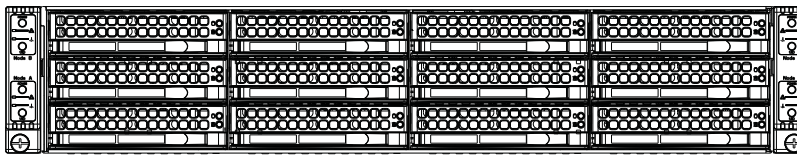
SUPERMICRO®

SUPERSERVER
6027TR-H71QRF
6027TR-H71FRF
6027TR-H71RF



USER'S MANUAL

Revision 1.0

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6027TR-H71QRF/H71FRF/H71RF. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 6027TR-H71QRF/H71FRF/H71RF is a high-end server based on the SC827HQ-R1620B 2U rackmount chassis and the dual processor X9DRT-HIBQF/HIBFF/HF serverboard. All models have an IPMI LAN port and four serverboard nodes with three hot-swap Hard Disk Drives (HDD) each per node.

Each of the various models of the SuperServer 6027TR-H71QRF/H71FRF/H71RF servers and their associated serverboards for each of their unique options are listed in the table below:

SUPERSERVER 6027TR-H71QRF/H71FRF/H71RF Model Variations			
Server Model	**X9DRT Serverboard**	**InfiniBand QDR**	**InfiniBand FDR**
6027TR-H71QRF	X9DRT-HIBQF	YES	
6027TR-H71FRF	X9DRT-HIBFF		YES
6027TR-H71RF	X9DRT-HF		

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 X9DRT-HIBQF/HIBFF/HF serverboard and the SC827HQ-R1620B chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 6027TR-H71QRF/H71FRF/H71RF 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 6027TR-H71QRF/H71FRF/H71RF.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DRT-HIBQF/HIBFF/HF 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 SC827HQ-R1620B server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS/SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

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

Appendix A: BIOS Error Beep Codes

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Appendix A BIOS Error Beep Codes

Appendix B System Specifications

Notes

Chapter 1

Introduction

1-1 Overview

The SuperServer 6027TR-H71QRF/H71FRF/H71RF is a high-end server comprised of two main subsystems: the SC827HQ-R1620B 2U server chassis and the X9DRT-HIBQF/HIBFF/HF dual processor serverboard in four hot-swap nodes. 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 6027TR-H71QRF/H71FRF/H71RF server, as listed below:

- Heat Sinks
  Four (4) 1U passive CPU heat sinks for rear CPU (SNK-P0047PW)
  Four (4) 1U passive CPU heat sinks w/narrow ILM (SNK-P0047PS)
- Four (4) Plastic air shrouds (MCP-310-82715-0B)
- Four (4) 80x80x38mm cooling fans (FAN-0129L4)
- SATA/SAS Backplane
  Four (4) SAS2 HD expansion cards (BPN-ADP-SAS2-H6IR-O-P)
  One (1) SAS Backplane for 12 3.5" HDD (BPN-SAS-827HQ)
  Twelve (12) hot-swap 3.5" HDD trays (MCP-220-00075-0B)
- Four (4) Riser cards (RSC-R1U-E16R-O-P)
- One (1) Rails set (MCP-290-00053-0N)
- One (1) CD with device drivers (CDR-X9)

1-2 Serverboard Features

At the heart of the SuperServer 6027TR-H71QRF/H71FRF/H71RF lies the X9DRT-HIBQF/HIBFF/HF, a dual processor serverboard based on the Intel® C602 chipset and designed to provide maximum performance. Four of these serverboards can be mounted in the SC827HQ-R1620B chassis.

The sections below cover the main features of the X9DRT-HIBQF/HIBFF/HF serverboard (see Figure 1-1 for a block diagram of the chipset).

Processors

The X9DRT-HIBQF/HIBFF/HF supports single or dual Intel® Xeon® E5-2600 series processors (Socket R LGA 2011). Please refer to the serverboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9DRT-HIBQF/HIBFF/HF has eight (8) DIMM slots supporting up to 256 GB of DDR3-1600/1333/1066/800 MHz speed registered ECC SDRAM in up to 512 MB, 1 GB, 2 GB, 4 GB, 8 GB, 16 GB or 32 GB sizes at 1.35V or 1.5V voltages. See Chapter 5 for details.

Note: Check the Supermicro website (www.supermicro.com) for the latest memory support information.

SAS

An LSI® SAS2108 SAS2 controller is integrated into the BPN-ADP-SAS2-H6IR-O-P backplane to provide an eight port 6 Gb/s SAS2 (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.

PCI Expansion Slots

The SuperServer 6027TR-H71QRF/H71FRF/H71RF has for each node one (1) PCI Express 3.0 x16 slot (Slot 1) available for use with a riser card.

Onboard Controllers/Ports

One Fast UART 16550 serial port, one 9-pin RS-232 port and a Mellonox Connect-X3 InfiniBand (on 6027TR-H71QRF and 6027TR-H71FRF servers only) supporting a single QSFP connector are located on the serverboard. The color-coded I/O ports include one COM port, a VGA (monitor) port, two USB 2.0 ports (additional one internal USB headers are included on the serverboard), an IPMI dedicated LAN port and two Ethernet ports.

Note: For IPMI Configuration Instructions, please refer to the Embedded BMC Configuration User's Guide available @ **http://www.supermicro.com/support/manuals/**.

Graphics Controller

The X9DRT-HIBQF/HIBFF/HF features an integrated Matrox G200eW Video Controller.

InfiniBand

The 6027TR-H71QRF server include a QDR (quad data rate) speed InfiniBand QSFP connector. The 6027TR-H71FRF server includes a FDR (fourteen data rate) speed InfiniBand QSFP connector. InfiniBand is a scalable serial communications link intended for connecting processors with high-speed peripherals.

Other Features

Other onboard features that promote system health include onboard voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection, node manager software and BIOS rescue.

1-3 Server Chassis Features

The following is a general outline of the main features of the SC827 server chassis.

System Power

Each SC827 chassis model includes a high-efficiency 80-plus Platinum certified power supply, rated at 1620 Watts plus one redundant backup power supply. In the unlikely event your power supply fails, replacement is simple and can be accomplished without tools.

SAS/SATA Subsystem

The SC827 supports up to twelve (12) 3.5" hot-swap SAS/SATA drives in trays (3 for each node). These drives are hot-swappable units and are connected to a backplane that provides power and control.

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

Front Control Panel

SC827HQ-R1620B chassis includes four front panels on the handles of the chassis which control each of the systems. Each control panel on the SUPERSERVER 6027TR-H71QRF/H71FRF/H71RF provides you with system monitoring and control for one server node. 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.

I/O Ports

The SC827 is an proprietary form factor chassis designed to be used in a 2U rackmount configuration. The SC827 chassis provides a low-profile add-on card slot, a COM port, a VGA port, two USB 2.0 ports , one IPMI Ethernet port and two gigabit Ethernet ports per node.

Cooling System

The SC827 chassis accepts four system fans powered from either backpane or the serverboards. If not powered from the backpane, the SC827HQ-R1620B model chassis powers four fans from four motherboards, so that when one of the motherboard drawers is removed, the other motherboards will continue running all fans.

Air Shrouds

The SC827 chassis includes four plastic air shrouds that direct the airflow where cooling is needed on each serverboard. Always use the air shroud included with your chassis on each serverboard.

Mounting Rails

The SC827 includes a set of quick-release rails, and 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.

1-4 Advanced Power Management

Intel® Intelligent Power Node Manager (NM)

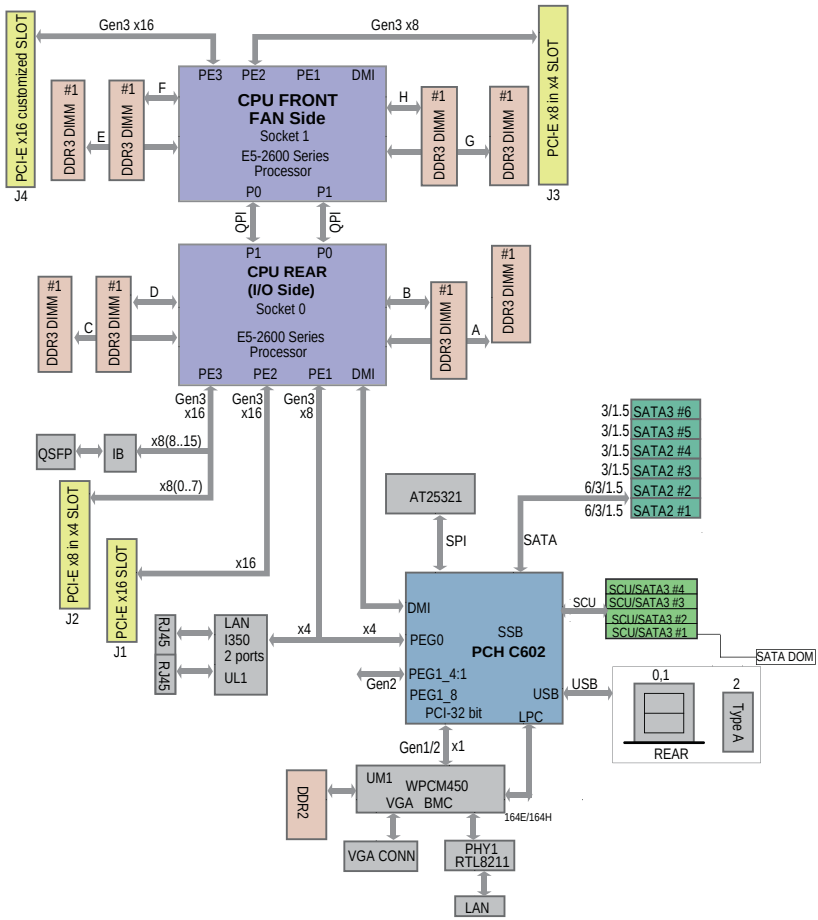
The Intel® Intelligent Power Node Manager (IPNM) provides your system with real-time thermal control and power management for maximum energy efficiency. Although IPNM Specification Version 1.5 is supported by the BMC (Baseboard Management Controller), your system must also have IPNM-compatible Manageability 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. AMD C602 Chipset: System Block Diagram

Note: This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard. This block diagram is intended for your reference only.



1-5 Contacting Supermicro

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1-6 2U Twin²: System Notes

As a 2U Twin² configuration, the SuperServer 6027TR-H71QRF/H71FRF/H71RF is a unique server system. With four system boards incorporated into a single chassis acting as four separate nodes, there are several points you should keep in mind.

Nodes

Each of the four serverboards act as a separate node in the system. As independant nodes, each may be powered off and on without affecting the others. In addition, each node is a hot-swappable unit that may be removed from the rear of the chassis. The nodes are connected to the server backplane by means of an adapter card.

Note: A guide pin is located between the upper and lower nodes on the inner chassis wall. This guide pin also acts as a "stop" when a node is fully installed. If too much force is used when inserting a node this pin may break off. Take care to slowly slide a node in until you hear the "click" of the locking tab seating itself.

System Power

Dual 1620 Watt power supplies are used to provide the power for all four serverboards. Each serverboard however, can be shut down independently of the other with the power button on its own control panel.

SAS/SATA Backplane/Drives

As a system, the SuperServer 6027TR-H71QRF/H71FRF/H71RF supports the use of twelve SAS/SATA drives. A single SAS/SATA backplane works to apply system-based control for power and fan speed functions, yet at the same time logically connects a set of three SAS/SATA drives to each serverboard. Consequently, RAID setup is limited to a three-drive scheme (RAID cannot be spread across all twelve drives). See the Drive Bay Installation/Removal section in Chapter 6 for the logical hard drive and node configuration.

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 6027TR-H71QRF/H71FRF/H71RF 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 6027TR-H71QRF/H71FRF/H71RF 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 6027TR-H71QRF/H71FRF/H71RF. 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 6027TR-H71QRF/H71FRF/H71RF 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.

2-4 Cautions!

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.

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

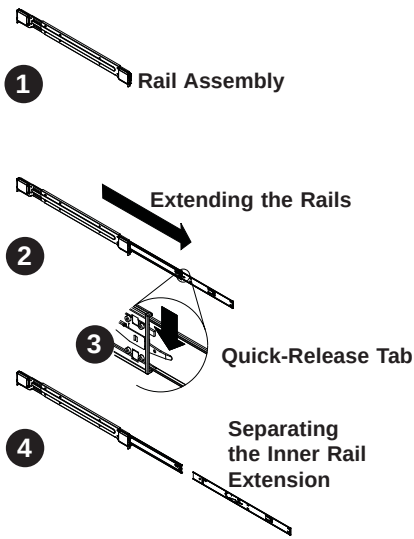
This section provides information on installing the SC827 chassis into a rack unit with the quick-release rails provided. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

NOTE: This rail will fit a rack between 26" and 33.5" deep.

Separating the Sections of the Rack Rails

The chassis package includes two rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself (Figure 2-1).

Figure 2-1: Separating the Rack Rails



Separating the Inner and Outer Rails

1. Locate the rail assembly in the chassis packaging.
2. Extend the rail assembly by pulling it outward.
3. Press the quick-release tab.
4. Separate the inner rail extension from the outer rail assembly.

