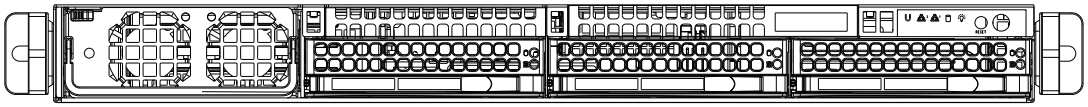
SUPERMICRO®

SUPERSERVER

5017GR-TF



USER'S MANUAL

Revision 1.0

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

Manual Revision 1.0
Release Date: May 7, 2012

Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5017GR-TF. Installation and maintenance should be performed by experienced technicians only.

The 5017GR-TF is based on the SC818G-1K43B 1U rackmount server chassis and the Super X9SRG-F motherboard. Please refer to our web site for an up-to-date list of supported operating systems, processors and memory.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X9SRG-F motherboard and the SC818G-1K43B chassis.

Chapter 2: Server Installation

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

Chapter 3: System Interface

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

Chapter 4: System Safety

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

Chapter 5: Advanced Motherboard Setup

Chapter 5 provides detailed information on the X9SRG-F motherboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC818G-1K43B 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

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

Appendix A: BIOS Error Beep Codes

Appendix B: System Specifications

Notes

Table of Contents

Chapter 3 System Interface

Chapter 4 System Safety

Chapter 5 Advanced Motherboard Setup

Chapter 1

Introduction

1-1 Overview

The SuperServer 5017GR-TF series is a GPU-optimized server comprised of two main subsystems: the SC818G-1K43B 1U server chassis and the X9SRG-F motherboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com).

- Four 4-cm counter-rotating fans (FAN-0117L4)
- Four 4-cm fans (FAN-0102L4)
- One air shroud (MCP-310-81801-0B)
- One passive CPU heatsink (SNK-P0047PS)
- Riser Cards
  One RSC-R1UG-E16R for PCI-Express 3.0 x16 card. left front side
  One RSC-R1UG-E16-X9S for PCI-Express 3.0 x16 card, right front side
  One RSC-R1UG-E16R-X9S for PCI-Express 3.0 x8 low-profile card, above motherboard
- Two power cables for GPU cards (CBL-0333L)
- SATA Accessories
  One SAS backplane (BPN-SAS-818TQ)
  Three 3.5" drive carriers (MCP-220-00075-0B)
- One rail set (MCP-290-00054-0N)
- One Super Server 5017GR-TF User's Manual

1-2 Motherboard Features

At the heart of the SuperServer 5017GR-TF server is the X9SRG-F, a single processor motherboard based on the Intel C602 chipset. Below are the main features of the X9SRG-F. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X9SRG-F supports a single Intel Xeon E5-2600 series processors in LGA 2011 sockets (Socket R). Please refer to the motherboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9SRG-F has eight DIMM slots that can support up to 256 GB of unbuffered ECC DDR3-1600/1333/1066/800 RDIMMs or 64 GB of DDR3, unbuffered non-ECC UDIMMs up to 1600 MHz. Modules of the same size and speed are recommended. See Chapter 5 for details.

Serial ATA

A SATA controller is integrated into the chipset to provide a 10-port SATA subsystem, which is RAID 0, 1, 5 and 10 supported. Two of these are SATA 3.0 ports and eight are SATA 2.0 ports. The SATA drives are hot-swappable units.

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

PCI Expansion Slots

The X9SRG-F has two PCI-Express 3.0 x16 slots to support three double-width GPU cards. An additional slot supports one PCI-Express 3.0 x8 low-profile card.

I/O Ports

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

IPMI

IPMI (Intelligent Platform Management Interface) is a hardware-level interface specification that provides remote access, monitoring and administration for Supermicro server platforms. IPMI allows server administrators to view a server's hardware status remotely, receive an alarm automatically if a failure occurs, and power cycle a system that is non-responsive.

1-3 Server Chassis Features

System Power

The SC818G-1K43B features a Gold Level 1400W high-efficiency power supply. The AC power cord should be removed from the system before servicing or replacing the power supply. See Chapter 6 for details.

SATA Subsystem

The SC818G-1K43B chassis includes three 3.5" drive bays, which may be used to house hot-swappable SATA drives. RAID 0, 1, 5 and 10 are supported (RAID 5 is not supported with Linux OS).

Front Control Panel

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

Cooling System

The SC818G-1K43B has an innovative cooling design that includes eight 4-cm counter-rotating PWM (Pulse Width Modulated) fans located in the middle section of the chassis. Two additional fans are included to cool each GPU in the server. The power supply module also includes a cooling fan. All chassis and power supply fans operate continuously. An air shroud channels the airflow from the system fans to efficiently cool the processors and memory. See note on the following page regarding fan control.

1-4 GPU Subsystem

The 5017GR-TF server represents one of Supermicro's massively parallel processing multiple-GPU servers, with support for up to two GPUs. NVIDIA® Fermi™ GPUs place this system at the forefront of today's GPU computing solutions.

