UID LED functions. The red LED on pin 7 provides warning of overheat, fan failure or power failure. The blue LED on pin 8 works as the front panel UID LED indicator. The red LED takes precedence over the blue LED by default. Refer to the table on the right for pin definitions.

OH/Fan Fail/ Pwr Fail/UID LED Pin Definitions (JF1)	
Pin#	Definition
7	Red + (Blue LED Cathode)
8	Blue (OH/Fan Fail/ PWR Fail/UID LED)

OH/Fan Fail Indicator Status	
State	Definition
Off	Normal
On	Overheat
Flashing	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 the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)	
Pin#	Definition
9	Activity
10	Link

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 the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)	
Pin#	Definition
11	Activity
12	Link

HDD LED

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

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	3.3V
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 the table on the right for pin definitions.

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

NMI Button

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

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

Fan Headers

There are eight fan headers on the serverboard, all of which are 4-pin fans. However, pins 1-3 of the fan headers are backward compatible with traditional 3-pin fans. See the table on the right for pin definitions. The fan speeds are controlled by firmware thermal management via IPMI Interface. When using Thermal Management setting, please use all 3-pin fans or all 4-pin fans.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWM Control

Chassis Intrusion

The Chassis Intrusion header is designated JL1. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened

Chassis Intrusion Pin Definitions (JL1)	
Pin#	Definition
1	Intrusion Input
2	Ground

Power LED/Speaker

On JD1 header, pins 1-3 are for a power LED and pins 4-7 are for the speaker. Pins 4-7 are available for connection to 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	Onboard Speaker

Serial Ports

COM1 is located on the rear I/O panel. COM2, located close to PCI-E Slot2, provides front access support. See the table on the right for pin definitions.

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

Overheat LED/Fan Fail

The JOH1 header is used to connect an LED to provide warning of chassis overheating. This LED will blink to indicate a fan failure. Refer to the table on right for 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

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

Power SMB (I2C)

The Power System Management Bus (I^{2}C) header (JPI^{2}C) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

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

IPMB Header

A System Management Bus header for IPMI 2.0 is located at JIPMB1. 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

T-SGPIO 1/2 Headers

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

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

NC = No Connection

Unit Identifier Switch

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

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

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

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

Ethernet Ports

Two Gigabit Ethernet ports (LAN1/2) are located on the I/O backplane on the motherboard to provide internet connections. In addition, an IPMI_ Dedicated LAN, located above USB 0/1 ports on the backplane, provides KVM support for IPMI 2.0. All these ports accept RJ45 type cables.

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

(NC = No Connection)

Universal Serial Bus (USB)

Four Universal Serial Bus ports (USB0/1, USB2/3) are located on the I/O back panel. Two USB headers (USB6/7 and USB5) provide front-accessible USB connections. In addition, a Type A USB header (USB4), located close to the PCH chip, also provides USB connection for front access.(cables are not included). See the tables on the right for pin definitions.

Backplane Accessible USB Connectors Pin Definitions			
USB 0/2		USB 1/3	
Pin #	Definition	Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	NC	5	Key

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

NC = No Connection

Type A USB (USB4) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	4	Ground
2	PO-	5	NA
3	PO+		

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.
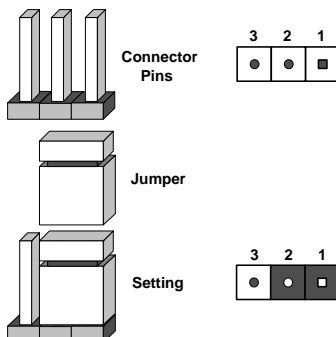
CMOS Clear

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). It is also recommended that you remove the onboard battery from the serverboard.

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.*

GLAN1/2 Enable/Disable

Change the setting of jumper JPTG1 to enable or disable the LAN1/LAN2 Ethernets port on the serverboard. The default setting is enabled. See the table on the right for jumper settings.

GLAN1/2 Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

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

BMC Enable

Jumper JPB1 allows you to enable the embedded WPCM 450 BMC (Baseboard Management) Controller to provide IPMI 2.O/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

BMC Reset

Use jumper JPRST1 to reset the BMC settings on the motherboard. See the table on the right for jumper settings.

BMC Reset Jumper Settings	
Jumper Setting	Definition
Closed	BMC Reset
Open	Normal (Default)

Watch Dog Enable/Disable

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

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

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

5-11 Onboard Indicators

LAN1/2 LEDs

The LAN 1/2 ports are located on the IO Backplane. Each Ethernet LAN port has two LEDs. The Yellow LED on the right indicates activity. The Link LED on the left may be green, amber or off to indicate the speed. See the tables at right for more information.

LAN Ports

Link LED   Activity LED

Rear View (when facing the rear side of the chassis)
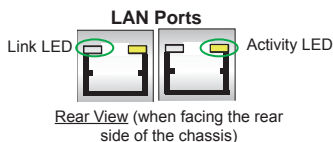
LAN Activity Indicator (Right) LED Settings		
Color	Status	Definition
Off	No Connections	
Yellow	Flashing	Active

LAN Link Speed Indicator (Left) LED Settings	
Color	Definition
Off	No Connection or 10 Mbps
Green	100 Mbps
Amber	1 Gbps

IPMI Dedicated LAN LEDs

In addition to LAN 1/LAN 2, an IPMI Dedicated LAN is also located on the I/O Backplane of the motherboard. The amber LED on the right indicates connection and activity, while the green LED on the left indicates the speed of the connection. See the tables at right for more information.

IPMI LAN

Link Speed LED   Activity LED
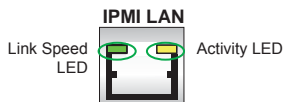
IPMI LAN Link LED (Left) & Activity LED (Right)		
Color	Status	Definition
Green: Solid	Link (Left)	100 Mb/s
Amber Blinking	Activity (Right)	Active

BMC Heartbeat LED

A BMC Heartbeat LED is located at DS1 on the motherboard. When DS1 is blinking, BMC is functioning normally. See the table at right for more information.

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

Unit Identification Switch/LED

A Unit Identifier switch (SWUID) and a rear UID LED indicator (LEDUID1) are located next to the VGA port. When pushing the rear UID switch, the front UID LED indicator and the rear UID LED (LEDUID1) will be turned on. Push the UID switch again to turn off both UID LED indicators. The UID switch provides easy identification of a system unit that may be in need of service.

UID LED (LEDUID1) Status		
Color/State	OS	Status
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified

5-12 SAS/SATA Ports

SATA Ports

There are no jumpers to configure the onboard SATA ports. These ports are supported by the Intel chipset. See the table on the right for pin definitions.

| SATA Port Pin Definitions (I-SATA0 ~ I-SATA5)	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

SAS2 Ports

Eight Serial_Attached_SCSI Ports (SAS 3.0 0~3, 4~7) located on the X9QR7-TF+ to provide serial link connections. These ports are supported by the LSI 2208 SAS Controller. See the table on the right for pin definitions.

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.