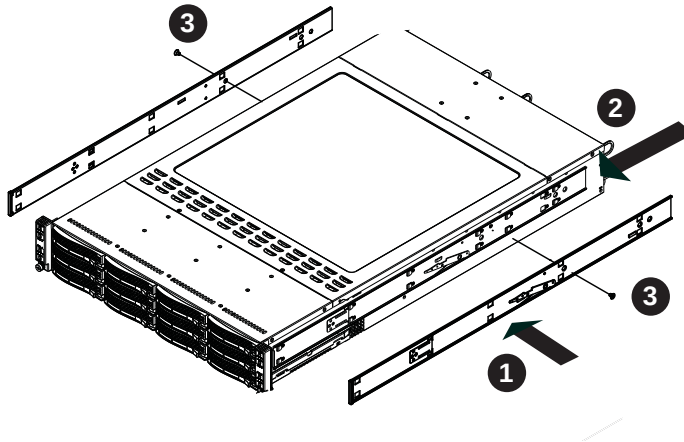
Installing the Inner Rail Extension

The SC827 chassis includes a set of inner rails in two sections: inner rails and inner rail extensions. The inner rails are pre-attached to the chassis, and do not interfere with normal use of the chassis if you decide not to use a server rack. The inner rail extension is attached to the inner rail to mount the chassis in the rack.

Installing the Inner Rails (Figure 2-2)

1. Place the inner rail extensions on the side of the chassis aligning the hooks of the chassis with the rail extension holes. Make sure the extension faces "outward" just like the pre-attached inner rail.
2. Slide the extension toward the front of the chassis.
3. Secure the chassis with 2 screws as illustrated. Repeat steps for the other inner rail extension.

Figure 2-2: Installing the Inner Rail Extensions



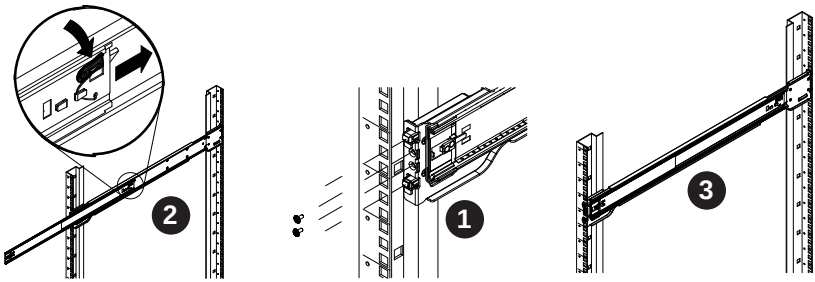
Outer Rack Rails

Outer rails attach to the rack and hold the chassis in place. The outer rails for the SC827 chassis extend between 30 inches and 33 inches.

Installing the Outer Rails to the Rack (Figure 2-3)

1. Secure the back end of the outer rail to the rack, using the screws provided.
2. Press the button where the two outer rails are joined to retract the smaller outer rail.
3. Hang the hooks of the rails onto the rack holes and if desired, use screws to secure the front of the outer rail onto the rack.
4. Repeat steps 1-3 for the remaining outer rail.

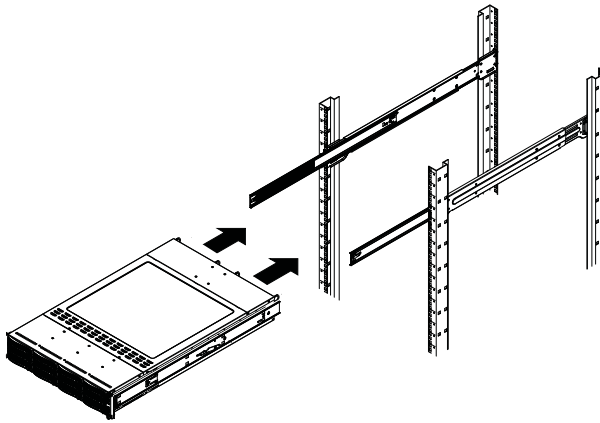
Figure 2-3. Assembling the Outer Rails



Installing the Chassis into a Rack (Figure 2-4)

1. Extend the outer rails as illustrated above.
2. Align the inner rails of the chassis with the outer rails on the rack.
3. Slide the inner rails into the outer rails, keeping the pressure even on both sides. When the chassis has been pushed completely into the rack, it should click into the locked position.
4. Optional screws may be used to secure the to hold the front of the chassis to the rack.

Figure 2-4: Installing the Rack Rails



Note: The figure above is for illustration purposes only. Always install servers to the bottom of the rack first.

2-6 Checking the Serverboard Setup

After you install the SuperServer 6027TR-H71QRF/H71FRF/H71RF in the rack, you will need to open the unit to make sure the serverboard is properly installed and all the connections have been made.

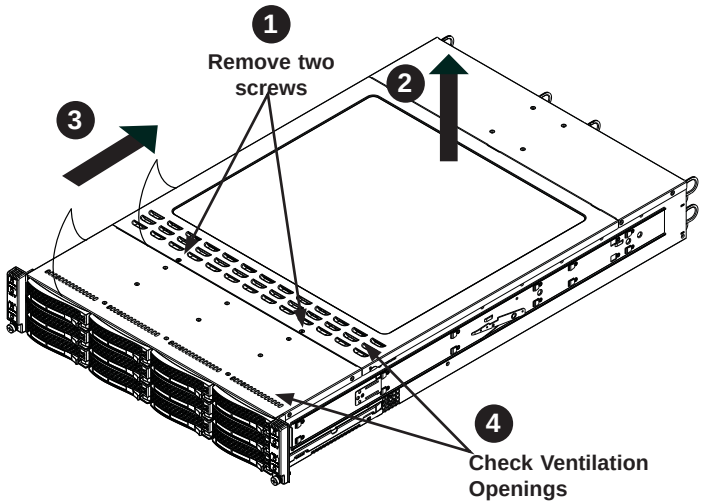
Accessing the inside of the System

Before operating the server for the first time, it is important to remove the protective film covering the top of the chassis, in order to allow for proper ventilation and cooling.

Removing the Chassis Cover and Protective Film (Figure 2-5)

1. Remove the two screws which secure the top cover onto the chassis as shown above.
2. Lift the top cover up and off the chassis.
3. Peel off the protective film covering the top cover and the top of the chassis
4. Check that all ventilation openings on the top cover and the top of the chassis are clear and unobstructed.

Figure 2-5. Accessing the Inside of the System



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 SuperServer 6027TR-H71QRF/H71FRF/H71RF 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.

2-7 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. A hard drive can be installed and removed from the front of the chassis without removing the top chassis cover.
2. 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. Airflow is provided by four hot-swappable 8-cm chassis cooling fans. The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat.
2. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

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.

Notes

Chapter 3

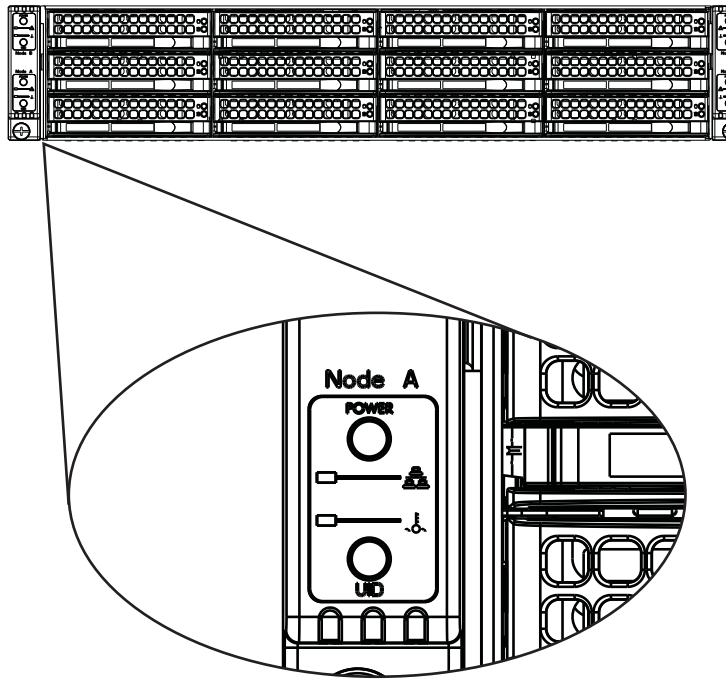
System Interface

3-1 Overview

There are several LEDs on the control panel and on the drive carriers to keep you constantly informed of the overall status of the system. SC827 models include four front panels on the handles of the chassis which control each of the systems.

This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

Figure 3-1: Control Panel

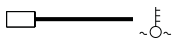


3-2 Control Panel Button

- Power: The main power button on each of the four control panels is used to apply or remove power from the power supply to each of the four systems in the chassis. 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.

3-3 Control Panel LEDs

The four control panels are located on the front handle of the SC827 chassis. Each control panel has three 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.



- Overheat: This LED is illuminated when an overheat condition occurs. A solid red LED indicates an overheat condition in the system. A flashing red LED which flashes in one second intervals indicates a fan failure. A flashing red LED which flashes in four second interfals indicates a power failure. 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 and air shrouds are installed. Finally, verify that the heatsinks are installed properly. This LED will remain flashing or on as long as the temperature is too high or a fan does not function properly.

- NIC1: Indicates network activity on GLAN1 when flashing.

3-4 Drive Carrier LEDs

The server chassis uses SAS/SATA drives.

SAS/SATA Drives

Each SAS/SATA drive carrier has two LEDs.

- Blue: Each Serial ATA drive carrier has a green LED. When illuminated, this green LED (on the front of the SAS/SATA drive carrier) indicates drive activity. A connection to the SAS/SATA backplane enables this LED to blink on and off when that particular drive is being accessed.
- Red: The red LED to indicate an SAS/SATA drive failure. If one of the SAS/SATA drives fail, you should be notified by your system management software.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 6027TR-H71QRF/H71FRF/H71RF 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 6027TR-H71QRF/H71FRF/H71RF clean and free of clutter.
- The SuperServer 6027TR-H71QRF/H71FRF/H71RF 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

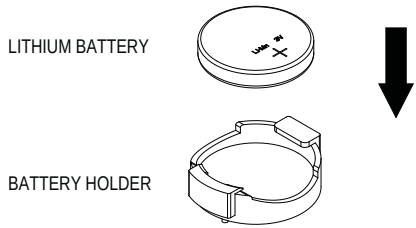
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient 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 6027TR-H71QRF/H71FRF/H71RF 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



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 Motherboard Setup

This chapter covers the steps required to install the X9DRT-HIBQF/HIBFF/HF motherboard into the chassis, connect the data and power cables and install add-on cards. All motherboard 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 motherboard to better cool and protect the system.

5-1 Handling the Motherboard

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 motherboard 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 motherboard, 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 motherboard.

Unpacking

The motherboard 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 processors are installed, the next step is to connect the cables to the serverboard.

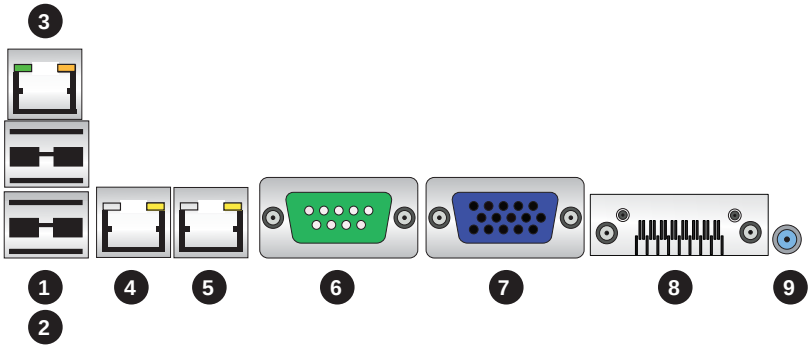
Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems 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 reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables.

5-3 Rear I/O Ports

The rear I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-1 below for the colors and locations of the various I/O ports.

Figure 5-1. Rear I/O Ports



Back Panel I/O Port Locations and Definitions	
1.	Back Panel USB Port 0
2.	Back Panel USB Port 1
3.	IPMI_Dedicated LAN
4.	Gigabit LAN 1
5.	Gigabit LAN 2
6.	COM Port 1 (Turquoise)
7.	Back Panel VGA (Blue)
8.	InfiniBand Connector (For X9DRT-HIBQF/HIBFF)
9.	UID Switch

5-4 Processor and Heatsink Installation

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

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.

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

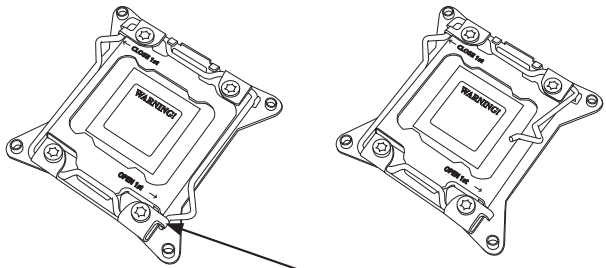
Make sure to install the system board into the chassis before you install the CPU heatsink.

When receiving a server board without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.

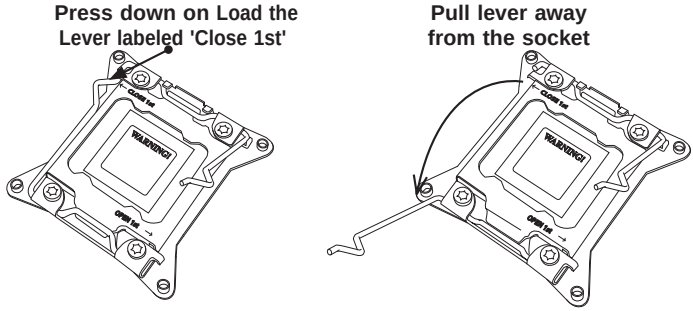
Refer to the Supermicro website for updates on CPU support.