Please refer to the NVIDIA web site (www.nvidia.com) for details on Fermi GPUs.

Two GPUs can be bundled with the system.

1-5 Contacting Supermicro

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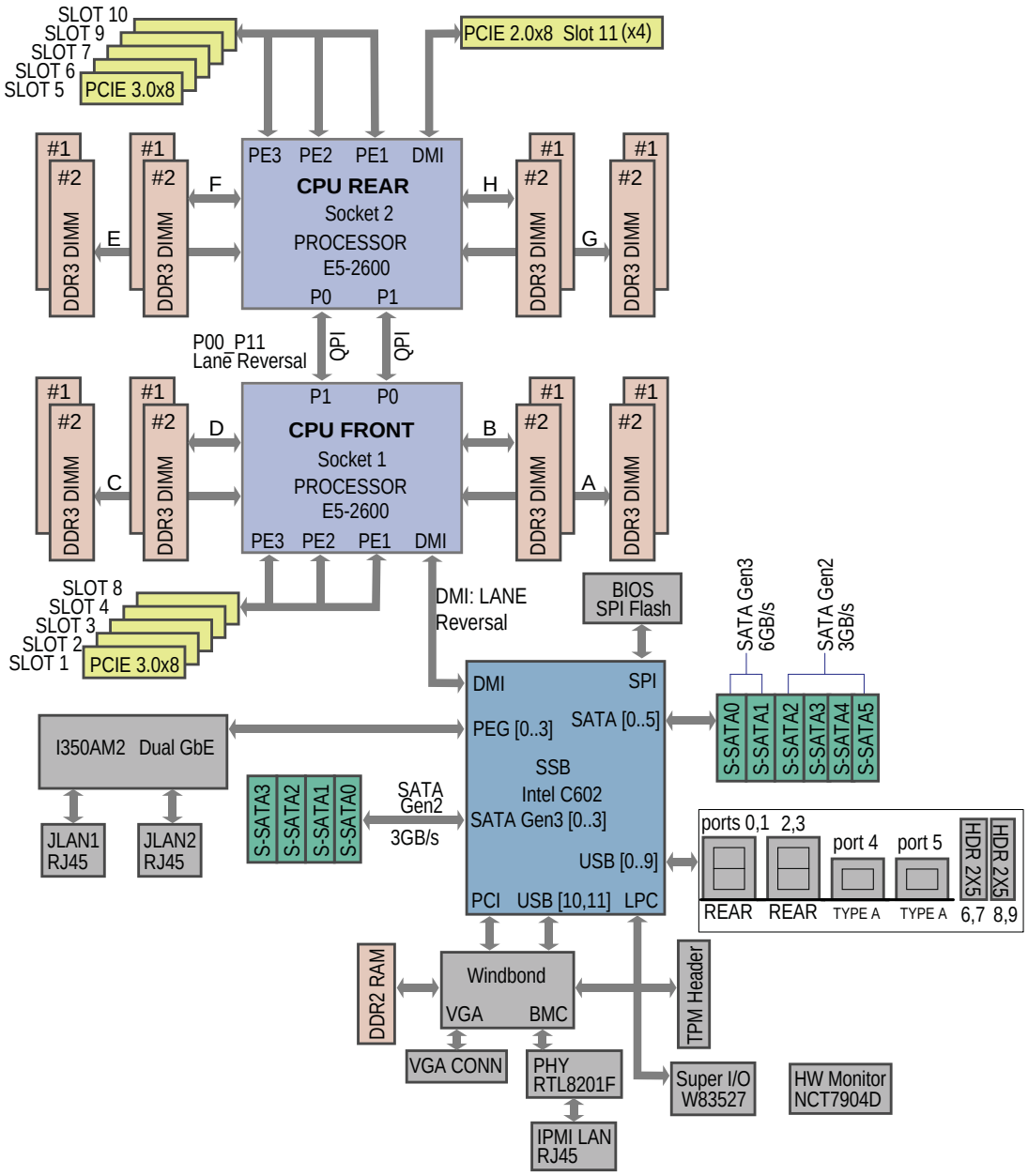
Web Site:	www.supermicro.com.tw
Technical Support:	
Email:	support@supermicro.com.tw
Tel:	886-2-8226-5990

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

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



Notes

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 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 motherboard, 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 system was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the server was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.
- Rack-mounted equipment should not be used as a shelf or work space.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.