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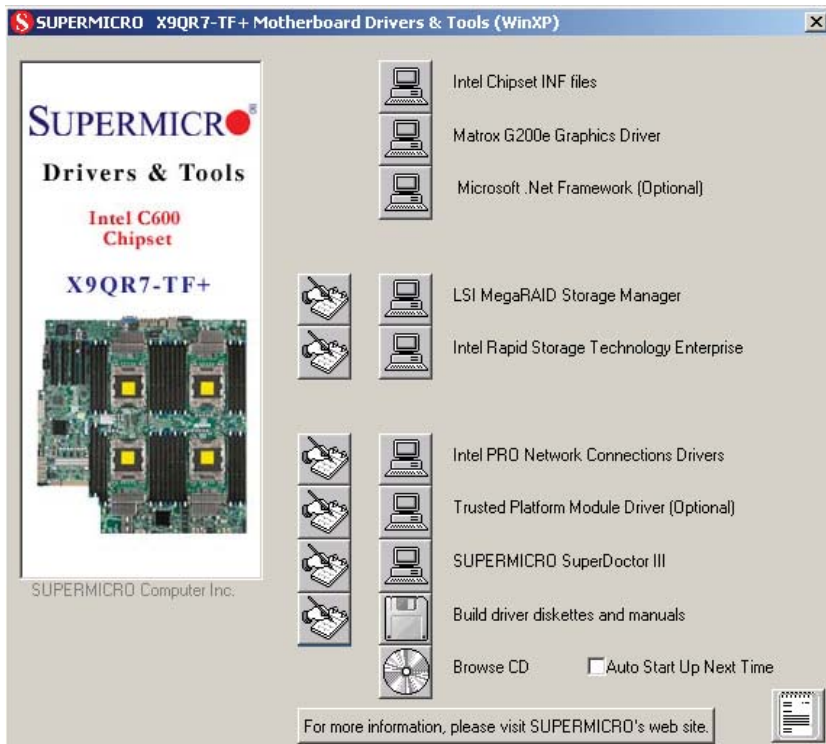
Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on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

Supero Doctor III

The 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.

Figure 5-6. Supero Doctor III Interface Display Screen (Health Information)
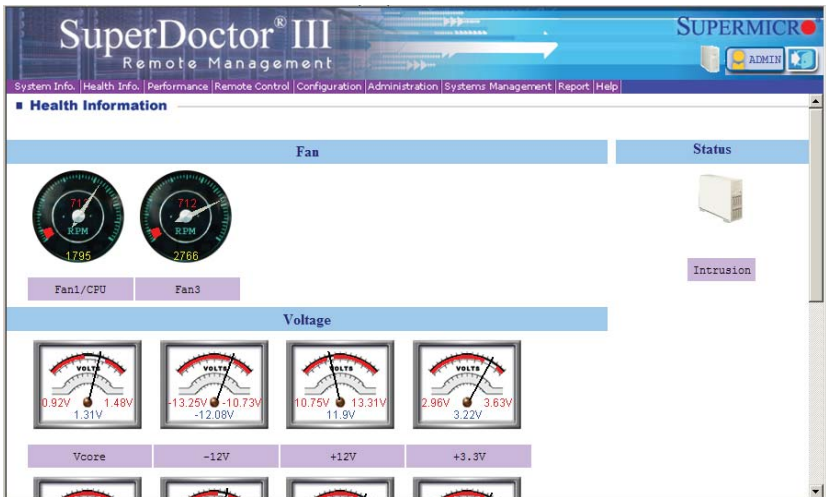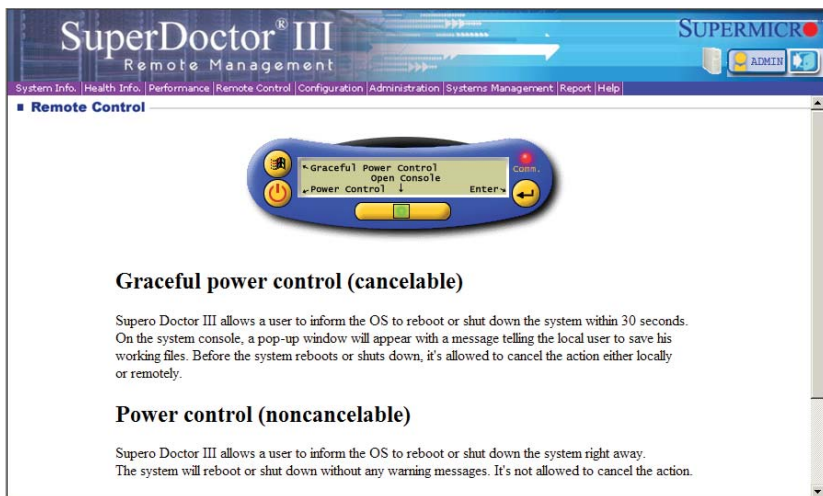
**Figure 5-7. Supero Doctor III Interface Display Screen (Remote Control)**

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 that you use the SuperoDoctor II application instead.

5-14 Serverboard Battery

Caution: There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 5-5). 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.

Figure 5-5. Installing the Onboard Battery
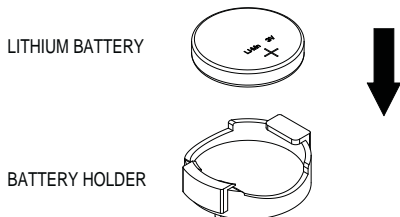
LITHIUM BATTERY

BATTERY HOLDER

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

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC748TQ-R1K43BP chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

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

6-1   Static-Sensitive Devices

Electrostatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

Precautions

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

Unpacking

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

Figure 6-1. Front and Rear Chassis Views

5.25" PeripheralDrive Bays (3)
Control Panel   USB Ports (2)   Power Supplies (2)

Main Power   System Reset   SAS/SATA Drives (6)
                                   In Mobile Rack

COM1 Port   USB Ports VGA Port   UID   Standard Size PCI Slots (6)
                                                  (4 on Motherboard)
    IPMI LAN   Ethernet Ports
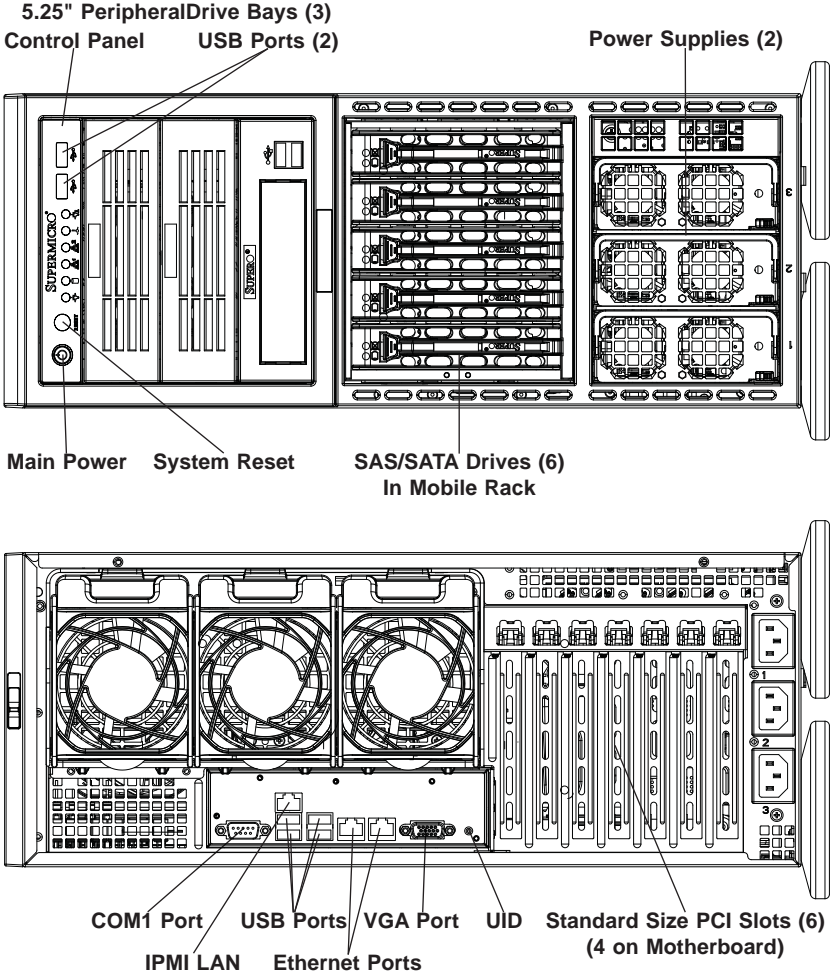
6-2   Control Panel

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

See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3   Configuring the Storage Module

This section covers configuring the storage module for the SC748 chassis. The storage module can be configured for either tower or server rack configurations.