Installing the LGA2011 Processor

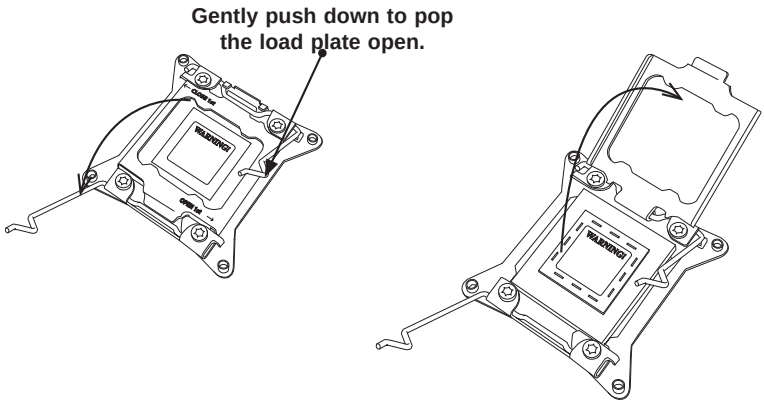
1. There are two load levers on the LGA2011 socket. To open the socket cover, first press and release the load lever labeled 'Open 1st'.



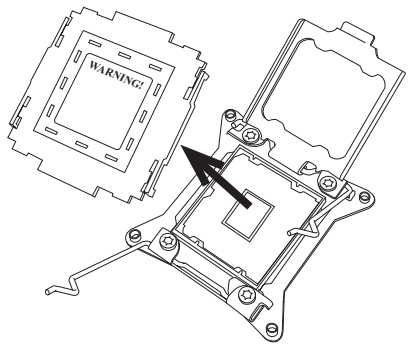
2. Press the second load lever labeled 'Close 1st' to release the load plate that covers the CPU socket from its locking position.



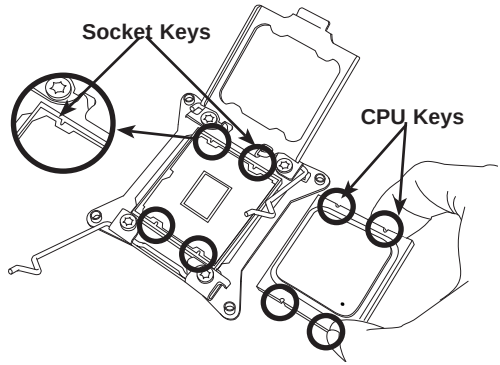
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.



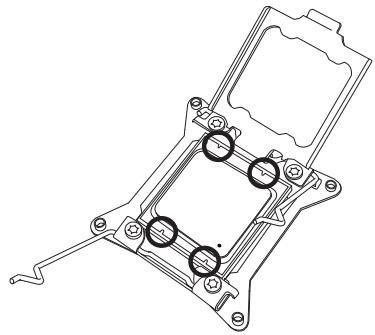
4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.



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

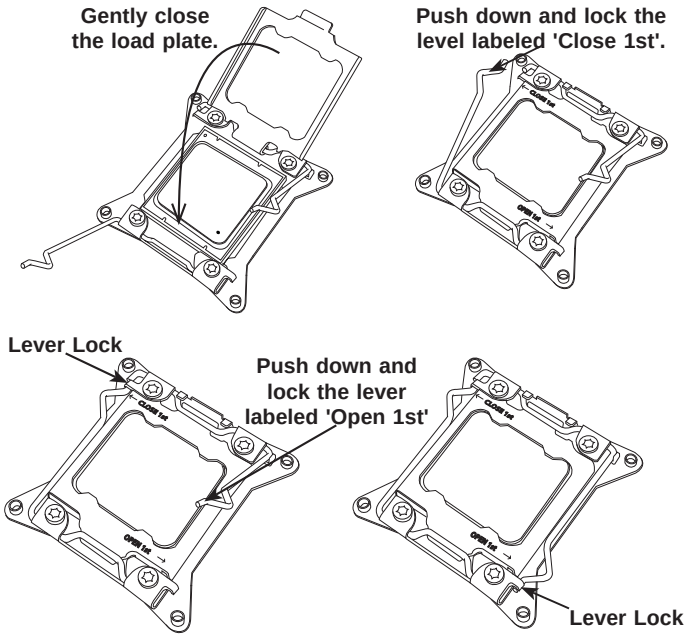


6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.)



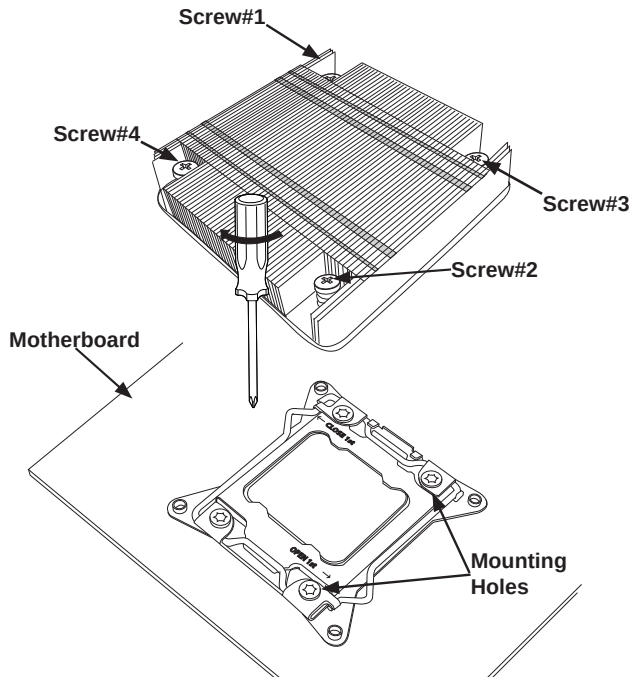
Caution: You can only install the CPU inside the socket in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU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



Installing a Passive CPU Heatsink

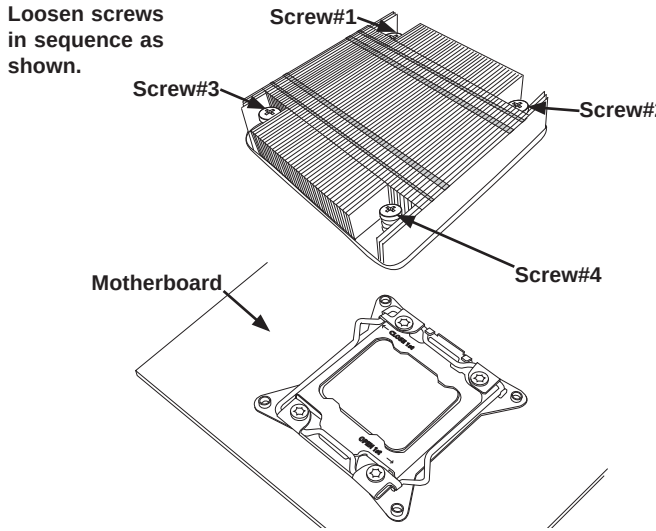
1. Do not apply any thermal grease to the heatsink or the CPU die -- the required amount has already been applied.
2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the Motherboard's and the Heatsink Bracket underneath. Make sure the heatsink is placed so that the fins of the heatsink are in the direction of the airflow in your system.
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. Gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!)
3. Once the CPU is loosened, remove the 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

Installing Memory

1. Insert each memory module vertically into its slot, paying attention to the notch along the bottom of the module to prevent inserting the module incorrectly (see Figure 5-2).
2. Install to slots P1/DIMM1A, P1/DIMM2A, etc.
3. Gently press down on the memory module until it snaps into place.
4. With two CPUs installed, repeat step 2 to populate the CPU2 DIMM slots.

Note: 512 MB, 1 GB, 2 GB, 4 GB, 8 GB, 16 GB or 32 GB size memory modules are supported. It is highly recommended that you remove the power cord from the system before installing or changing memory modules. Please refer to our web site for memory that has been tested on the X9DRT-HIBQF/HIBFF/HF serverboard.

Memory Support

The X9DRT-HIBQF/HIBFF/HF serverboard supports DDR3-1600/1333/1066/800 MHz speed registered ECC/Unbuffered ECC/non-ECC SDRAM. Populating two slots at a time with memory modules of the same size and type will result in interleaved (128-bit) memory, which is faster than non-interleaved (64-bit) memory."

Note: Check the Supermicro website (www.supermicro.com) for the latest memory support information.

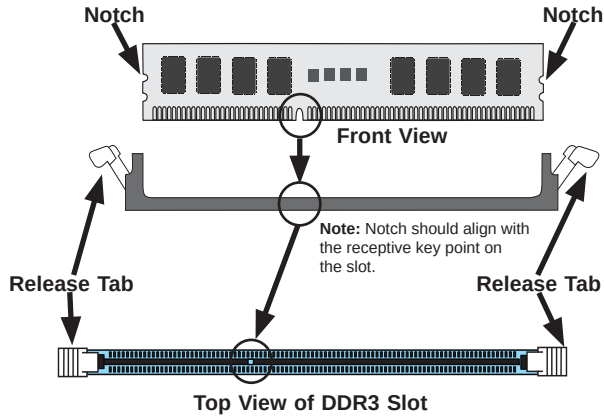
Maximum Memory

The X9DRT-HIBQF/HIBFF/HF serverboard supports up to 256 GB of ECC RDIMM memory in eight (8) DIMM slots.

Figure 5-2. Installing DIMM into Slot

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

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



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

Processor and Memory Module Population	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table (*For memory to work proper, please install DIMMs in pairs)**
1 CPU & 2 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & 4 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1, P1-DIMMC1/P1-DIMMD1
2 CPUs & 8 DIMMs	CPU1/CPU P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1, P1-DIMMC1/P1-DIMMD1, P2-DIMMG1/P2-DIMMH1

DIMM Module Population Configuration

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

UDIMM Support on the E5-2600 Series Processor Platform			
DIMMs Populated per DDR Channel	**UDIMM Type (Unb. DIMM)**	**POR Speeds (in MHz)**	**Ranks per DIMM (Any Combination)**
1	ECC/Non-ECC DDR3	1066, 1333	SR, DR

RDIMM Support on the E5-2600 Series Processor Platform			
DIMMs Populated per DDR Channel	**RDIMM Type (Reg. DIMM)**	**POR Speeds (in MHz)**	**Ranks per DIMM (Any Combination)**
1	Reg. ECC DDR3	1066, 1333, 1600	SR, DR

LRDIMM Support on the E5-2600 Series Processor Platform			
DIMMs Populated per DDR Channel	**LRDIMM Type (Load Reduced DIMM)**	**POR Speeds (in MHz)**	**Ranks per DIMM (Any Combination)**
1	LR ECC DDR3	1066, 1333	QR

Note 1: For the memory modules to work properly, please install DIMM modules in pairs (w/even number of DIMMs installed).

Note 2: All channels in a system will run at the fastest common frequency.

Possible System Memory Allocation & Availability		
System Device	**Size**	**Physical Memory Available (4 GB Total System Memory)**
Firmware Hub flash memory (System BIOS)	1 MB	3.99 GB
Local APIC	4 KB	3.99 GB
Area Reserved for the chipset	2 MB	3.99 GB
I/O APIC (4 Kbytes)	4 KB	3.99 GB
PCI Enumeration Area 1	256 MB	3.76 GB
PCI Express (256 MB)	256 MB	3.51 GB
PCI Enumeration Area 2 (if needed) -Aligned on 256-M boundary-	512 MB	3.01 GB
VGA Memory	16 MB	2.85 GB
TSEG	1 MB	2.84 GB
Memory available for the OS & other applications		2.84 GB

5-6 Adding PCI Expansion Cards

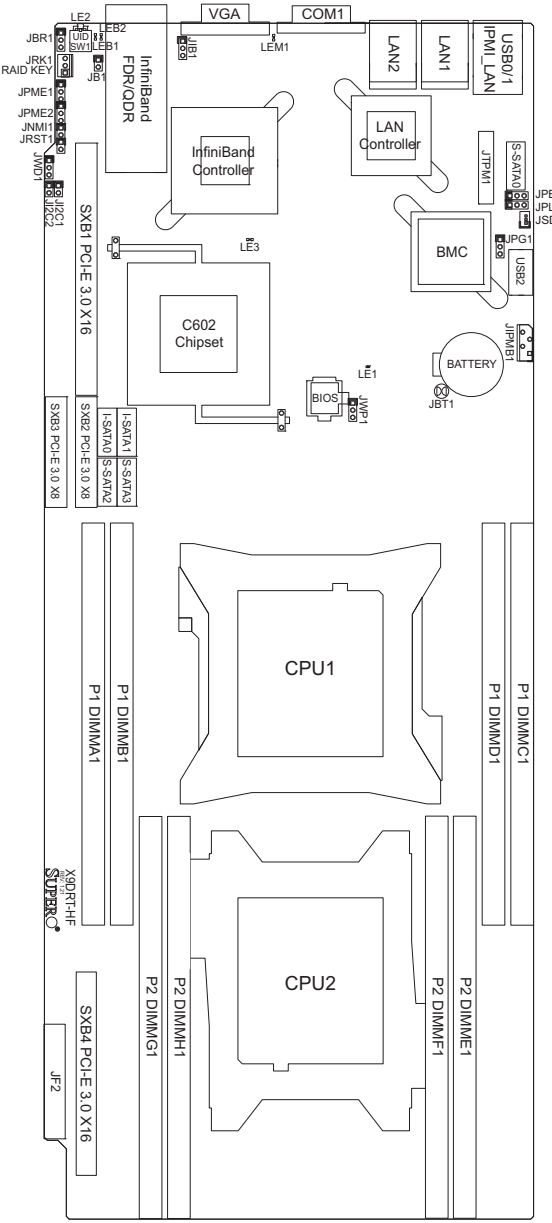
The 6027TR-H71QRF/H71FRF/H71RF includes one preinstalled riser cards designed specifically for use in the SC827HQ-R1620B 2U rackmount chassis. These riser cards support one low-profile PCI Express x16 cards to fit inside the chassis for each node.