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

Rack Mounting Considerations

Ambient Operating Temperature

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

Reduced Airflow

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

Mechanical Loading

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

Circuit Overloading

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

Reliable Ground

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

2-4 Installing the System into a Rack

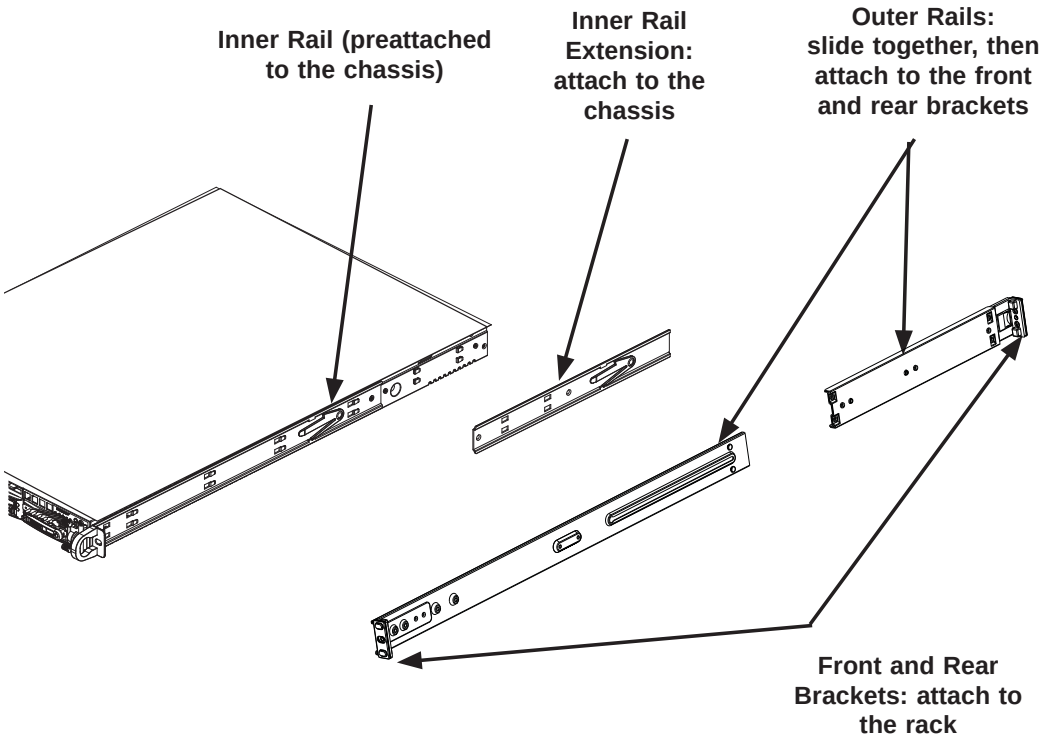
This section provides information on installing the SC818G chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

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

Identifying the Sections of the Rack Rails

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

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



Installing the Inner Rail Extensions

The SC818G chassis includes a set of inner rack rails in two sections: inner rails (A) and inner rail extensions (B). The inner rails are preattached and do not interfere with normal use of the chassis if you decide not to install to a server rack. Attaching the inner rail extensions to to the inner rails stabilizes the chassis within the rack.

Installing the Inner Rail Extensions

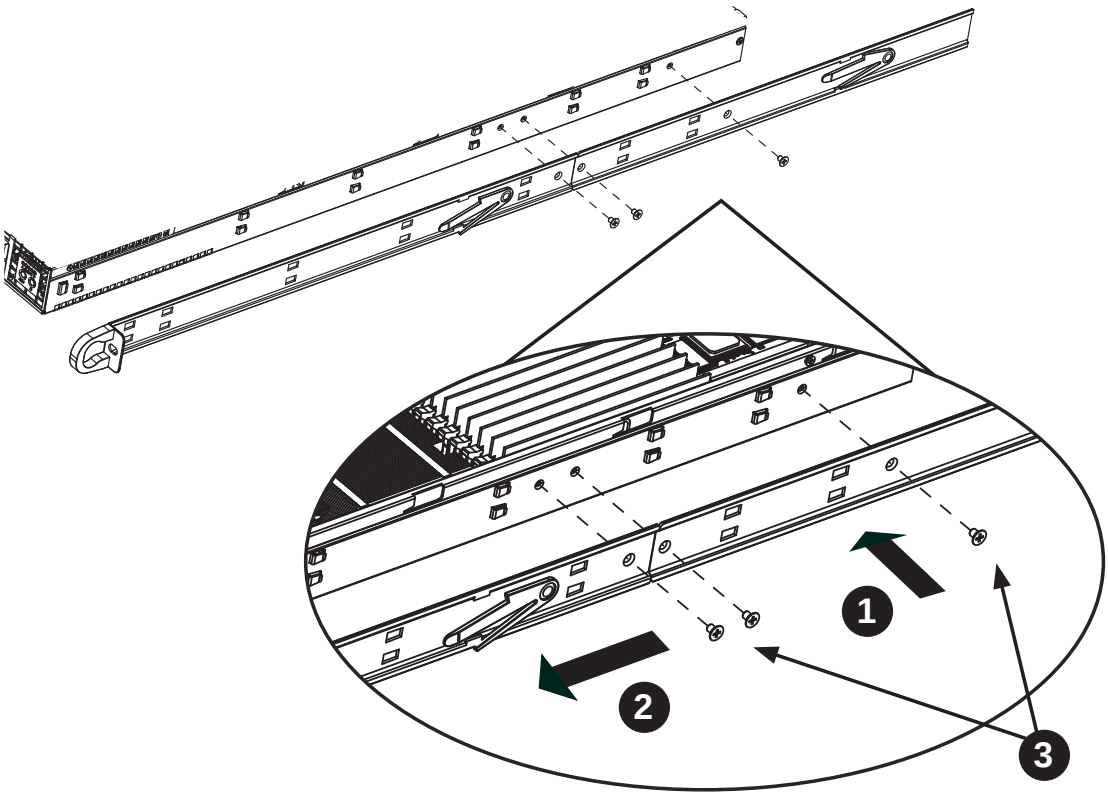
1. Place the inner rail extensions (B) over the preattached inner rails (A) which are attached to the side of the chassis. Align the hooks of the inner rail with the rail extension holes. Make sure the extension faces "outward" just like the inner rail.