Tower or Rack Configuration

The SC748 chassis is shipped in tower mode and can be immediately used as desktop server. If the chassis is to be used in a rack, you must rotate the storage module 90 degrees. This can be done before, during, or after setup.
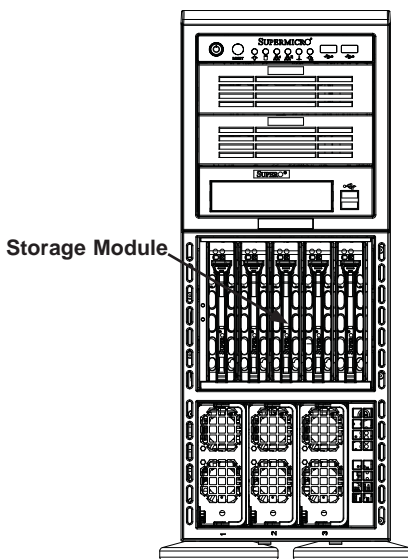
Figure 6-2: Chassis in Tower Mode

Figure 6-3: Chassis in Rack Mount Mode
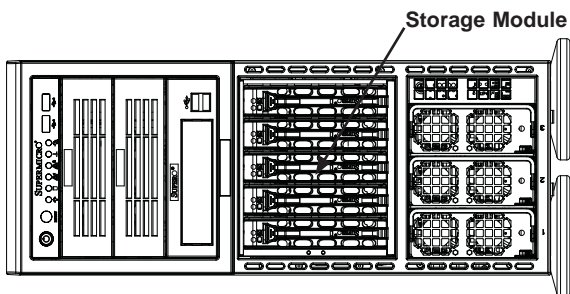
Figure 6-4: Chassis Storage Module
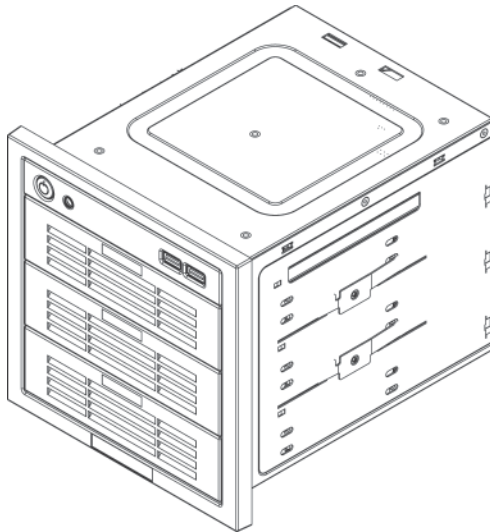
Rotating the Storage Module for Rack Mounting

1. Open the chassis cover.

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

3. Push the storage module release lever. This lever unlocks the storage module.

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

5. Rotate the storage module 90 degrees (as illustrated in Figure 6-5).

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

Caution: All of the drive carriers must remain in the drive bays to maintain proper cooling airflow.

Figure 6-5: Remove the Storage Module
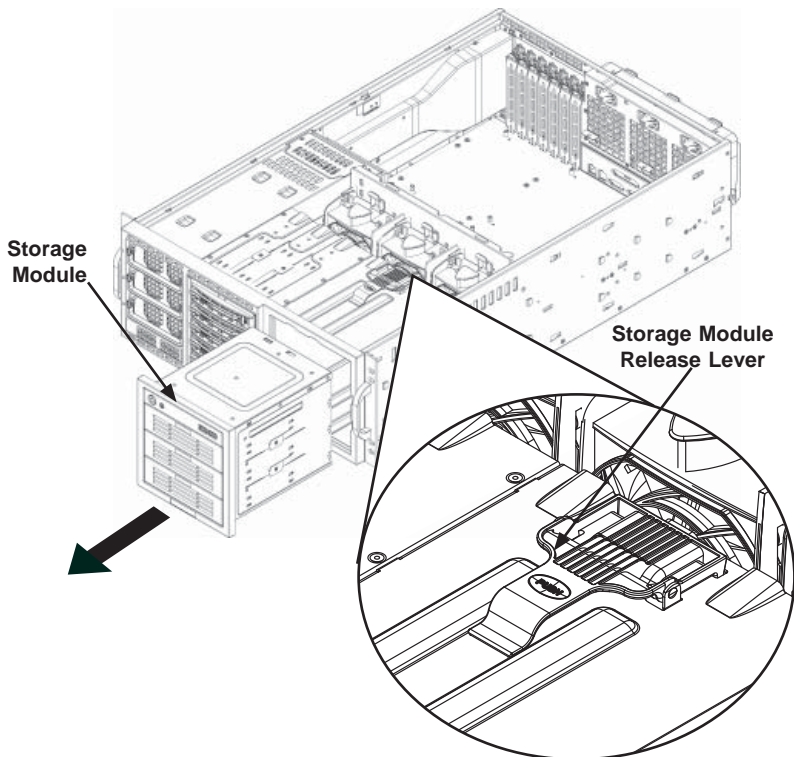
Adding Drives to the Storage Module

The storage module includes three full sized drive bays and the front LED panel. The storage module can be set up in a variety of configurations: There are three basic configurations (see A, B, and C below) which can then be combined within the three bays to suit the user's needs.

(Example: 2 DVDs with 1 HDD or 1 DVD with 2 HDD etc.)

Basic Configurations:

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

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

C. Add five hot swappable hard drives to the storage module. This configuration requires a CSE-M35BP mobile rack. More information on mobile rack installation can be found in the appendices at the end of this manual.

Installing Hard Drives into the Drive Tray

1. Open the chassis cover.

2. Locate the drive tray you want to replace and pull the tray release tab for the slot.

3. Push the drive tray toward the front of the chassis (Figure 6-6).

Figure 6-6: Remove Drive Tray
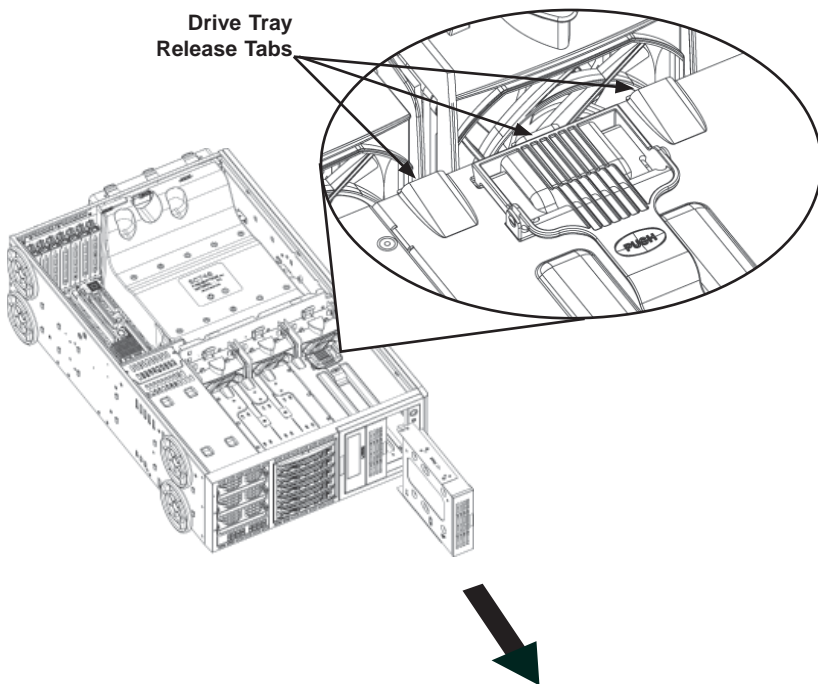
4. Place the hard drive to the hard drive tray. The hard drive can be SAS or SCSI depending on your motherboard. The hard drive may not completely fill the tray (Figure 6-7).