Installing an Expansion Card

1. After powering down the system, remove the PCI slot shield.
2. Fully seat the card into the slot, pushing down with your thumbs evenly on both sides of the card.
3. Finish by using a screw to secure the top of the card shield to the chassis. The PCI slot shield protects the motherboard and its components from EMI and aid in proper ventilation, so make sure it is always in place.

5-7 Motherboard Details

Figure 5-3. X9DRT-HIBQF/HIBFF/HF Motherboard Layout
(not drawn to scale)



Notes:

1. For the latest CPU/Memory updates, please refer to our website at **http://www.supermicro.com/products/motherboard/** for details.
2. Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid possible explosion.
3. Jumpers not indicated are for test purposes only.
4. All graphics shown in this manual were based upon the latest PCB Revision available at the time of publishing of the manual. The motherboard you've received may or may not look exactly the same as the graphics shown in this manual.

X9DRT-HIBQF/HIBFF/HF Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Chapter 3
JIB1I	InfiniBand Enable (X9DRT-HIBQF/X9DRT-HIBFF only)	Pins 1-2 (Enabled)
JI2C1/JI2C2	SMB to PCI-E Slots	Pins 2-3 (Normal)
JPB1	BMC Enabled	Pins 1-2 (Enabled)
JPG1	VGA Enabled	Pins 1-2 (Enabled)
JPL1	Ethernet GLAN1/GLAN2 Enable	Pins 1-2 (Enabled)
JWD	Watch Dog	Pins 1-2 (Reset)

LED	Description	State	Status
LE1	Onboard PWR LED	On	Onboard PWR On
LE2	UID LED	Blue: On (Windows OS Blinking (Linux)	Unit Identified
LE3	HDD LED	Green: On	HDD/SATA Active
LEB1	InfiniBand Link LED	Green: On	IB Connected (X9DRT-HIBQF and X9DRT-HIBFF only)
LEB2	InfiniBand Activity LED	Yellow: On	IB Active (X9DRT-HIBQF and X9DRT-HIBFF only)
LEM1	BMC Heartbeat LED	Green: Blinking	BMC Normal

Connector	Description
COM1	Backplane COM Port1
IB	InfiniBand Connector (X9DRT-HIBQF and X9DRT-HIBFF only)
I-SATA 0/1	Intel PCH SATA Connectors 0/1
JBAT1	Onboard Battery (See the warning on P. 1-6.)
JF2	SMC Proprietary Slot for Power, FP Control & I-SATA Connections
JNMI1	NMI (Non-Maskable Interrupt) Header
JIPMB1	4-pin External BMC I^2C Header (for an IPMI Card)
JRST1	Alarm Reset Header
JPTM1	TPM (Trusted Platform Module)/Port 80
JSD1	SATA DOM (Device_On_Module) Power Connector
LAN1/2	G-bit Ethernet Ports 1/2
(IPMI) LAN	IPMI_Dedicated LAN
Slot1	PCI-E 3.0 x16 Slot
SXB1	PCI-E 3.0 x8 Slot for Rear I/O Riser Card
SXB2	PCI-E 3.0 x8 Slot for SMC-Proprietary Daughter (Add-On) Card
SW1	UID (Unit Identifier) Switch
USB 0/1	Back Panel USB 0/1
USB 2	Type-A USB Connection
VGA	Backpanel VGA Port

5-8 Connector Definitions

Ethernet LAN Ports

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

Note: Please refer to the LED Indicator Section for LAN LED information.

LAN Ports (LAN1/2) Pin Definition

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 indicates no connection.

Universal Serial Bus (USB)

Two Universal Serial Bus ports (USB 0/1) are located on the I/O back panel. In addition, a USB header, located next to I-SATA 5, provides two front-accessible USB connections (USB 2/3). (Cables are not included.) See the tables on the right for pin definitions.

USB (2/3) Pin Definitions

USB 2 Pin#	Definition	USB 3 Pin#	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	NC	5	Key

NC indicates no connection.

Backplane USB (USB 0/1) Pin Definitions

Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	NA

Serial Ports

The COM1 serial port is located beside the VGA port. Refer to the motherboard layout for the location of the COM2 header. See the table on the right for pin definitions.

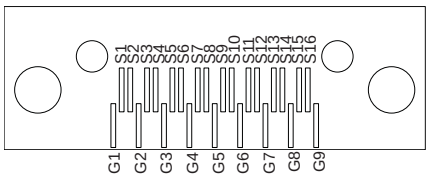
Serial Port Pin Definitions (COM1/COM2)

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

NC indicates no connection.

InfiniBand Connection

Both the X9DRT-HIBQF and X9DRT-HIBFF **serverboards** have an onboard InfiniBand (IB) connector, which is located on the rear IO panel on the motherboard. The IB switch is primarily used for High-performance computing. See the table on the right for pin definitions.



InfiniBand (IB) Pin Definitions

Pin #	Definition	Pin #	Definition
S1	Input Pair0:Pos	S9	Output Pair3:Pos
S2	Input Pair0:Neg	S10	Output Pair3:Neg
S3	Input Pair1:Pos	S11	Output Pair2:Pos
S4	Input Pair1:Neg	S12	Output Pair2:Neg
S5	Input Pair2:Pos	S13	Output Pair1:Pos
S6	Input Pair2:Neg	S14	Output Pair1:Neg
S7	Input Pair3:Pos	S15	Output Pair0:Pos
S8	Input Pair3:Neg	S16	Output Pair0:Neg

InfiniBand Ground Pins (G1~G9) Pin Definitions

Pin#	Definitions
G1~G9	Ground

Video Connector

A Video (VGA) connector is located next to the COM Port on the IO backplane. This connector is used to provide video and CRT display. Refer to the board layout below for the location.

Unit Identifier Switches

Two Unit Identifier (UID) Switches and two LED Indicators are located on the motherboard. The Front Panel UID Switch is located at Pin 16 on JF2. The Rear UID Switch is located at SW1 next to the InfiniBand Connector. The Front Panel UID LED is located at Pin 17 of JF2, and the Rear UID LED is located at LE2. When the user presses a UID switch on the front panel or on the back panel, both Rear UID LED and Front Panel UID LED Indicators will be turned on. Press the UID switch again to turn off both LED Indicators. These UID Indicators provide easy identification of a system unit that may be in need of service. See the table on the right for pin definitions.

Note: UID LED is supported by the physical switch or the BMC. When it is controlled by the physical switch, it will stay solid. When it is controlled by the BMC, it will blink.

UID Switch

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

UID Switches & LEDs

Description	Location
FP Switch	Pin 16 on JF2
Rear Switch	SW1
FP UID LED (Blue LED)	Pin 17 on JF2
Rear UID LED	LE2

NMI Header

The non-maskable interrupt header is located at JNMI1. Refer to the table on the right for pin definitions.

NMI Button (JNMI1) Pin Definitions

Pin#	Definition
1	Control
2	Ground

IPMB I2C SMB

A System Management Bus header for the IPMI slot is located at JIPMB1. Connect an appropriate cable here to use the IPMB I^2C connection on your system.

SMB Header (JIPMB1) Pin Definitions

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

System Reset

A System Reset header is located at JRST1 on the motherboard. Connect a cable to this header for system reset. Refer to the layout below for the location.

System Reset (JRST1) Pin Definition

Pin Setting	Definition
Pin 1	Signal
Pin 2	Ground

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 for your SATA DOM devices.

DOM PWR (JSD1) Pin Definitions

Pin#	Definition
1	+5V
2	Ground
3	Ground

TPM Header/Port 80

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

TPM/Port 80 Header (JTPM1) Pin Definitions

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

IPMB I2C SMB

A System Management Bus header for the IPMI slot is located at JIPMB1. Connect an appropriate cable here to use the IPMB I^2C connection on your system.

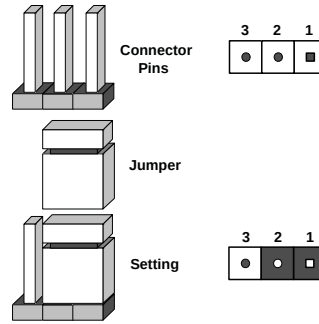
JTAG Scan (JPP0) Jumper Settings

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

JTAG Scan (JPP1) Jumper Settings

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

5-9 Jumper Settings



Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

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

JBT1 contact pads

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*.

GLAN Enable/Disable

JPL1 enables or disables the GLAN 1/2 ports on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

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

Watch Dog Enable/Disable

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

Watch Dog (JWD1) Jumper Settings

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

VGA Enable

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

VGA Enable (JPG1) Jumper Settings

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

BMC Enable

Jumper JPB1 allows you to enable the onboard 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 (JPB1) Jumper Settings

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

InfiniBand (IB) Enable

Both the X9DRT-HIBQF and X9DRT-HIBFF **serverboards have** Jumper JIB1, which allows you to enable the onboard InfiniBand connector. The default setting is 1-2 to enable the connection. See the table on the right for jumper settings.

InfiniBand Enable (JIB1) Jumper Settings

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

I2C Bus to PCI-Exp. Slots

Jumpers JI²C1 and JI²C2 allow you to connect the System Management Bus (I²C) to PCI-Express slots. The default setting is Open to disable the connection. See the table on the right for jumper settings.

I2C to PCI-E (JI2C1/JI2C2) Jumper Settings

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

5-10 Onboard Indicators

GLAN LEDs

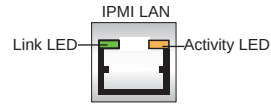
The Gigabit LAN ports are located on the IO Backplane on the motherboard. On each Gb LAN port, one LED blinks to indicate activity while the other may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

LAN LED (Connection Speed Indicator)

LED Color	Definition
Off	10 MHz
Green	100 MHz
Amber	1 GHz

IPMI Dedicated LAN LEDs

In addition to the Gigabit Ethernet ports, an IPMI Dedicated LAN is also located above the Backplane USB ports 0/1 on the motherboard. The amber LED on the right of the IPMI LAN port indicates activity, while the green LED on the left indicates the speed of the connection. See the table at right for more information.



IPMI LAN Link LED (Left) & Activity LED (Right)

Color	Status	Definition
Green: Solid	Link (Left)	100 Mb/s
Amber Blinking	Activity (Right)	Active

Onboard Power LED

An Onboard Power LED is located at LE1 on the motherboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components. See the tables at right for more information.

Onboard PWR LED Indicator (LE1) LED Settings

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

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEM1 on the motherboard. When LEM1 is blinking, BMC functions normally. See the table at right for more information.

BMC Heartbeat LED (LEM1) Status

Color/State	Definition
Green: Blinking	BMC:Normal

InfiniBand LED Indicators

Both the X9DRT-HIBQF and X9DRT-HIBFF **serverboards have** two InfiniBand LED Indicators (LEB1/LEB2) that are located on the motherboard. The green LED (LEB1) is the InfiniBand Link LED. The yellow LED (LEB2) indicates activity. Refer to the table on the right for details. Also see the layout below for the LED locations.

InfiniBand Link LED (LEB1) Settings

Color	Status	Definition
Green	Solid	InfiniBand Connected
Off	Off	No connection

InfiniBand Activity LED (LEB2) Settings

Color	Status	Definition
Yellow	Solid	InfiniBand: Active
Yellow	Dim	InfiniBand: Connected, Activity: Idle
Off	Off	No connection

HDD/SATA LED (LE3)

An HDD/SATA LED Indicator is located at LE3 on the motherboard. This LED indicates the status of hard drive activities or SATA activities supported by the South Bridge. Also see the layout below for the LED locations.

HDD/SATA LED (LE3) Settings

Status	Definition
On	HDD/SATA Connected
Off	No connection

Rear UID LED

The rear UID LED is located at LE2 on the rear of the motherboard. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service. Refer to UID Switch on Page 3-15 for more information.

UID LED Status

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

5-11 PCI-Express and Serial ATA Connections

PCI-Express 3.0 x16 Slot

A PCI-Express 3.0 x16 slot (Slot 1) is located on the motherboard. Refer to the layout below for the locations.

PCI-Express 3.0 x8 Slots

Two PCI-Express 3.0 x8 slots (Slots SXB1/ SXB2) are on the motherboard. Slot SXB1 is used for a rear IO riser card; while Slot SXB2 supports the SMC-proprietary daughter card. Refer to the layout below for the locations.

Serial ATA (SATA) Connections

A Front Panel Add-On Card header is located at JF2 on the motherboard. This header provides onboard SATA support. Plug an add-on card in JF2 to use SATA connections. In addition, two SATA connections (I-SATA 0/1), located next to the Intel PCH chip also provide SATA connections.