2. Slide the extension toward the front of the chassis.

3. Secure the chassis with screws as illustrated.

4. Repeat steps 1-3 for the other inner rail extension.

Figure 2-2. Installing the Inner Rails



Assembling the Outer Rails

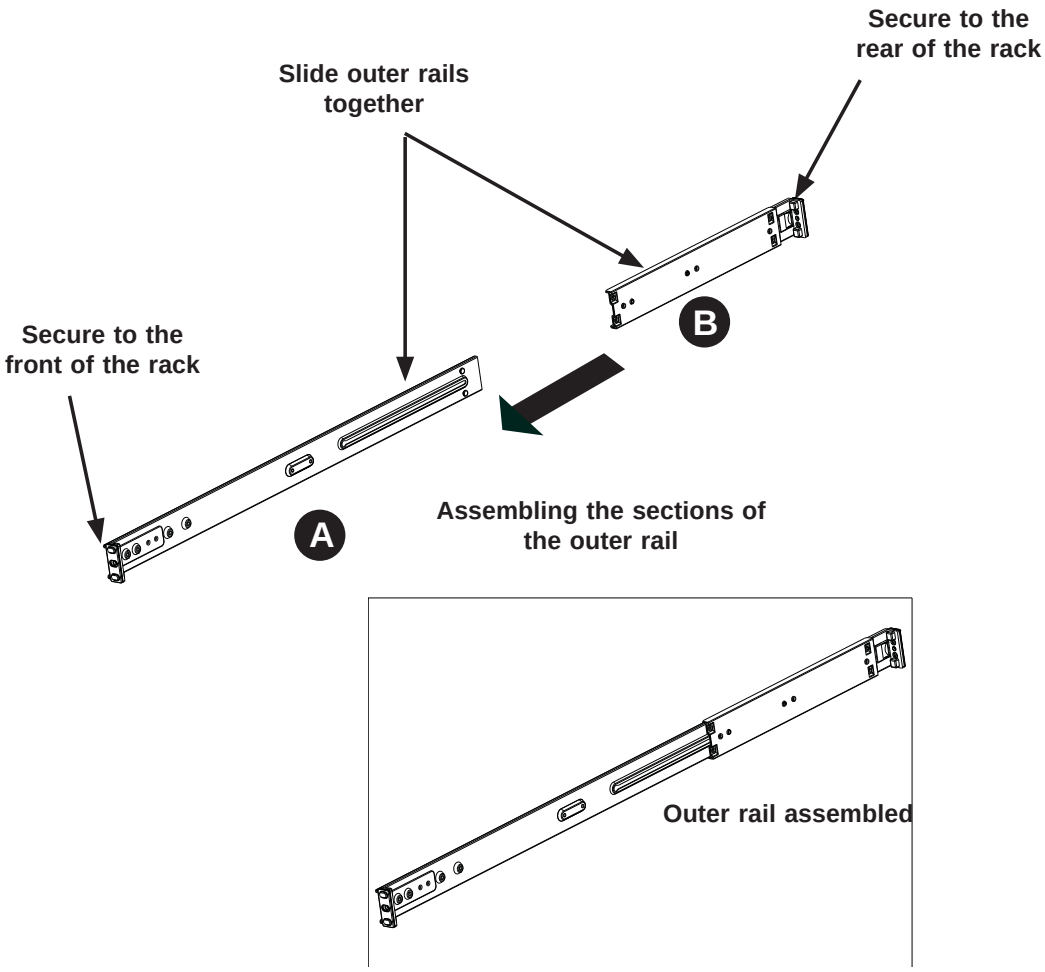
Each outer rail is in two sections that must be assembled before mounting on to the rack.