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

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

7. Repeat these steps for each hard drive tray.

Figure 6-7: Add a Hard Drive to the Drive Tray

Hard Drive Tray

Hard Drive
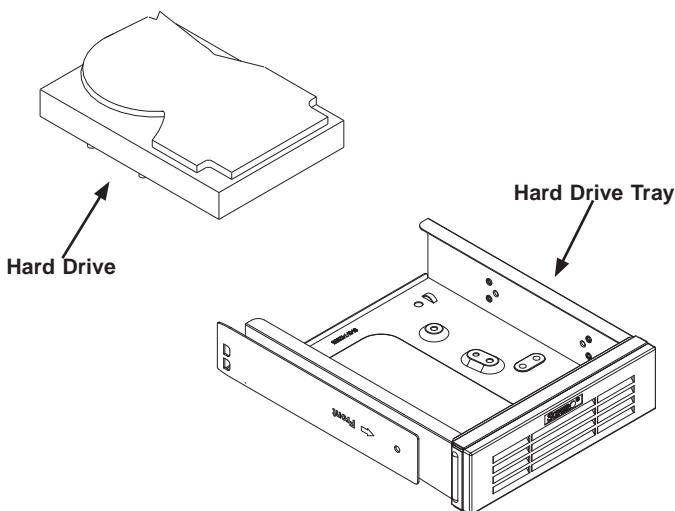
Adding Peripheral Drives (DVD-ROM, CD-ROM, Floppy Drive, etc.) to the Drive Trays

1. Open the chassis cover.

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

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

4. Remove the hard drive tray rails from the hard drive tray. To do this, you must remove two screws from each side.

5. Attach the rails to a DVD-ROM, CD-ROM, floppy drive, or other peripheral. The rails should fit any standard sized peripherals (Figure 6-8).

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

7. Repeat these steps for each hard drive tray.

Caution! 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/files/storage/SAS-CompList.pdf

Caution: Use caution when working around the backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

Figure 6-8: Add Hard Drive Rails to the DVD-ROM Drive

Hard Drive Tray

Hard Drive Rails
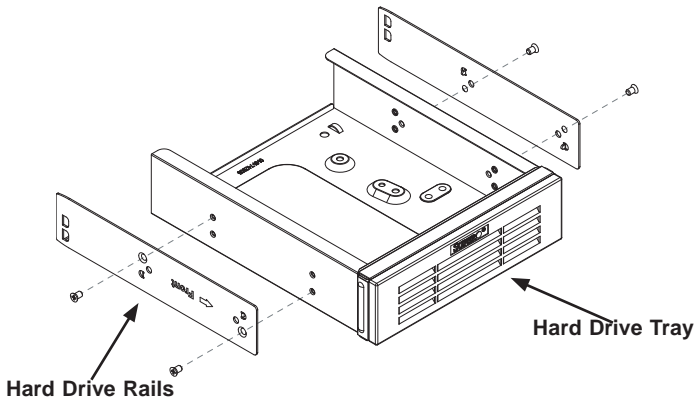
Adding Five Hard Drives to a Supermicro Mobile Rack:

The SC748 chassis accepts a CSE-M35BP mobile rack in order to install hot swappable hard drives. The mobile rack replaces the storage module in the chassis.

For more information on mobile rack installation and use, refer to the appendices located at the end of this manual.

Removing the Storage Module and Installing the M35 Mobile Rack

1. Open the chassis cover.

2. Press the drive tray release tabs

3. Push the storage module forward and out of the chassis (Figure 6-9)

Figure 6-9: Removing the Drive Bay
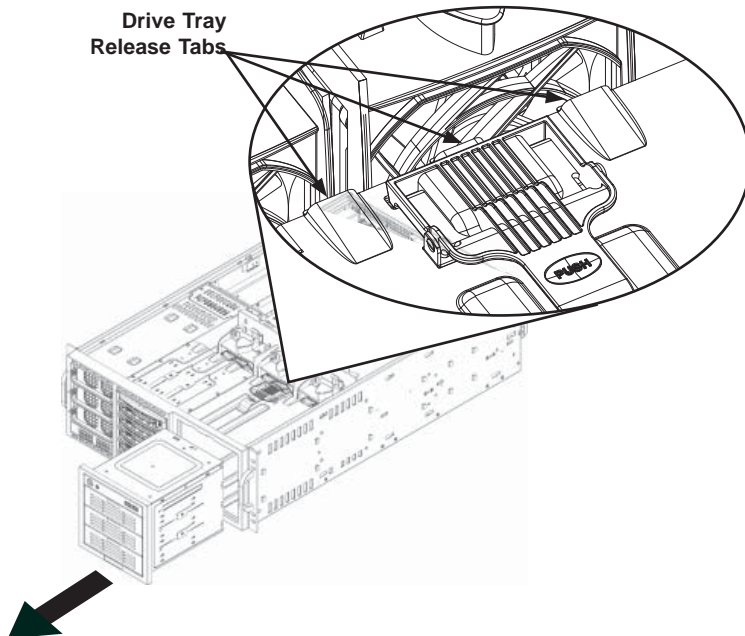
4. Install all six storage module rails onto the mobile rack. Each rail requires two screws. Make sure the arrow on the rail points toward the front of the chassis (Figure 6-10).

Figure 6-10: Add Storage Module Rails to the Mobile Rack
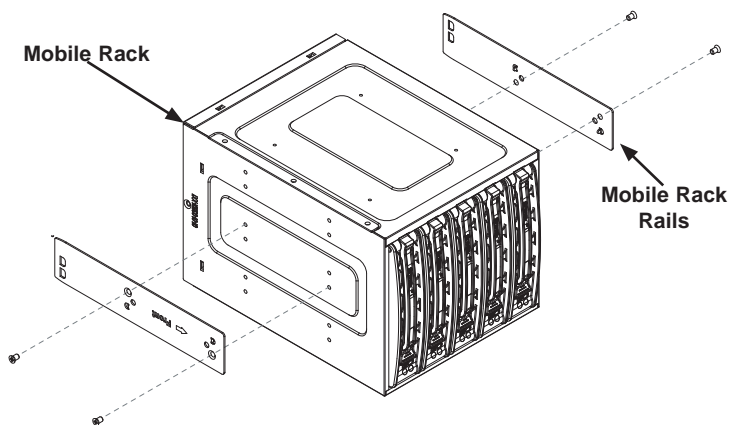
5. Slide the mobile rack into the chassis.

6-4   Installing Hard Drives

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

Installing Hard Drives

1. Press the release button to extend the drive tray handle.

2. Using the handle, pull the drive tray out by the handle. The drive is hot-swappable; there are no cables to disconnect (Figure 6-11).