SATA Port Pin Definitions (I-SATA0~I-SATA5)

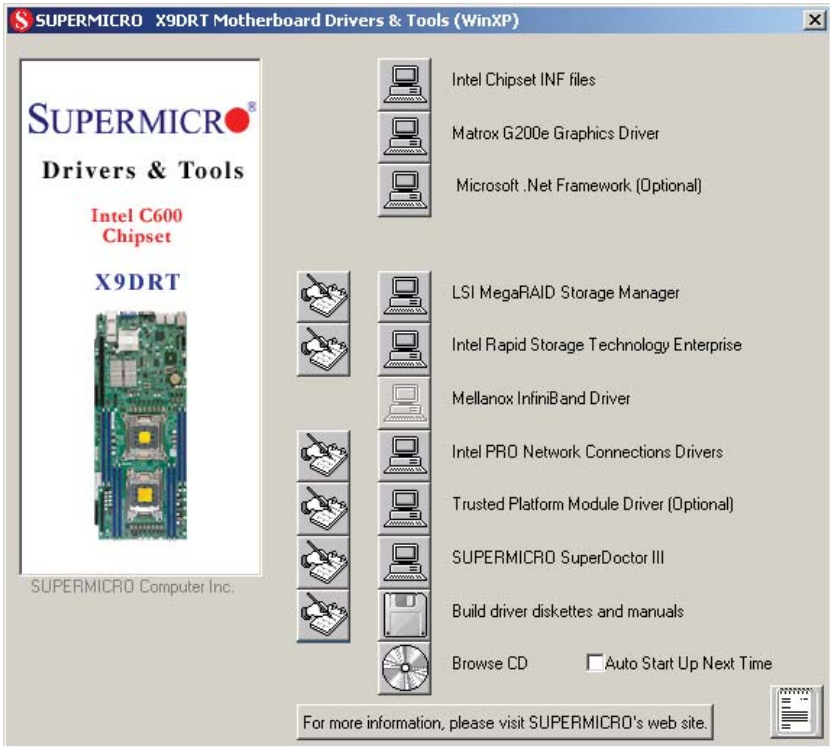
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

5-12 Installing Drivers

The CD that came bundled with the system contains drivers, some of which must be installed, such as the chipset driver. After inserting this CD into your CD-ROM drive, the display shown in Figure 5-6 should appear. (If this display does not appear, click on the My Computer icon and then on the icon representing your CD-ROM drive. Finally, double click on the S "Setup" icon.)

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 should reboot 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.

Figure 5-6. Driver/Tool Installation Display Screen



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 5-7. Supero Doctor III Interface Display Screen (Health Information)

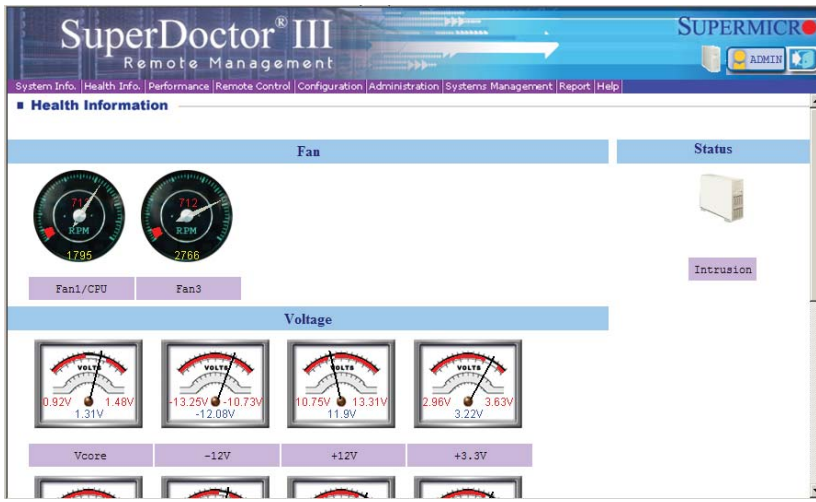


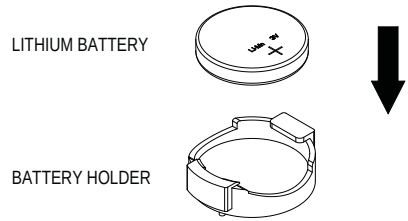
Figure 5-8. Supero Doctor III Interface Display Screen (Remote Control)

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.

5-13 Serverboard Battery

Caution: There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 5-9). 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 5-9. Installing the Onboard Battery



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

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC827HQ-R1620B 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.

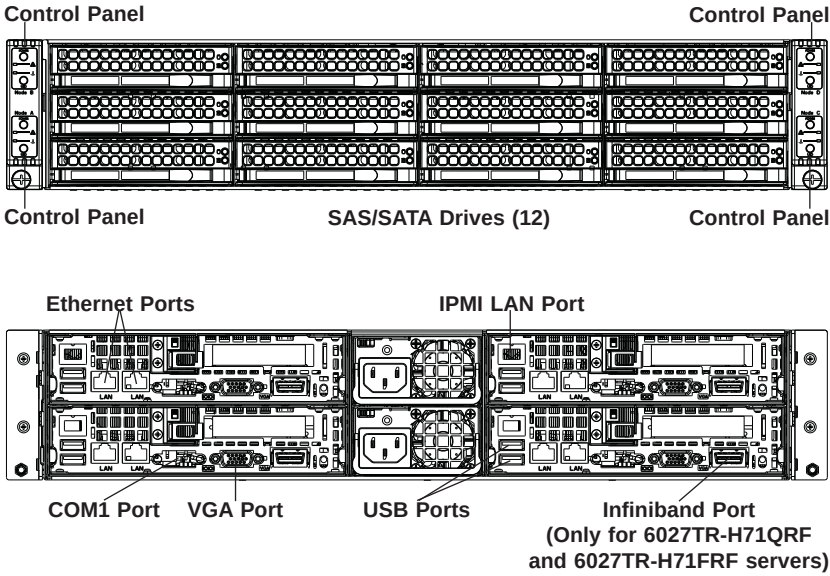
Precautions

- 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



6-2 Control Panel

The control panel is located on the front of the chassis. The LEDs inform you of system status.

See Chapter 3 for details on the LEDs and the control panel buttons.

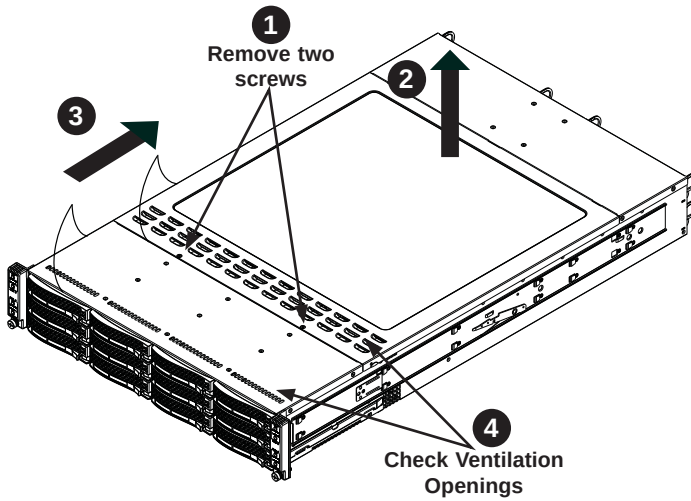
6-3 Chassis Cover

Before operating the SC827 chassis for the first time, it is important to remove the protective film covering the top of the chassis, in order to allow for proper ventilation and cooling.

Removing the Chassis Cover and Protective Film (Figure 6-2)

1. Remove the two screws which secure the top cover onto the chassis as shown above.
2. Lift the top cover up and off the chassis.
3. Peel off the protective film covering the top cover and the top of the chassis
4. Check that all ventilation openings on the top cover and the top of the chassis are clear and unobstructed.

Figure 6-2. Removing the Chassis Cover



Caution: Except for short periods of time, do NOT operate the server without the cover in place. The chassis cover must be in place to allow proper airflow and prevent overheating.

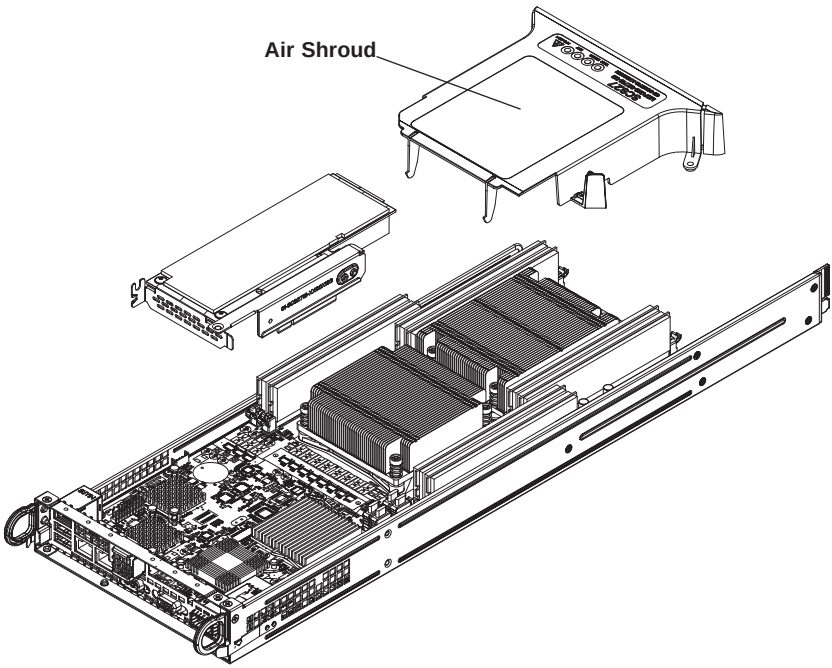
6-4 Air Shrouds

Air shrouds concentrate airflow to maximize fan efficiency. The SC827 chassis air shroud does not require screws to set up. The SC827 chassis requires four identical air shrouds, one in each motherboard drawer. Air shrouds vary depending upon the motherboard used. See the illustrations below.

Installing an Air Shroud

1. Confirm that all four fans are in place and are working properly
2. Place the first air shroud into the motherboard drawer. The air shroud sits behind the system fans and goes over the top of the motherboard and its components.
3. Repeat the procedure for the remaining three motherboard drawers.

Figure 6-3: Installing the Air Shroud



6-5 Checking the Airflow

Checking Airflow

1. Make sure there are no objects to obstruct 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 airflow through the chassis. Pull all excess cabling out of the airflow path or use shorter cables.
4. The control panel LEDs inform you of system status. See “Chapter 3: System Interface” for details on the LEDs and the control panel buttons.

6-6 System Fans

Four fans provide cooling for the chassis. These fans circulate air through the chassis as a means of lowering the chassis internal temperature. The SC827 system fans are hot-swappable. There is no need to power down the system when replacing fans and new tools are required for installation.

Optional Fan Configurations

The SC827 model chassis is designed so that the default configuration of the system is for each motherboard to control two fans (Figure 6-3). The fans are hot-swappable. Each motherboard node in the chassis is connected to the backplane through the adapter card, mounted in the motherboard drawer. In the event that one of the motherboard drawers is removed, then the remaining motherboard will operate both fans.

Fan Configurations Options
SC827H Hot-Swappable Default Configuration
Fan A connected to bplane, bplane connected to Node A by adapter card
Fan B connected to bplane, bplane connected to Node B by adapter card
Fan C connected to bplane, bplane connected to Node C by adapter card
Fan D connected to bplane, bplane connected to Node D by adapter card

Changing a System Fan

1. If necessary, open the chassis while the power is running to determine which fan has failed. (Never run the server for an extended period of time with the chassis cover open.)
2. Remove the failed fan's power cord from the backplane.
3. Lift the fan housing up and out of the chassis.
4. Push the fan up from the bottom and out of the top of the housing.
5. Place the replacement 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.
6. Put the fan back into the chassis and reconnect the cable (see Figure 6-4 and Figure 6-5 for details).
7. Confirm that the fan is working properly before replacing the chassis cover.