Assembling the Outer Rails

1. Identify the left and right outer rails by examining the ends, which bend outward.

2. Slide the front section of the outer rail (A), into the rear section of the outer rail (B).

Figure 2-3. Assembling the Outer Rails



Installing the Outer Rails onto the Rack

Outer Rail Installation

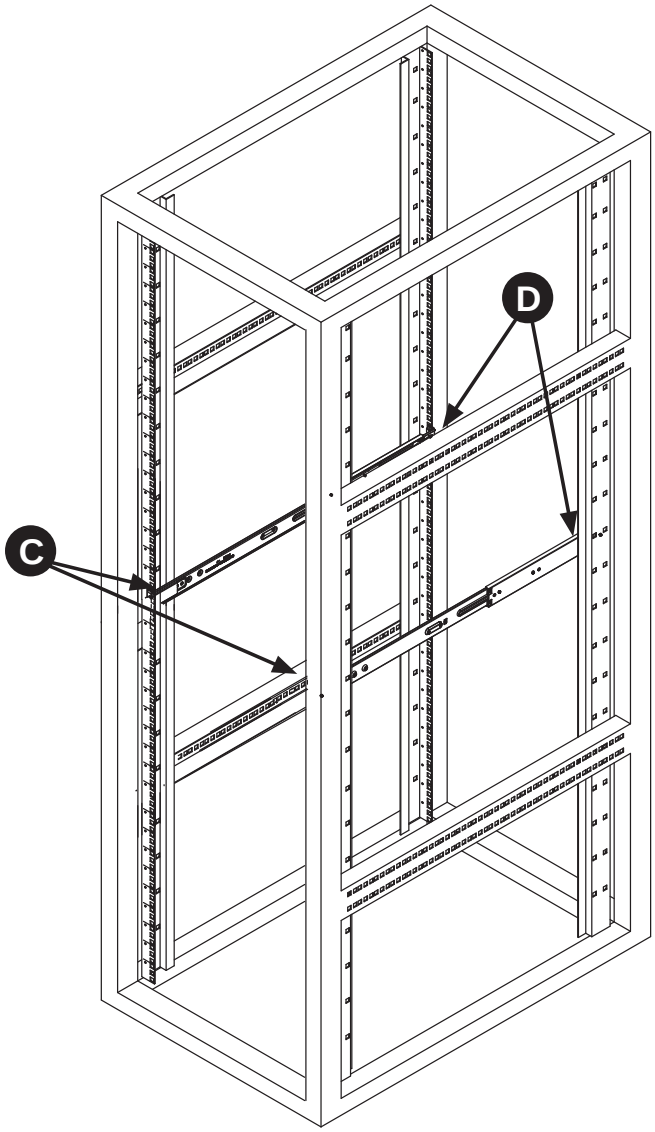
1. Adjust the outer rails to the proper length so that the outer rail fits snugly within the rack.

2. Align the holes on the front of the outer rail, with the holes on the front of the rack (C) and secure with the screws provided.

3. Align the holes on the rear of the outer rail to the holes on the rack (D) and secure with the screws provided.

4. Repeat the procedure with the second outer rail assembly.

Figure 2-4. Installing the Outer Rails to the Rack



Installing the Chassis into a Rack (Figure 2-5)

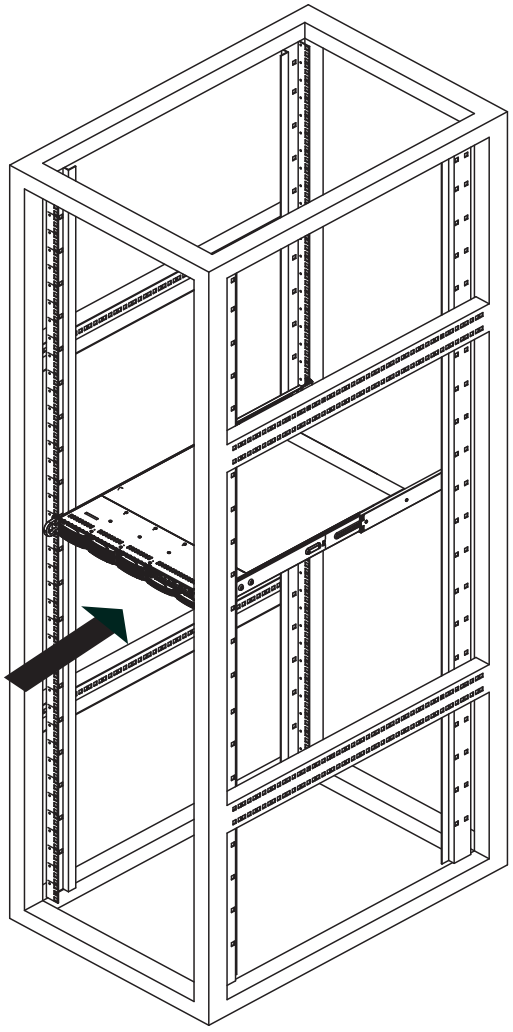
1. Confirm that chassis includes the inner rails and rail extensions . Also, confirm that the outer rails are installed on the rack.

2. Line chassis rails with the front of the rack rails.

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

4. (Optional) Insert and tightening the thumbscrews that hold the front of the server to the rack.