Figure 6-11: Install Hard Drives

Release Button

Drive Tray Handle
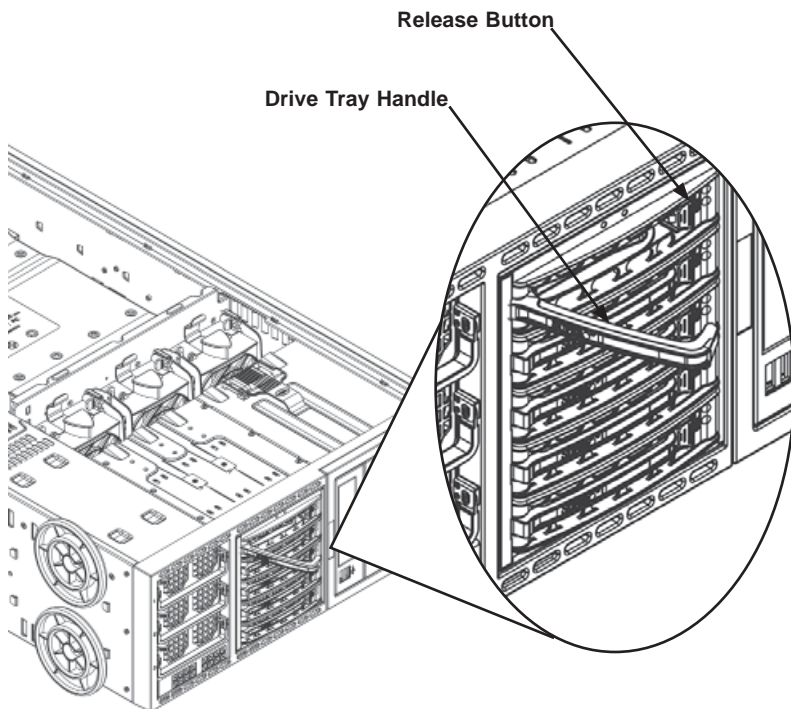
3. Remove the screws holding the drive tray to the dummy drive.

4. Place a hard drive in the drive tray (Figure 6-12).

Figure 6-12: Removing the Dummy Drive Tray

Drive Tray

**SAS/SATA or
SCSI Hard Drive**
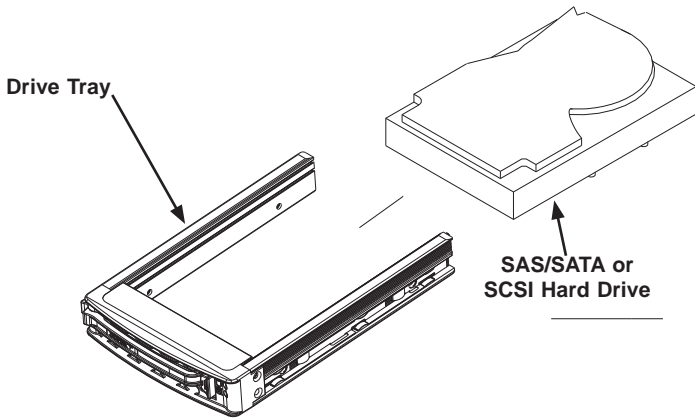
5. Secure the hard drive to the tray using four screws (Figure 6-13).

Figure 6-13: Installing the Hard Drive
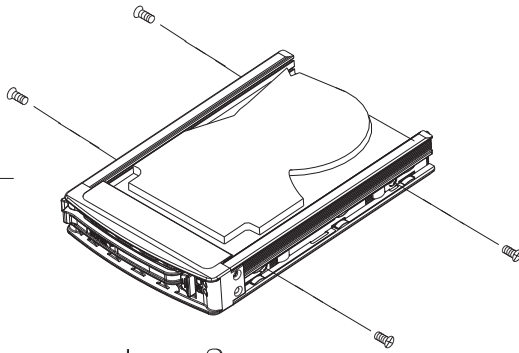
6. Insert the hard drive into the chassis. To do this:

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

   b. Insert the hard drive into the chassis and close the handle to lock the hard drive into place.

Add-on Card/Expansion Slot Setup

After motherboard installation, install add-on cards to the chassis, such as PCI cards.

Installing Add-on and Expansion Cards

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

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

3. Pull the release tab upward (Figure 6-14).

Figure 6-14: Add-on Card/Expansion Card Port

Press the Middle of the Release Tab

Lift the Release Tab
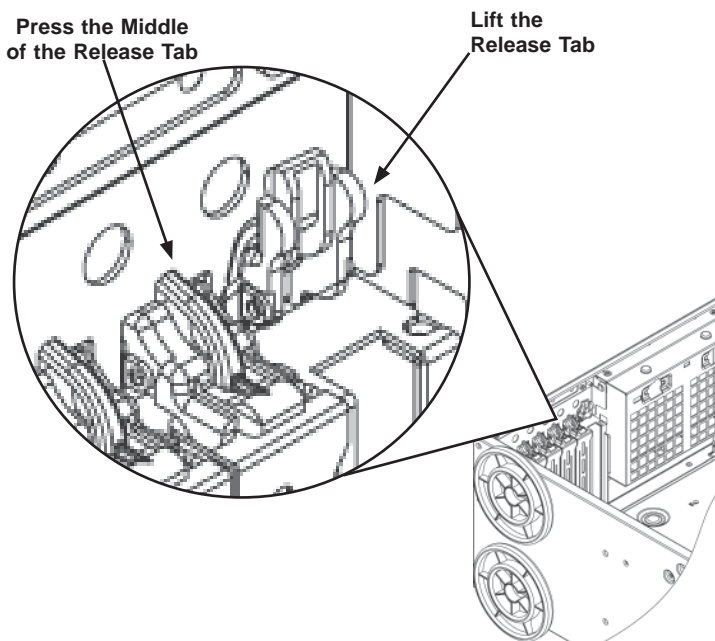
4. Remove the screw holding the bracket in place and pull the bracket from the chassis (Figure 6-15).

Figure 6-15: Remove PCI Card Slot Guard
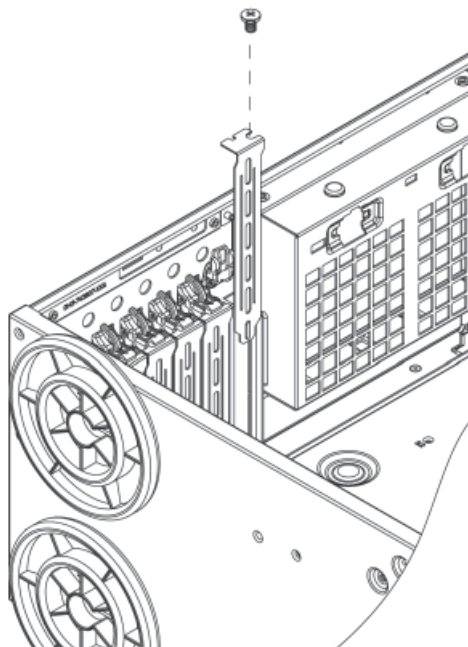
5. Install your PCI card or other add-on card into the PCI slot bracket and motherboard. To do this, slide the PCI card (with "L" bracket) into the PCI slot and secure the card to the motherboard.

6. Push the PCI bracket release tab down until it locks into place with an audible "click".

7. Secure the PCI card with the screw previously removed from the chassis

8. Repeat this process with each PCI card you want to install into the chassis.

6-5   Installing the Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The SC748 chassis air shroud does not require screws to set it up.

The SC748 chassis supports two different air shroud designs, one for AMD CPUs and, and another for Intel CPUs.

Figure 6-16: CPU Air Shroud
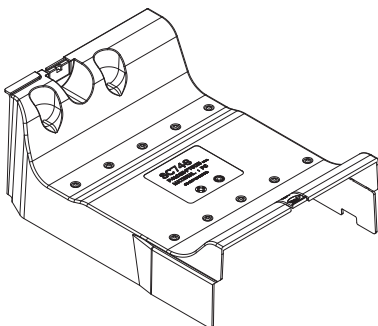
Installing the Air Shroud

1. Remove the chassis cover.
2. Place air shroud in your chassis with the fan side touching the edge of the two fans closest to the power supply. The other side should cover both of the rear fans (Figure 6-17).