Figure 6-4. System Fan Placement

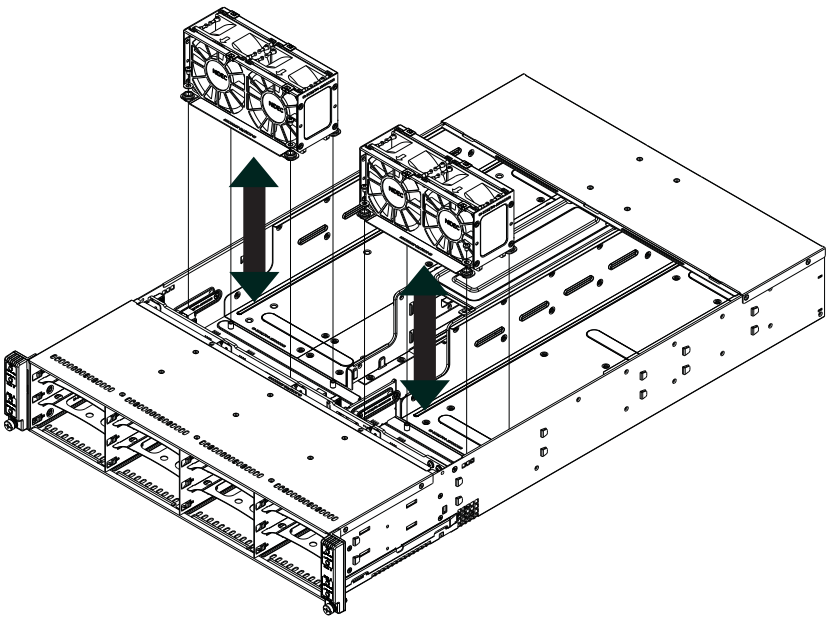
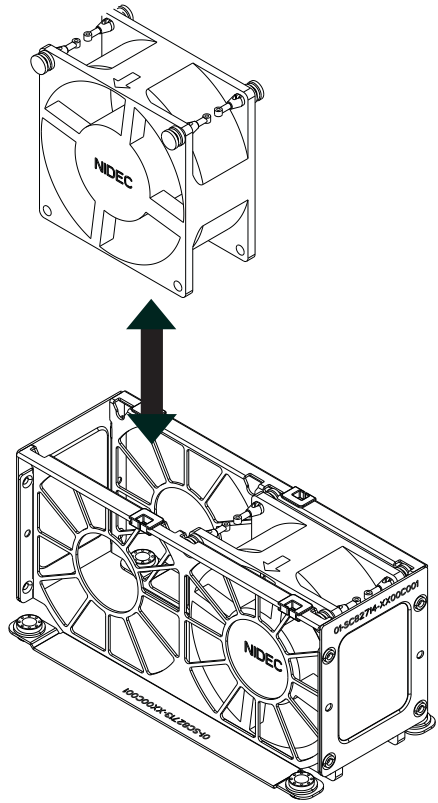


Figure 6-5. Replacing a System Fan in the Fan Housing



6-7 Removing and Installing the Backplane

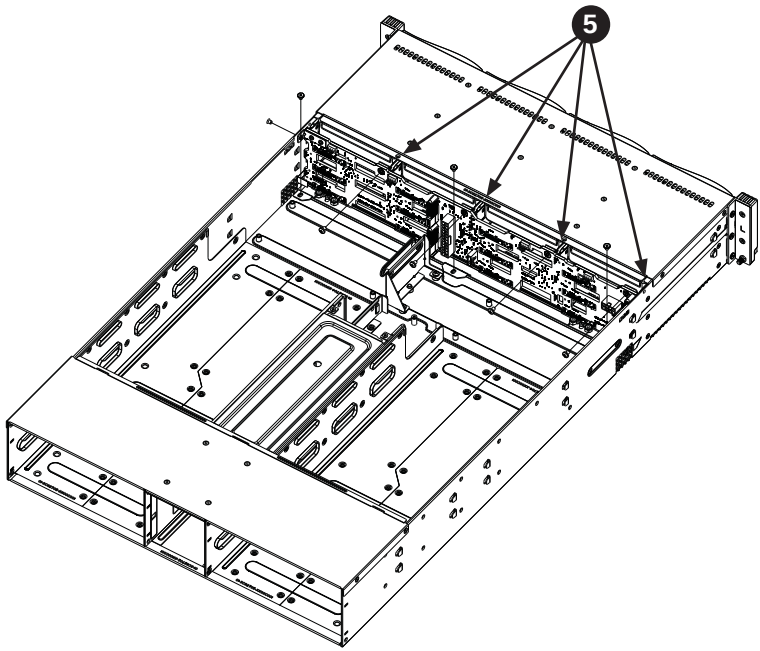
The SC827 chassis backplane is located behind the hard drives and in front of the front system fans. In order to change jumper settings on the backplane, it may be necessary to remove the backplane from the chassis.

Removing the Backplane

Removing the Backplane from the Chassis

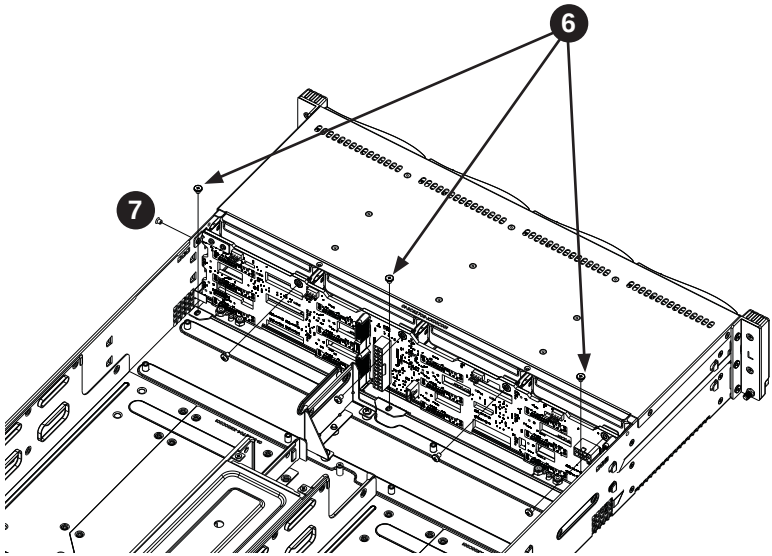
1. Power down and unplug the system from any power source.
2. Remove the chassis cover.
3. Disconnect the cabling to the backplane.
4. Remove all of the hard drive trays from the front of the chassis.
5. Remove the four upper screws at the top of the backplane, indicated by the arrows below.
6. Loosen the three screws in the spring bar, located on the floor of the chassis, indicated by the arrows below (Figure 6-6).

Figure 6-6. Removing the Screws at the Top of the Backplane



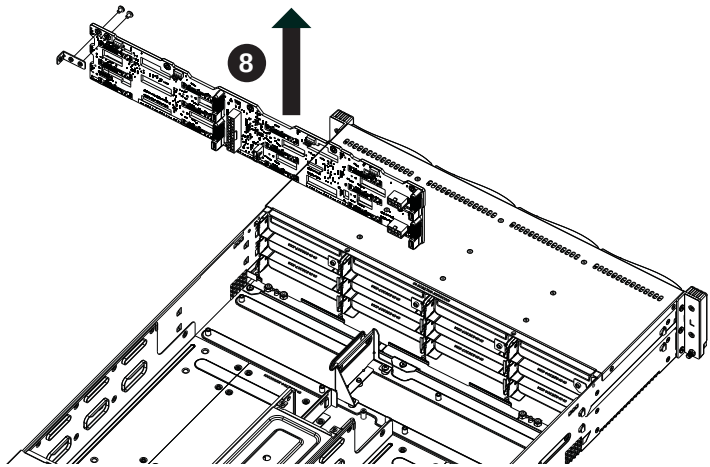
7. Remove the side screw from the side of the chassis (Figure 6-7).

Figure 6-7. Loosening the Spring Bar Screws in the Floor of the Chassis



8. Gently ease the backplane up and out of the chassis (Figure 6-8).

Figure 6-8. Removing the Backplane from the Chassis

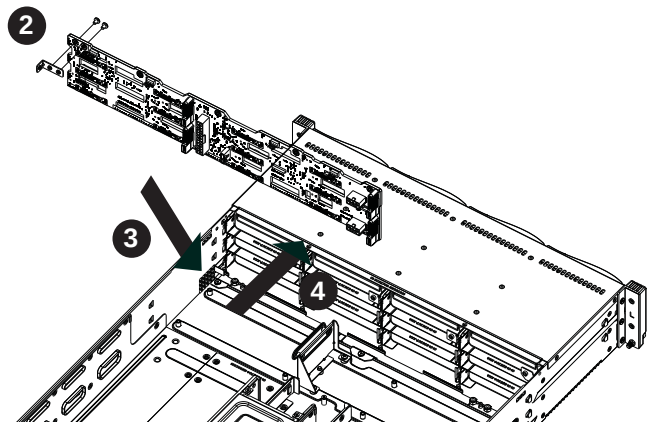


Installing the Backplane

Installing the Backplane into the Chassis (Figure 6-9)

1. Ensure that all of the hard drive trays have been removed from the bays in the front of the chassis and that the spring bar has been loosened as directed in the previous section.
2. Secure the side mounting bracket to the backplane with the two screws provided.
3. Slide the backplane into the chassis at a slight angle, pushing it up against the side of the chassis.
4. Ease the backplane forward, against the front of the chassis. This will aid in the alignment of the mounting holes.
5. Align the mounting holes in the backplane with the holes in the chassis. Replace the four screws at the top of the backplane and the screw on the side of the chassis.
6. Adjust the spring bar, then tighten the spring bar screws in the floor of the chassis.
7. Replace the side screw in the side of the chassis
8. Reconnect all cables and return the hard drive trays to their bays in the front of the chassis.

Figure 6-9. Installing the Backplane

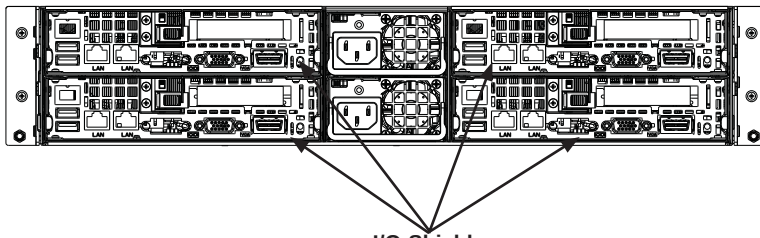


6-8 Installing the Motherboard

I/O Shield

The I/O shield (Figure 6-10) holds the motherboard ports in place. The I/O shield does not require installation.

Figure 6-10. I/O Shield Placement



Permanent and Optional Standoffs

Standoffs prevent short circuits by securing space between the motherboard and the chassis surface. The SC827 chassis includes permanent standoffs in locations used by the motherboards. These standoffs accept the rounded Phillips head screws included in the SC827 accessories packaging.

Some motherboards require additional screws for heatsinks, general components and/or non-standard security. Optional standoffs are used for these motherboards.

To use an optional standoff, you must place a hexagon screw through the bottom the chassis and secure the screw with the hexagonal nut (rounded side up).

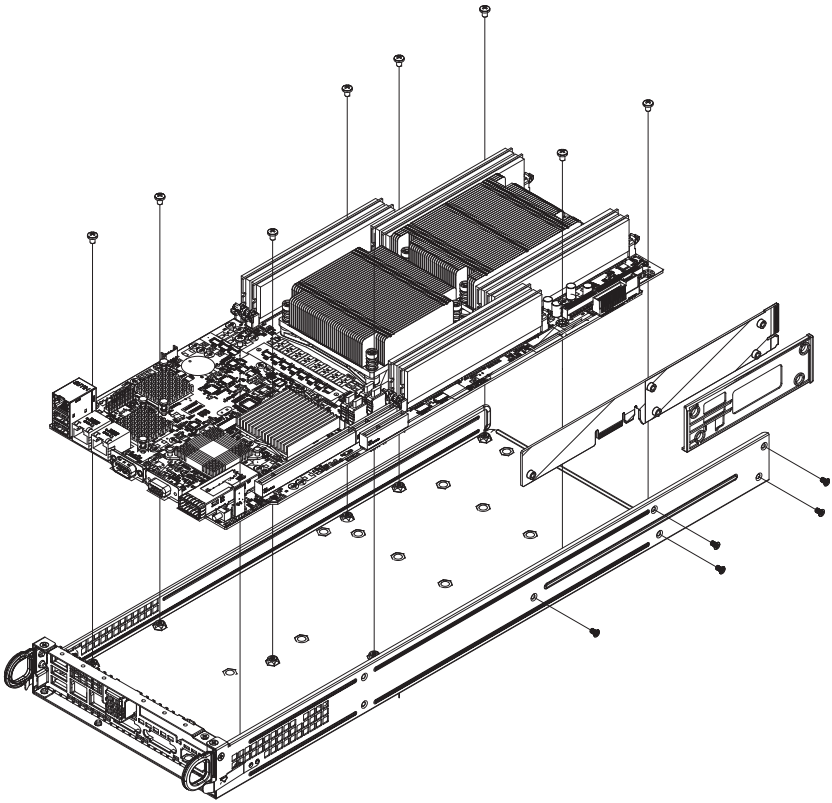
Depending upon the configuration of the motherboard being used, it is also possible that some of the optional standoffs which are pre-installed in the chassis, may need to be removed.

Installing the Motherboard (Figure 6-11)

1. Review the documentation that came with your motherboard. Become familiar with component placement, requirements, precautions, and cable connections.
2. Pull the motherboard drawer out of the back of the chassis.
3. Remove the add-on card brackets:
   a. Remove screw securing the add-on card bracket to the back of the drawer.
   b. Lift the bracket out of the drawer.
   c. Repeat this process for the second riser card.

4. Lay the first motherboard in the drawer aligning the standoffs with the motherboard.
5. Secure the motherboard to the drawer using the rounded, Phillips head screws included for this purpose.
6. Repeat steps 3 - 5 for the remaining drawers.
7. Secure the CPU(s), heatsinks, and other components to the motherboard as described in the motherboard documentation.
8. Connect the cables between the motherboard, backplane, chassis, front panel, and power supply, as needed. Also, fans may be temporarily removed to allow access to the backplane ports.
9. Replace the add-on card bracket and secure the bracket with a screw.