Figure 2-5. Installing the Server into a Rack

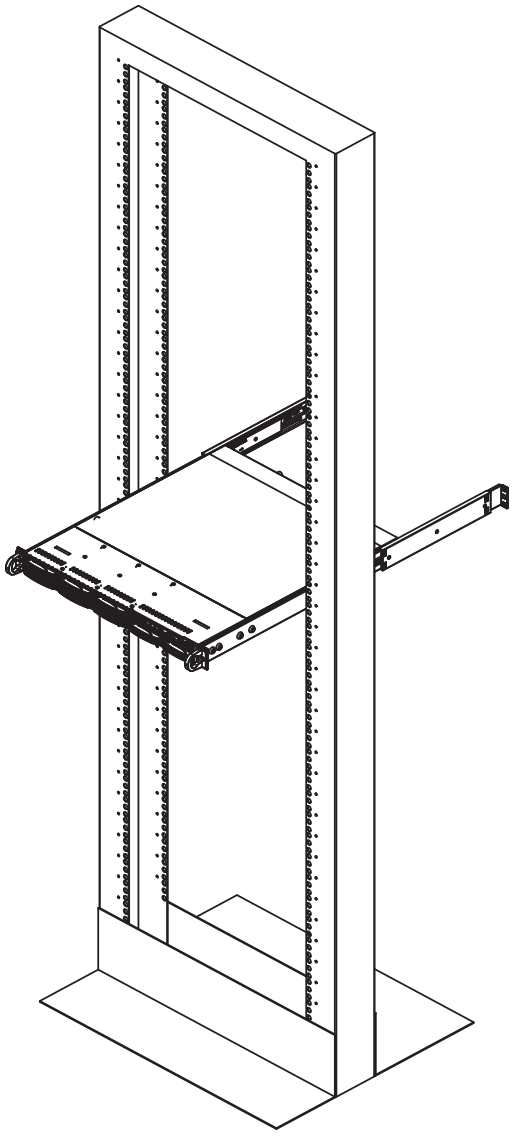


Installing the Server into a Telco Rack

Optional brackets (p/n MCP-290-00016-0N) are needed to install the server to a telco (open type) rack.

To install the server into a Telco type rack, use the two L-shaped brackets on either side of the chassis (four total). First, determine how far follow the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

Figure 2-6. Installing the Server into a Telco Rack



Notes

Chapter 3

System Interface

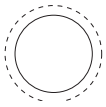
3-1 Overview

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

3-2 Control Panel Buttons

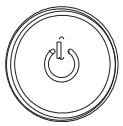
There are two push-buttons located on the front of the chassis: a reset button and a power on/off button.

RESET



Reset

Use the reset button to reboot the system.



Power

The main power button is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the SC818G chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

Universal Information LED

When this LED blinks red quickly, it indicates a fan failure. This LED will be blue when used for UID (Unit Identifier). When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists. See the table below for descriptions of the LED states.

Figure 3-1. Universal Information LED States

Universal Information LED States	
State	Indication
Fast Blinking Red (1x/sec)	Fan Fail
Solid Red	CPU Overheat
Solid Blue	Local UID Button Depressed
Blinking Blue	IPMI-Activated UID

Note: deactivating the UID LED must be performed in the same way it was activated. (If the UID LED was activated via IPMI, you can only turn the LED off via IPMI and not with the UID button.)

NIC2

Indicates network activity on LAN2 when flashing .

NIC1

Indicates network activity on LAN1 when flashing .

HDD

This light indicates SATA and/or DVD-ROM drive activity when flashing.

Power

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

3-4 SATA Drive Carrier LEDs

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

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

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions

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

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

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

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

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

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

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

4-2 General Safety Precautions

Follow these rules to ensure general safety:

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

- The server weighs approximately 47 lbs. (21.4 kg)47 lbs. (21.4 kg) . When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

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

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

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

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

4-3 ESD Precautions

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

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

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

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

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

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

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

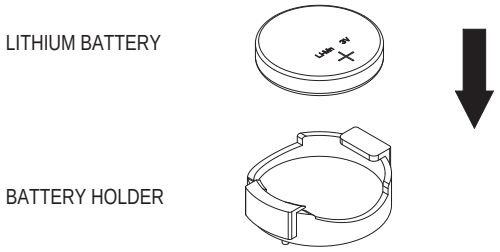
- Put the serverboard and peripherals back into their antistatic bags when not in use.

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

4-4 Operating Precautions

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

Figure 4-1. Installing the Onboard Battery



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 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 ESD.
- Touch a grounded metal object before removing boards from antistatic bags.
- 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 motherboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the layout on page 5-12 for connector locations.)

- SATA drive data cables (I-SATA0 ~ 2)
- SATA sideband cable (T-SGPIO ~ 1)
- Control Panel cable (JF1)
- GPU power cables (JPW2, PDB connector)
- SATA backplane power cable (JPW5)

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

Connecting Power Cables

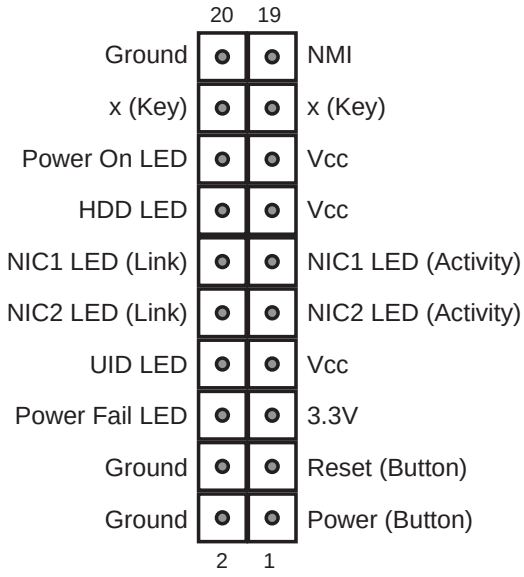
The X9SRG-F has two power supply connectors (JPW1 and JPW2) for connection to the ATX power supply. See Section 5-8 for power connector pin definitions.