Figure 6-17: Air Shroud in Place
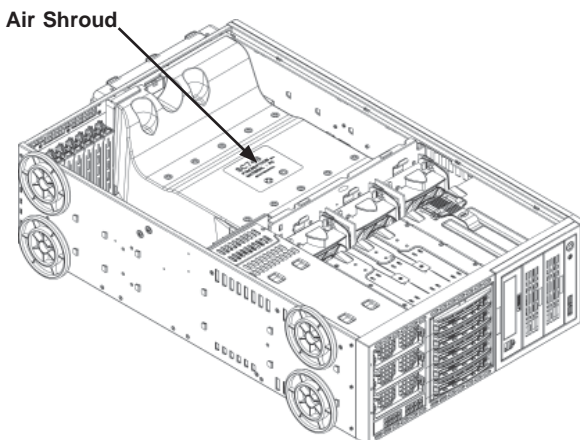
3. Replace the chassis cover.

6-6   System Fans

Six heavy duty fans provide cooling for the chassis. Three fans are located in the front of the chassis and three fans are in the rear. These fans circulate air through the chassis as a means of lowering the internal temperature of the chassis.

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

Replacing a Front Chassis Fan

Front Fan Replacement Procedure (Figure 6-18)

1. Open the chassis cover and determine which fan has failed. Because the fans are hot-swappable, the chassis does not have to be powered down.

2. Press the fan release tab and lift the failed fan from the chassis. Front fans must be pulled straight up.

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

Figure 6-18: Front Chassis Fans
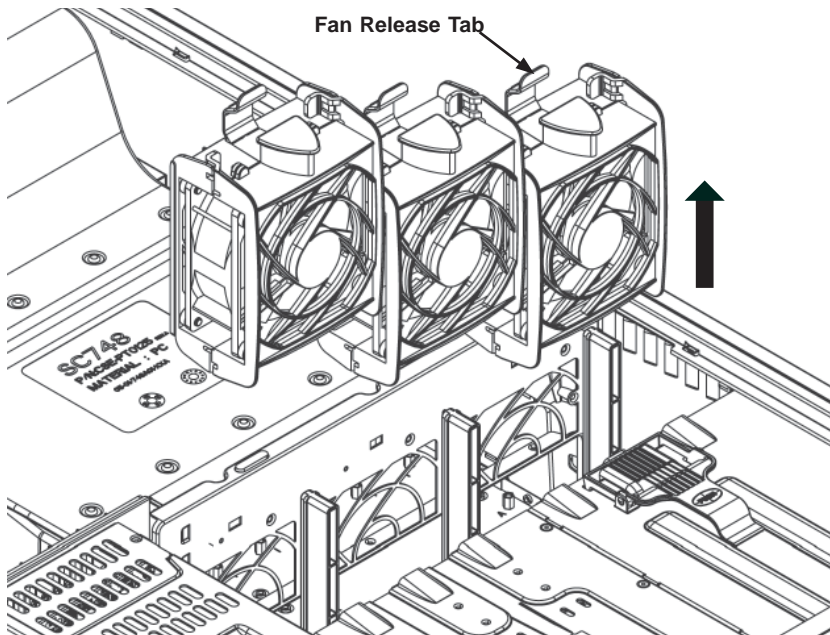
Replacing a Rear Chassis Fan

Rear Fan Replacement Procedure (Figure 6-19)

1. Press the rear fan release tab.

2. Pull the fan from the chassis top first.

3. Place the new fan in the chassis bottom first.

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

Figure 6-19: Rear Chassis Fans

Rear Fan Release Tab
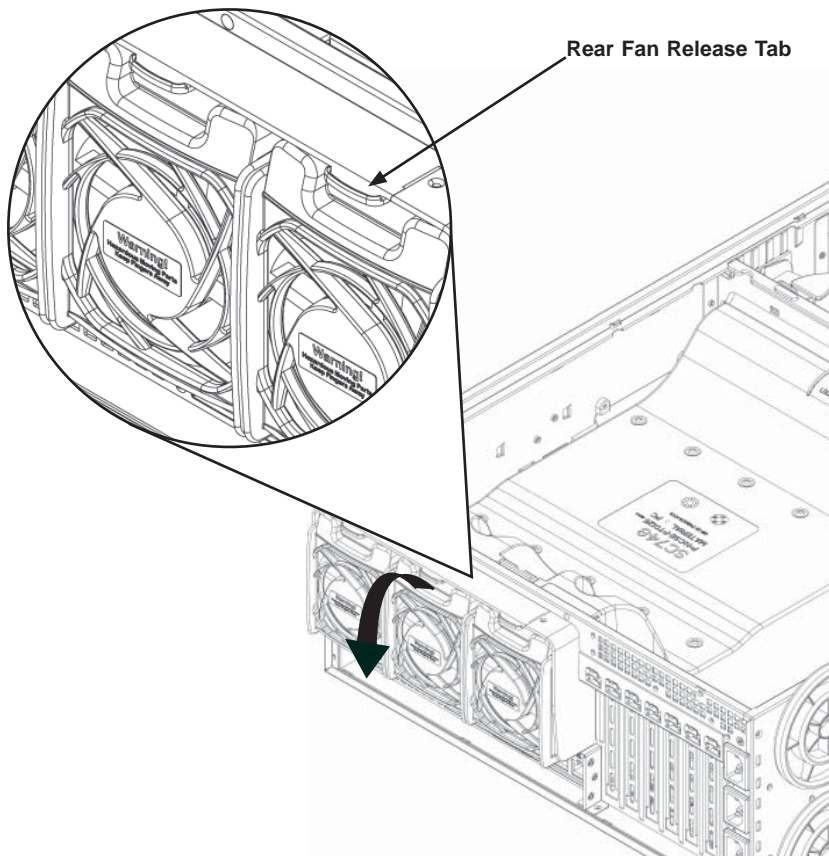
6-7   Power Supply

Depending on your chassis model, the SC748 Chassis has a 1400 Watt (redundant) power supply. This power supply is auto-switching capable. This enables it to automatically sense and operate at a 100v to 240v input voltage. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

Power Supply Failure

In redundant power supply models, the system automatically switches to the second power supply when the first fails. If your system has only one power supply, the system shuts down in the unlikely event of a power failure.