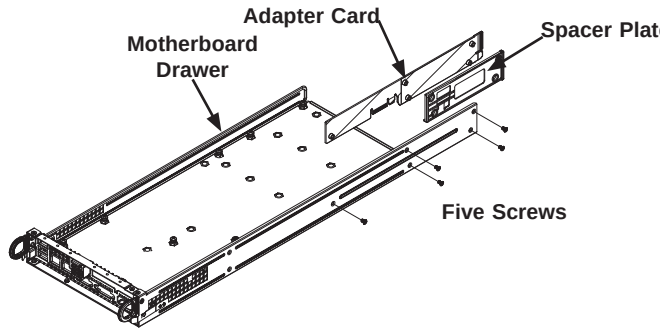
Figure 6-11. Installing the Motherboard in the Motherboard Node Drawer



6-9 Adapter Card Replacement

Each motherboard drawer comes equipped with an adapter card which plugs into the backplane. In the unlikely event that the adapter card needs to be replaced, installation requires only a Phillips head screwdriver.

Figure 6-12. Adapter Card Installation



Removing the Adapter Card (Figure 6-12)

1. Disconnect the wiring connecting the adapter card to the motherboard.
2. Remove the motherboard drawer from the chassis.
3. Remove the motherboard from the motherboard drawer by removing the screws securing it to the drawer. Set the screws aside for later use.
4. Remove the five screws securing the adapter card and the spacer plate to the drawer and set them aside for later use.
5. Remove the adapter card and spacer plate from the motherboard drawer.
6. Set the spacer plate aside for later use.

Installing the Adapter Card (Figure 6-12)

1. Place the adapter card and spacer plate in the motherboard drawer, aligning the holes in the spacer and the adapter card with the holes in the motherboard drawer.
2. Secure the adapter card and spacer plate to the motherboard drawer, using the five screws which were previously set aside.
3. Reconnect the wiring from the motherboard to the adapter card.
4. Return the motherboard drawer to the closed position in the chassis.

Add-on Card/Expansion Slot Setup

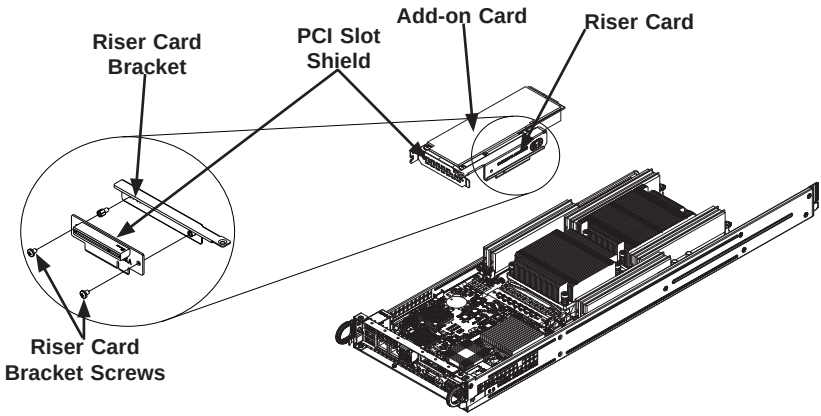
The SC827 chassis includes I/O slots for add-on cards and expansion cards. Each side supports one low profile/half length add-on card for a total of four per chassis, one per drawer.

Installing Add-on Cards (Figure 6-13)

1. Disconnect the power supply, lay the chassis on a flat surface, and open the chassis cover.
2. Pull open the add-on card slot clip in the rear of the chassis.
3. Slide the temporary PCI slot shield toward the slot clip and remove the temporary shield from the chassis.
4. Connect the add-on card to the riser card.
5. Secure the riser card to the motherboard tray using the riser card screw.
6. Slide the add-on card bracket into the rear add-on card slot and secure with the add-on card bracket screws.
7. Close the add-on card slot clip.

Note: Under normal circumstances, the riser card and add-on card bracket are not separated.

Figure 6-13. Installing the Low Profile Add-On Card



6-10 Drive Bay Installation/Removal

Accessing the Drive Bays

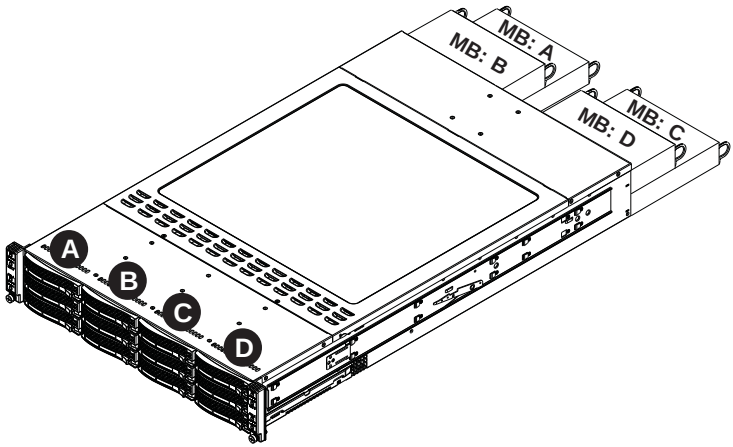
SAS/SATA Drives: You do not need to access the inside of the chassis or remove power to replace or swap SAS/SATA drives. Proceed to the next step for instructions. You must use standard 1" high, SAS/SATA drives in the system.

Note: Refer to Supermicro's web site for setup guidelines: <http://www.supermicro.com/support/manuals/>.

The SC827 chassis contains four individual motherboards in separate node drawers (Figure 6-14). Each motherboard node controls a set of three hard drives. Note that if a motherboard node drawer is pulled out of the chassis, the hard drives associated with that node will power down as well.

Motherboard Drawer Locations in the Chassis	
Motherboard B Controls HDDs B1, B2 and B3	Motherboard D Controls HDDs D1, D2 and D3
Motherboard A Controls HDDs A1, A2 and A3	Motherboard C Controls HDDs C1, C2 and C3

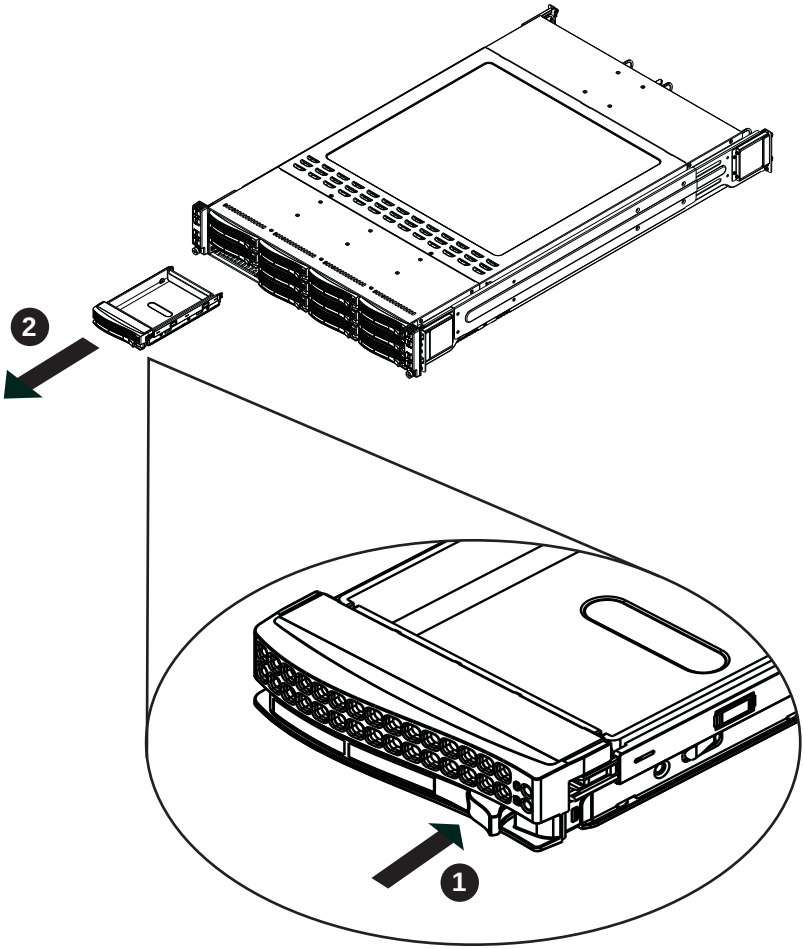
Figure 6-14. Hard Drives and the Corresponding Motherboards



Removing Hard Drive Trays from the Chassis (Figure 6-15)

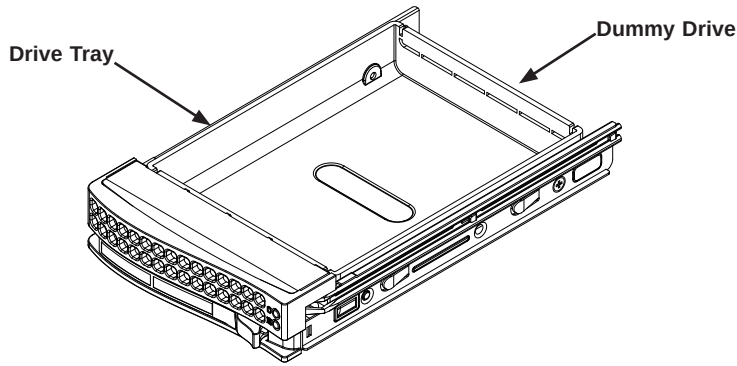
1. Press the release button on the drive tray. This extends the drive bay handle.
2. Use the handle to pull the drive out of the chassis.

Figure 6-15. Removing Hard Drive



The drives are mounted in drive carriers to simplify their installation and removal from the chassis (Figure 6-16). These carriers also help promote proper airflow for the drive bays.

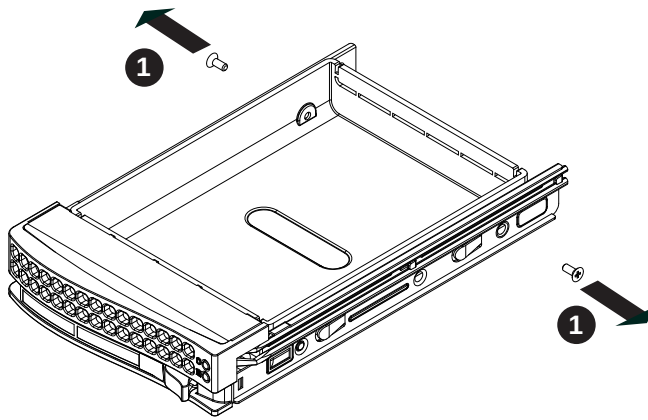
Figure 6-16. Chassis Drive Tray



Installing a Drive into the Hard Drive Tray

1. Remove the screws (2) holding connecting the drive tray the carrier (Figure 6-17).
2. Remove the tray from the carrier.

Figure 6-17. Removing Dummy Drive from Tray

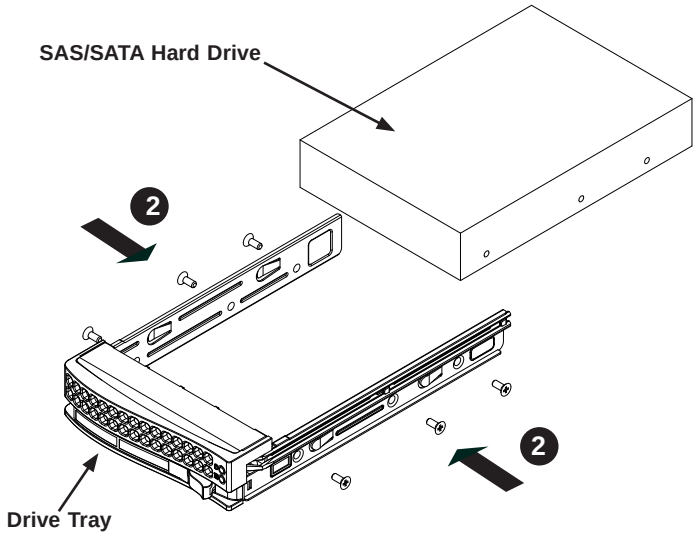


Caution: Except for short periods of time while swapping hard drives, do not operate the server with the hard drives empty.

Installing the Hard Drive (Figure 6-18)

1. Install a new drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
2. Secure the hard drive by tightening all six (6) screws.
3. Use the open handle to replace the drive tray into the chassis. Make sure the close the drive tray handle.

Figure 6-18. Installing the Hard Drive



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

6-11 Power Supply

Depending on your chassis model, the SC827 chassis will include two 1620 Watt power suppies. 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 Replacement

The SC827 chassis utilizes two redundant power supplies. In the unlikely event that the power supply unit needs to be replaced, one power supply can be removed, without powering down the system. Replacement units can be ordered directly from Supermicro (See the contact information in the Preface of this manual).

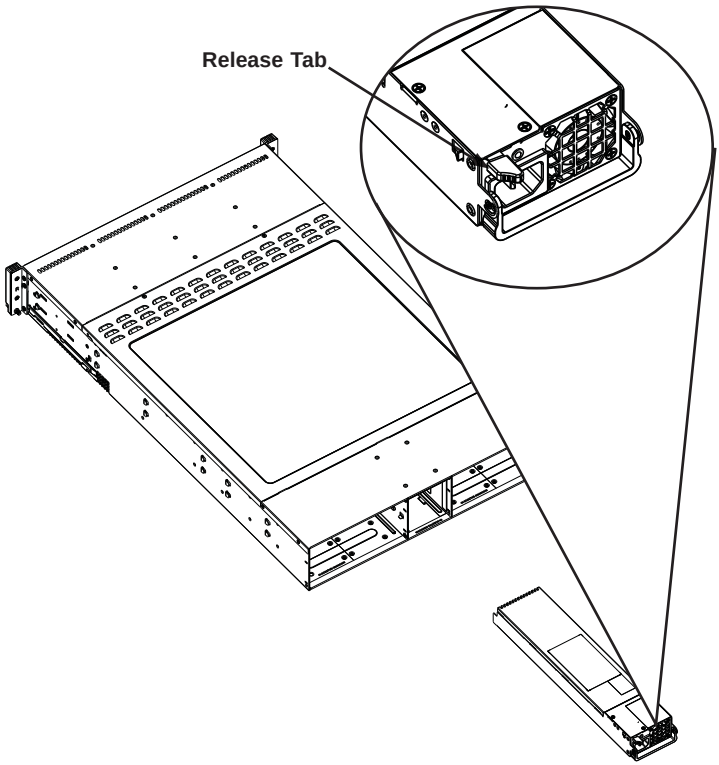
Power Supply Replacement

The SC827 chassis utilizes two redundant power supplies. In the unlikely event that the power supply unit needs to be replaced, one power supply can be removed, without powering down the system. Replacement units can be ordered directly from Supermicro (See the contact information in the Preface of this manual).