Connecting the Control Panel

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

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

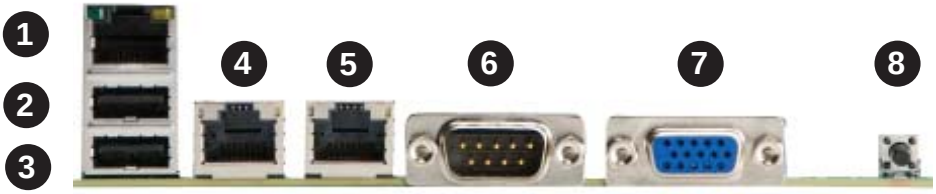
Figure 5-1. Control Panel Header Pins



5-3 I/O Ports

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

Figure 5-2. I/O Ports



I/O Ports	
1. IPMI LAN	5. LAN2
2. USB 2.0 Port 0	6. COM1
3. USB 2.0 Port 1	7. VGA
4. LAN1	8. Unit ID

5-4 Installing the Processor and Heatsink

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

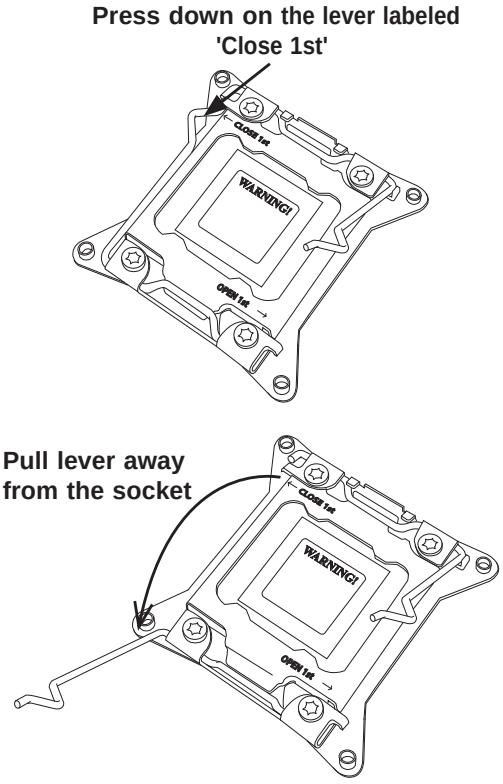
Notes:

- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the motherboard into the chassis before you install the CPU heatsinks.
- When receiving a motherboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Supermicro web site for updates on CPU support.

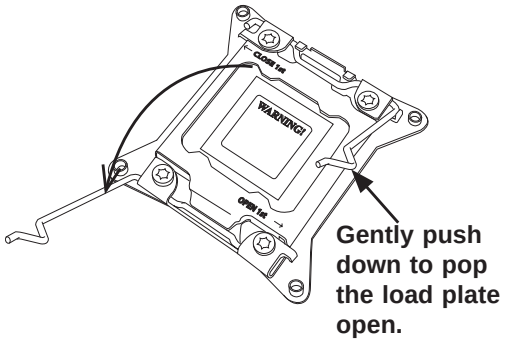
Installing an LGA 2011 Processor

Follow the procedure below to install a CPU.

1. There are two levers on the LGA 2011 socket. First press and release the load lever labeled 'Open 1st'.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.