Replacing the Power Supply

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

2. Push the release button on the back of the power supply.

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

4. Replace the failed power module with the same model.

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

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

Figure 6-20: Removing a Power Supply

Pull the Drive Out Using the Handle

Press the Release Button
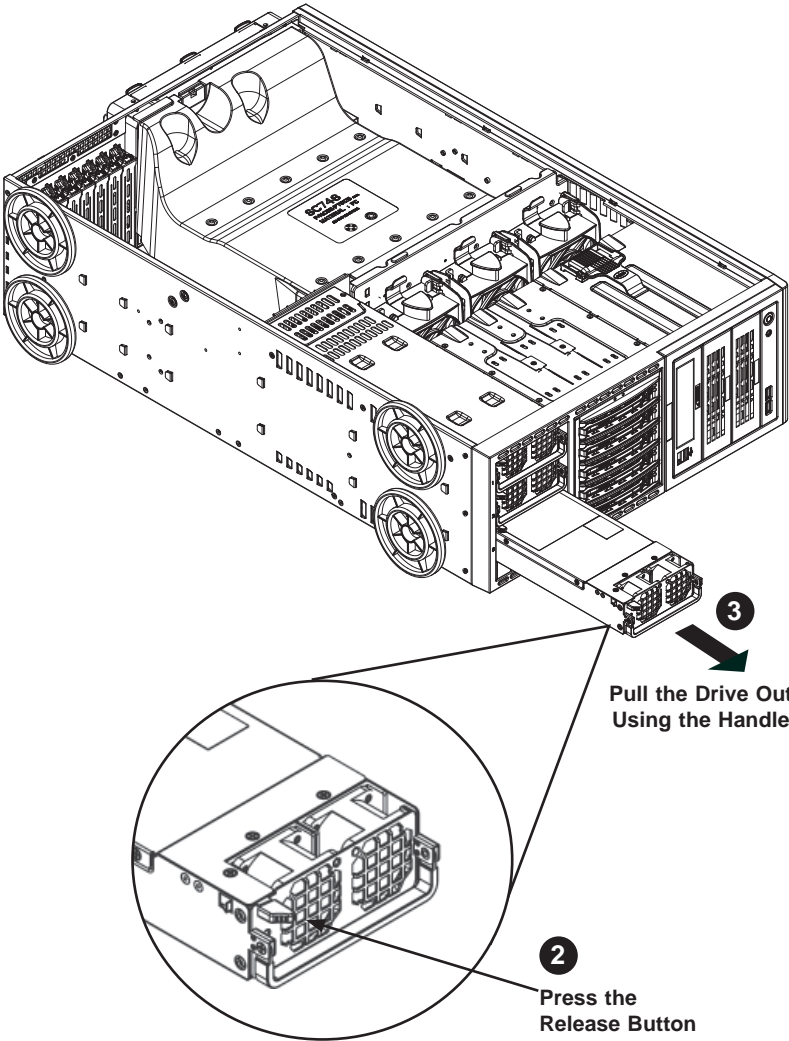
Chapter 7

BIOS

7-1   Introduction

This chapter describes the AMI BIOS Setup Utility for the SuperServer 8047R-TRF+/7RFT+. The 16 MB SPI AMI BIOS® SM Flash BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

Starting the Setup Utility

To enter the BIOS Setup Utility, hit the <Delete> key while the system is booting-up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.) Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. 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 that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.

A " ▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

7-2   Main Menu

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 10/12/2012).

System Time

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

Supermicro X9QR7-TF+

Displays the serverboard number.

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 ROM was built.

Total Memory

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

7-3   Advanced Settings Menu

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 Immediate, the ROM BIOS of the host adaptors will immediately "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 Postponed, the ROM BIOS of the host adaptors will capture Interrupt 19 during a legacy boot. The options are **Immediate** and Postponed.

Watch Dog Function

If enabled, the Watch Dog timer will allow the system to automatically reboot when a non-recoverable error occurs that lasts for more than five minutes. The options are Enabled and **Disabled.**

Power Button Function

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

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power On, Stay Off, and **Last State**.

▶CPU Configuration

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

▶Socket 1 CPU Information/Socket 2 CPU Information/ Socket 3 CPU Information/ Socket 4 CPU Information

This submenu displays the following information regarding the CPUs installed in Socket 1/ Socket 2/ Socket 3/ Socket 4.

- 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 the Socket selected.

64-bit

This item indicates if 64-bit technology is supported by the CPU installed in the Socket selected.

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.

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.

Hyper-threading

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

Active Processor Cores

Set to Enabled to use a processor's second core and above. (Please refer to Intel's website for more information.) The options are **All,** 1, 2, 4, 6.

Limit CPUID Maximum

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

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

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

Intel® AES-NI

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

MLC Streamer Prefetcher (Available when supported by the CPU)

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

MLC Spatial Prefetcher (Available when supported by the CPU)

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

DCU Streamer Prefetcher (Available when supported by the CPU)

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

DCU IP Prefetcher

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

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

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

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

▶CPU Power Management Configuration

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

Power Technology

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disabled, Energy Efficient, 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

This feature allows processor cores to run faster than marked frequency in specific conditions. The options are Disabled and **Enabled.**

P-STATE Coordination

This feature selects the type of coordination for the P-State of the processor. P-State is a processor operational state that reduces the processor's voltage and frequency. This makes the processor more energy efficient, resulting in further gains. The options are **HW_ALL**, SW_ALL and SW_ANY.

C1E Support (Available when Power Technology is set to Custom)

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

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

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

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

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

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

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

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

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

Energy Performance Bias

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

Factory Long Duration Power Limit

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

Long Duration Power Limit

This item displays the power limit (in watts) set by the user during which long duration power is maintained. The default setting is **0**.

Factory Long Duration Maintained

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

Long Duration Maintained

This item displays the period of time (in seconds) during which long duration power is maintained. The default setting is **0**.

Recommended Short Duration Power

This item displays the short duration power settings (in watts) recommended by the manufacturer.

Short Duration Power Limit

This item displays the time period during which short duration power (in watts) is maintained. The default setting is **0**.

▶Chipset Configuration

▶North Bridge

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

▶Integrated IO Configuration

Intel VT-d

Select Enabled to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VWM (Virtual Working Memory) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and Disabled.

Data Direct I/O

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

DCA Support

When set to Enabled, this feature uses Intel's DCA (Direct Cache Access) Technology to improve data transfer efficiency. The default is **Enabled** and can not be changed.

PCIe Port Bifurcation Control

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

CPU 4 PCIe Slot 1 Link Width

This feature allows the user to set the PCI-Exp bus speed between CPU 4 and the PCI-e port. The options are x4, and **x8**.

CPU 4 PCIe Slot 1 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot 1. Select GEN2 to enable PCI-Exp Generation 2 support for Slot 1. Select GEN3 to enable PCI-Exp Generation 3 support for Slot 1. The options are GEN1, GEN2**,** and **GEN3**.

CPU 4 PCIe Slot 2 Link Width

This feature allows the user to set the PCI-Exp bus speed between CPU 4 and the PCI-e port. The options are x4, x8, and **x16**.

CPU 4 PCIe Slot 2 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot 2. Select GEN2 to enable PCI-Exp Generation 2 support for Slot 2. Select GEN3 to enable PCI-Exp Generation 3 support for Slot 2. The options are GEN1, GEN2**,** and **GEN3**.

CPU 1 PCIe Slot 3 Link Width

This feature allows the user to set the PCI-Exp bus speed between CPU 1 and the PCI-e port. The options are x4, and **x8**.

CPU 1 PCIe Slot 3 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot 3. Select GEN2 to enable PCI-Exp Generation 2 support for Slot 3. Select GEN3 to enable PCI-Exp Generation 3 support for Slot 3. The options are GEN1, GEN2**,** and **GEN3**.

CPU 1 PCIe Slot 1 Link Width

This feature allows the user to set the PCI-Exp bus speed between CPU 1 and the PCI-e port. The options are x4, x8, and **x16**.

CPU 1 PCIe Slot 1 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot 3. Select GEN2 to enable PCI-Exp Generation 2 support for Slot 3. Select GEN3 to enable PCI-Exp Generation 3 support for Slot 3. The options are GEN1, 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 Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enabled and **Disabled**.

QPI (Quick Path Interconnect) Link Speed Mode

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

QPI Link Frequency Select

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

▶DIMM Configuration

This section displays the following DIMM information.

Current Memory Mode

This item displays the current memory mode.

Current Memory Speed

This item displays the current memory speed.

Mirroring

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

Sparing

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

▶DIMM Information

CPU Socket 1 DIMM Information/ CPU Socket 2 DIMM Information

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

Memory Mode

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

DRAM RAPL Mode

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

DDR Speed

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

Channel Interleaving

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

Rank Interleaving

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

Patrol Scrub

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

Demand Scrub

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

Data Scrambling

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

Device Tagging

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

Thermal Throttling

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

▶South Bridge Configuration

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

PCH Information

This feature displays the following PCH information.

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

Stepping: This item displays the PCH stepping.

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

All USB Devices

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

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

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

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

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

Port 60/64 Emulation

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

EHCI Hand-Off

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

▶SATA Configuration

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

SATA Port0~SATA Port5

The AMI BIOS displays the status of each SATA port as detected by the BIOS.