Changing the Power Supply (Figure 6-19)

1. Power down all four nodes and unplug the power cord.
2. Push the release tab (on the back of the power supply) as illustrated.
3. Pull the power supply out using the handle provided.
4. Push the new power supply module into the power bay until you hear a click.
5. Plug the AC power cord back into the module and power up the nodes.

Figure 6-19. Changing the Power Supply



Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the X9DRT-HIBQF/HIBFF/HF serverboard. The 16 Mb AMI 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 BIOS Setup Utility

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

Note: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen. 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 setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (**Note**: the AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.)

The AMI BIOS Setup Utility uses a key-based navigation system called "hot keys". Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, arrow keys, etc.

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

How To Change the Configuration Data

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

Starting the Setup Utility

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

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

7-2 Advanced Settings Menu

▶ Boot Feature

Quiet Boot

This feature selects the 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

This item sets 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

This feature sets the Power-on state for the Numlock key. The options are Off and **On**.

Wait For 'F1' If Error

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

Interrupt 19 Capture

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

Watch Dog Function

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

Power Button Function

If this feature is set to Instant_Off, the system will power off immediately as soon as the user presses the power button. If this feature is set to 4_Second_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_Second_Override.

Restore on AC Power Loss

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

▶CPU Configuration

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

▶Socket 1 CPU Information/Socket 2 CPU Information

This submenu displays the following information regarding the CPU installed in Socket 1 and (or) Socket 2 as detected by the BIOS.

- 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 Cpu Socket 1 or Socket 2.

64-bit

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

Clock Spread Spectrum

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

Hyper-threading

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

Active Processor Cores

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

Limit CPUID Maximum

Use this feature to set the maximum CPU ID value. Select Enabled to boot a legacy operating system that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows XP OS).

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

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

Intel® AES-NI

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

Hardware Prefetcher (Available when supported by the CPU)

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

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

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

DCU Streamer Prefetcher (Available when supported by the CPU)

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

DCU IP Prefetcher (Available when supported by the CPU)

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 Disabled and **Enabled**.

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

▶ CPU Power Management Configuration

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

Power Technology

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

Factory Long Duration Power Limit

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

Long Duration Power Limit

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

Factory Long Duration Maintained

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

Long Duration Maintained

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

Recommended Short Duration Power

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

Short Duration Power Limit

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

▶Chipset Configuration

▶North Bridge

This feature allows the user to configure the following North Bridge settings.

▶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 VMM (Virtual Working Memory) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and Disabled.

Intel I/OAT

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

DCA Support

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

IIO 1 PCIe Port Bifuracation Control

This submenu allows the user to configure the following IO PCIe Port Bifurcation Control settings for IIO 1 PCIe port. These settings determine how to distribute the available PCI-Express lanes to the PCI-Exp. Root Ports.

IOU1-PCIe Port

This feature allows the user to set the PCI-Exp bus speed between IOU1/2 and PCIe port. The options are **x4x4** and x8.

Port 1A Link Speed

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

Port 1B Link Speed

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

IOU2-PCIe Port

If this feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

Port 2A Link Speed

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

IOU3-PCIe Port

If this feature allows the user to set the bus speed between the IOU3 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, and **x16**.

Port 3A Link Speed

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

Port 3C Link Speed

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

IIO 2 PCIe Port Bifuracation Control

This submenu allows the user to configure the following IO PCIe Port Bifurcation Control settings for IIO 2 PCIe port. These settings determine how to distribute the available PCI-Express lanes to the PCI-Exp. Root Ports.

IOU2-PCIe Port

If this feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, and **x16**.

Port 2A Link Speed

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

IOU3-PCIe Port

If this feature allows the user to set the bus speed between the IOU3 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, and **x16**.

Port 3A Link Speed

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

▶QPI Configuration

Current QPI Link Speed

This item displays the speed of the QPI Link.

Isoc

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

Current QPI Frequency

This item displays the frequency of the QPI Link.

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 item displays the following information of a DIMM module specified by the user.

CPU Socket 1 DIMM Information

This item displays the memory type/speed of a memory module specified.

- P1-DIMMA1
- P1-DIMMB1
- P1-DIMMC1
- P1-DIMMD1

CPU Socket 2 DIMM Information

This item displays the memory type/speed of a memory module specified.

- P1-DIMME1
- P1-DIMMF1
- P1-DIMMG1
- P1-DIMMH1

Memory Mode

When Independent is selected, all DIMMs will be 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, Lockstep and Sparing.

DRAM RAPL (Running Average Power Limit) Mode

This item sets the average power consumption limit on a DRAM module when it is in operation. The options are Disabled, DRAM RAPL Mode0, and **DRAM RAPL Mode1**.

DDR Speed

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

Channel Interleaving

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

Rank Interleaving

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

Patrol Scrub

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

Demand Scrub

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

Data Scrambling

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

Device Tagging

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

Thermal Throttling

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

▶South Bridge Configuration

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

PCH Information

This feature displays the following PCH information.

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

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

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

All USB Devices

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

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

Select Enabled to enable Enhanced Host Controller Interface (EHCI) Controller 1/ 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 for Controller 0 are Enhanced and **Compatible.** The default of SATA Controller 1 is **Enhanced**.

AHCI Mode

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

Aggressive Link Power Management

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

Port 0~5 Hot Plug

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

Staggered Spin Up

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

RAID Mode

The following items are displayed when RAID Mode is selected:

PCH RAID CodeBase

Select Intel or LSI to specify the code base to be used for RAID support. The options are **Intel** and LSI.

Port 0~5 Hot Plug

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

▶SCU (Storage Controller Unit) Configuration

Storage Controller Unite

Select Enabled to support a PCH storage device. The options are Disabled and **Enabled**.

Onchip SCU Option ROM

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

SCU Port 0~SCU Port 3: The AMI BIOS will automatically detect the presence of a SCU port and display the status of this port as detected.

▶PCIe/PCI/PnP Configuration

PCI ROM Priority

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

PCI Latency Timer

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

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

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

PERR# Generation

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

SERR# Generation

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

Maximum Payload

Select Auto to allow the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, and 512 Bytes.

Maximum Read Request

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

ASPM Support

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

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

SXB1 PCI-E 3.0 x16 Option ROM

Select Enabled to enable CPU1 SXB1 PCI-E 3.0 x16 Option ROM to boot the system via a device installed on this slot. The options are Disabled and **Enabled**.

SXB3 PCI-E 3.0 x16 Option ROM

Select Enabled to enable CPU2 SXB3 PCI-E 3.0 x16 Option ROM to boot the system via a device installed on this slot. The options are Disabled and **Enabled**.

Onboard LAN Option ROM Select

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

Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM

Select Enabled to enable Onboard LAN1 Option ROM or Onboard LAN2 Option ROM to boot the system via a device installed on the onboard LAN port as specified. The options are Enabled and **Disabled**.

VGA Priority

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

Network Stack

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

▶Super IO Configuration

Super IO Chip: This item displays the name of the super IO chip used in the system.

▶COM1 Configuration

Serial Port

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

Device Settings

This feature displays the serial port settings as specified.

Change Settings

Use this feature to set the settings of a serial port specified. The options are **Auto**, IO=3F8h; IRQ=4, IO=3F8h; IRQ=3, IO=2F8h; IRQ=3, IO=3E8h; IRQ=5, IO=2E8h; IRQ=7, IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12, IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12, IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12, and IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12.

Device Mode

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

Serial Port Attribute

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

▶Serial Port Console Redirection

COM 1

This submenu allows 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**.

▶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.

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

The submenu allows the user to configure the following 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 item determines how the host system exchanges data with the client computer.

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.

▶ACPI Setting

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

ACPI Sleep State

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

NUMA Support

Select Enabled to enable Non-Uniform Memory Access support to improve CPU performance for a system that has an OS with NUMA support. The options are **Enabled**, and Disabled.

RTID

This feature indicates the total number of RTIDs for local and remote poots. The options are **Optimal** and Alternate.

High Precision Event Timer

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

▶ME (Management Engine) Subsystem Configuration

This feature displays the following ME Subsystem Configuration settings.

- **ME BIOS Interface Version**
- **ME Version**

iSCSI: This item displays the following iSCSI information:

iSCSI Initiation Name

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

Intel®1350 Gigabit Network Connection

This item displays the following iSCSI Internet Connection information.

▶NIC Configuration

Link Speed

Use this feature to change the link speed of network connection and to configure duplex mode for the port currently used. The options are **AutoNeg**, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, and 100 Mbps Full.

Wake on LAN

Enable this option to wake up the system via a LAN (NIC) device. The options are **Enabled**, and Disabled.

Blink LEDs (Range 0~15 seconds)

This item displays the blinking range of the NIC LED indicators.

Port Configuration Information

This section displays the following LAN Port settings.

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

7-3 Event Logs

Use this feature to configure Event Log settings.

▶Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event settings.

Enabling/Disabling Options

SMBIOS Event Log

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

Runtime Error Logging Support

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

Memory Correctable Error Threshold

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

PCI Error Logging Support

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

Erasing Settings

Erase Event Log

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

7-4 IPMI

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

IPMI Firmware Revision

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

IPMI Status

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

▶System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL

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

When SEL is Full

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

Customize EFI Logging Options

Log EFI Status Codes

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

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

▶BMC Network Configuration

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

Update IPMI LAN Configuration

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

Configuration Address Source

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

Station IP Address

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

Subnet Mask

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

Station MAC Address

This item displays the Station MAC address of this computer.

Gateway IP Address

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

7-5 Boot

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

CSM Support

Select Enabled to enable UEFI Compatibility Support Module (CSM) to provide compatibility support to a traditional legacy BIOS which will allow an OS that requires CSM support to boot from a traditional option ROM. Select Auto to allow the BIOS to automatically enable or disable CSM support based on the OS installed in the system. The options are **Enabled**, Disabled, and Auto

Boot Option #1

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

Boot Option #2

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

Network Devices

▶Delete Boot Options

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

7-6 Security

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

Administrator Password

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

7-7 Save & Exit

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

Discard Changes and Exit

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

Save Changes and Reset

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

Save Changes

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

Discard Changes

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

Restore Optimized Defaults

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

Save as User Defaults

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

Restore User Defaults

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

Boot Override

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

- LAN Device
- UEFI: Built-in EFI Shell

Appendix A

BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed 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 overheat	System overheat

Notes

Appendix B

System Specifications

Note: Unless noted specifications apply to a complete system (all serverboards).

Processors

Two E5-2600 series processors per node in Socket R LGA 2011 type sockets

Note: please refer to our website for details on supported processors.

Chipset

One C602 chipset per node

BIOS

16 Mb AMI BIOS® Flash EEPROM per node

Memory Capacity

Each node has up to eight (8) DIMM slots supporting up to 256 GB of DDR3-1600/1333/1066/800 MHz registered ECC SDRAM in 512 MB, 1 GB, 2 GB, 4 GB, 8 GB, 16 GB or 32 GB size sizes of 1.5V or 1.35V voltages.

Note: refer to Section 5-6 for details on installation.

Note: Check the Supermicro website (www.supermicro.com) for the latest memory support information.

SAS/SATA Drive Bays

The SuperServer 6027TR-H71QRF/H71FRF/H71RF contains twelve (12) hot-swap drive bays to house twelve standard SAS/SATA drives

PCI Expansion

The SuperServer 6027TR-H71QRF/H71FRF/H71RF has one (1) PCI Express 3.0 x16 slot (Slot 1) available per node.

Serverboard

X9DRT-HIBQF/HIBFF/HF serverboard (proprietary form factor)

Dimensions: (LxW) 6.8 x 16.64 in. (172.72 x 422.66 mm)

Chassis

SC827HQ-R1620B (2U rackmount)

Dimensions: (WxHxD) 17.25 x 3.47 x 28.5 in. (438 x 88 x 724 mm)

Weight

Gross (Bare Bone): 85 lbs. (38.6 kg.)

System Cooling

The system has four (4) 8-cm PWM system cooling fans

System Input Requirements

AC Input Voltage: 85-264V AC auto-range
Rated Input Current: 15 - 5A
Rated Input Frequency: 47 to 63 Hz
Efficiency: 90+ (Platinum Level)

Power Supply

Rated Output Power: 1620W (Part# PWS-1K62P-1R)
Rated Output Voltages: +12V (135A@180-264V, 100A@120-140V), +5Vsb (6A)

Operating Environment

Operating Temperature: 0º to 35º C (32º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 20% to 95% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

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

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

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

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

Notes

(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.