SATA Mode

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

IDE Mode

The following items are displayed when IDE Mode is selected:

Serial-ATA (SATA) Controller 0~1

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

AHCI Mode

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

Aggressive Link Power Management

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

Port 0~5 Hot Plug

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

Staggered Spin Up

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

RAID Mode

The following items are displayed when RAID Mode is selected:

Port 0~5 Hot Plug

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

▶PCIe/PCI/PnP Configuration

PCI ROM Priority

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

PCI Latency Timer

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

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

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

PERR# Generation

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

SERR# Generation

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

Maximum Payload

Select Auto to allow the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes and 256 Bytes, 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 L0s to force all PCI-E links to operate at L0s 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 L0s, and Auto.

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

CPU4 PCIe Slot 1 OPROM/CPU4 PCIe Slot 2 OPROM/CPU1 PCIe Slot 3 OPROM/CPU1 PCIe Slot 4 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.

Load Onboard 10GbE OPROM

Select Enabled to enable the onboard 10GbE Option ROM. This is to boot the computer using a network device. The default setting for 10GbE Option ROM is **Enabled**.

Load Onboard LSI SAS OPROM

Select Enabled to enable the onboard LSI SAS Option ROM. This is to boot the computer using a SAS device. The default setting for LSI SAS Option ROM is **Enabled**.

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**.

IPv4 PXE Support (Available when Network Stack is set to Enabled)

Set this item to Enabled to activate IPv4 PXE Support. The options are **Enabled** and Disabled.

IPv6 PXE Support (Available when Network Stack is set to Enabled)

Set this item to Enabled to activate IPv6 PXE 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 Platform 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 Platform Environment Control Interface (PECI) setting for a serial port specified. The default setting is **Auto**, which will allow the AMI BIOS to automatically select the best setting for the PECI platform.

Device Mode

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

Serial Port 2 Attribute

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

▶Serial Port Console Redirection

COM 1/COM 2

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

Console Redirection

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

▶Console Redirection Settings

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

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

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

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

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

Console Redirection

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

▶Console Redirection Settings

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

Out-of-Band Management Port

The feature selects a serial port used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote server. The options are **COM1** and COM2.

Terminal Type

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

Bits Per Second

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

Flow Control

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

▶ACPI Settings

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

ACPI Sleep State

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

NUMA (NON-Uniform Memory Access)

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

High Precision Event Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback, 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

Use this item to schedule an operation for the security device. The options are **None**, Enable Take Ownership, Disable Take Ownership, and TPM Clear.

Note: During restart, the computer will reboot in order to execute the pending operation and change the state of the security device.

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 indicates if the Intel TXT support is enabled or disabled. The default setting is **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

▶ME Subsystem

This feature displays the following ME Subsystem Configuration settings.

- ME BIOS Interface Version
- ME Version
- ME FW Status Value
- ME FW State
- ME FW Operation State
- ME FW Error Code
- ME Ext FW Status Value
- BIOS Booting Mode
- Cores Disabled
- ME FW SKU Information
- End-of-POST Status

7-4   Event Logs

Use this feature to configure Event Log settings.

▶Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event settings.

Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

Runtime Error Logging Support

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

Memory Correctable Error Threshold

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

PCI Error Logging Support

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

Erasing Settings

Erase Event Log

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

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/Error Code/Severity

7-5   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.

Status of BMC

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

▶System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL

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

When SEL is Full

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

Custom EFI Logging Options

Log EFI Status Codes

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

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

▶BMC Network Configuration

LAN Channel 1/LAN Channel 2:

This feature allows the user to configure the settings for LAN1/LAN 2 Ports.

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, any changes the user made to the IPMI settings will be applied at the 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 it is attached to and request the next available IP address for this computer. The options for LAN 1 are **DHCP** and Static. The options for LAN 2 are **Unspecified**, Static, DHCP, Dynamic-Loaded by BIOS, and Dynamic-BMC running Other Protocol.

The following items are assigned IP addresses automatically if DHCP is selected, or can be configured manually if Static is selected.

Station IP Address

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

Subnet Mask

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

Station MAC Address

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

Gateway IP Address

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

7-6   Boot

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

Boot Option Priorities

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

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

Network Device BBS Priorities, Hard Drive BBS Priorities, USB Device BBS Priorities

This option sets the order of the legacy network and hard disk devices detected by the motherboard.

▶Delete Boot Option

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

Delete Boot Option

Select the desired boot device to delete.

7-7   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 20 characters long.

User Password

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

7-8   Save & Exit

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

Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, click Yes to quit BIOS without saving the changes, or click No to quit the BIOS and save changes.

Save Changes and Reset

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

Save Options

Save Changes

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

Discard Changes

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

Restore Optimized Defaults

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

Save as User Defaults

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

Restore User Defaults

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

Boot Override

This feature allows the user to override the Boot Option Priorities setting in the Boot menu, and instead immediately boot the system with one of the listed devices. This is a one-time override

Appendix A

BIOS Error Beep Codes

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

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

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

A-1   AMIBIOS Error Beep Codes

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

Notes

Appendix B

System Specifications

Processors

Quad Intel E5-4600 Series series (Socket R-LGA 2011 type) processors

Note: You must install at least two processors for full functions to be supported.

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

Chipset

One Intel C602 chipset

BIOS

16 MB SPI AMI BIOS® SM Flash BIOS

Memory Capacity

The X9QRi-F+/X9QR7-TF+ serverboard supports thirty-two (32) 240-pin DIMM sockets that can support up to 1024GB of Registered (RDIMM), Load Reduced (LRDIMM) ECC or Unbuffered (UDIMM) ECC/Non-ECC DDR3 1600/1333/1066/800 MHz speed SDRAM in a two-channel memory bus with memory sizes of 1GB, 2GB, 4GB, 8GB, 16GB and 32GB size @ 1.35V/1.5V voltages.

Note: LRDIMM (Reduced Load) memory supports only DDR3 1333/1066/800 MHz speeds. See the memory section in Chapter 5 for details.

SAS/SATA Controller

Intel C602 on-chip controller for six-port SATA subsystem (two SATA 3.0 and four SATA 2.0 ports), which is either RAID 0 and 1 (SATA3) or RAID 0, 1, 5, and 10 (SATA2) Windows/LINUX supported. The SATA drives are hot-swappable units.

A LSI® 2208 SAS controller is integrated into the X9QR7-TF+ serverboard to provide an eight port SAS (Serial Attached SCSI) subsystem, which is RAID 0, 1, 5, 6 and 10 supported (8047R-7RFT+ server only). The SAS drives are hot-swappable units.

Drive Bays

Five hot-swap 3.5" drive bays to house up to five SATA or SAS drives (additional five 3.5" hard drives available with optional M35 mobile rack), and three 5.25" peripheral drive bays

Expansion Slots

Four PCI low-profile expansion card slots are available in the rear of the chassis for four (4) PCI Express 3.0 x16 slots (Slot3/Slot5) and two (2) PCI Express 3.0 x8 in x 16 slots (Slot2/Slot4)

Serverboard

X9QRi-F+/X9QR7-TF+ (Proprietary form factor)
Dimensions: (LxW) 16.79 x 16.40 in. (426.47 x 416.56 mm)

Chassis

SC748TQ-R1K43BP (2U rackmount)
Dimensions (both): (WxHxD) 18.2 x 7 x 28.4 in. (462 x 178 x 721 mm)

Weight

Gross (Bare Bone): 86 lbs. (39 kg.)

System Cooling

Three heavy-duty 9.2-cm and three 8-cm cooling fans (fan speed controlled by BIOS setting)

System Input Requirements

AC Input Voltage: 90-264V AC auto-range
Rated Input Current: 15A max full load
Rated Input Frequency: 47 to 63 Hz
Platinum: 90+ (Platinum Level)

Power Supply

Rated Output Power: 1400 Watt (Part# PWS-1K43F-1R)
Rated Output Voltages: +12V (160A), +5Vsb (9A)

Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 95% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

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

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

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

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

(continued from front)

The products sold by Supermicro are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, Supermicro disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold Supermicro harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.