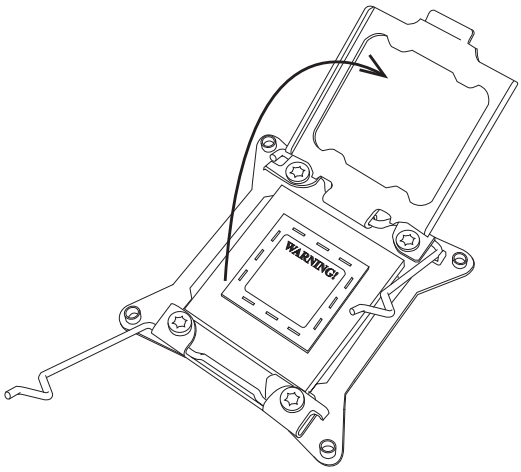


3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

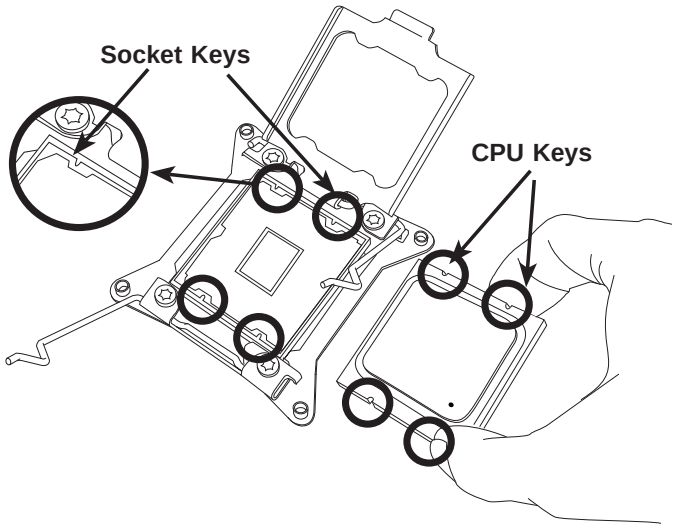


4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

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



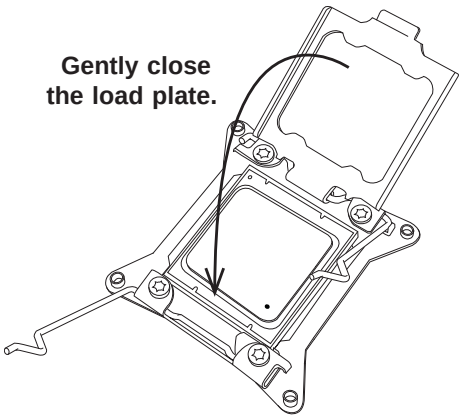
6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)

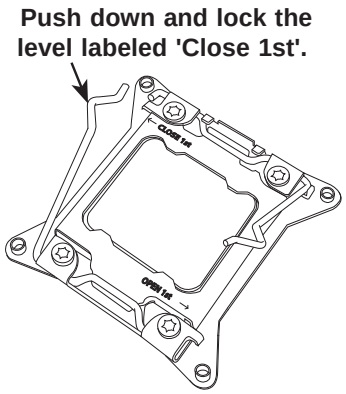


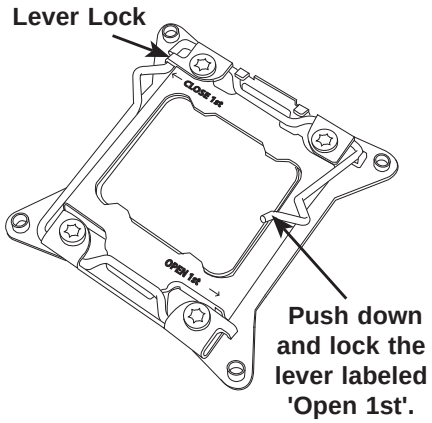
Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is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

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

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







Installing a CPU Heatsink

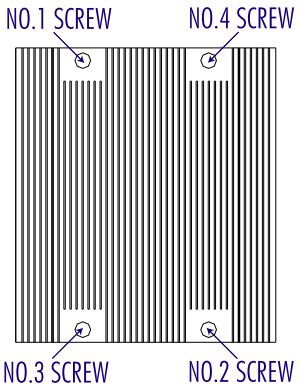
1. Remove power from the system and unplug the AC power cord from the power supply.

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

3. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

4. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug. Do not fully tighten the screws or you may damage the CPU.)

5. Add the two remaining screws then finish the installation by fully tightening all four screws.



Removing the Heatsink

1. Unscrew and remove the heatsink screws from the motherboard in the sequence as show in the picture above.

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

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

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install a heatsink.

Note: see Chapter 6 for details on installing the air shroud.

5-5 Installing Memory

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

Memory Support

The X9SRG-F motherboard supports up to 256GB of 1600/1066/1333/1600 MHz ECC/Non-ECC DDR3 DIMMs in eight memory slots (UDIMM/RDIMM). Please refer to the illustration below and the table on the next page:

Installing Memory Modules

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

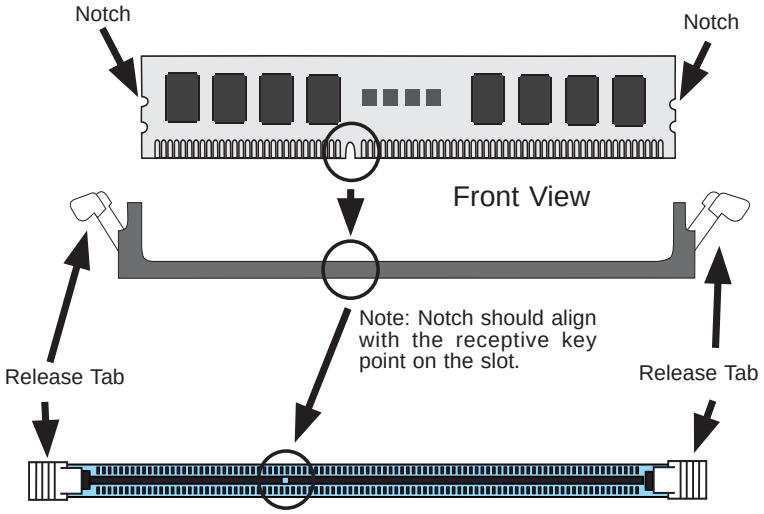
2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to avoid installing incorrectly (see Figure 5-4).

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

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

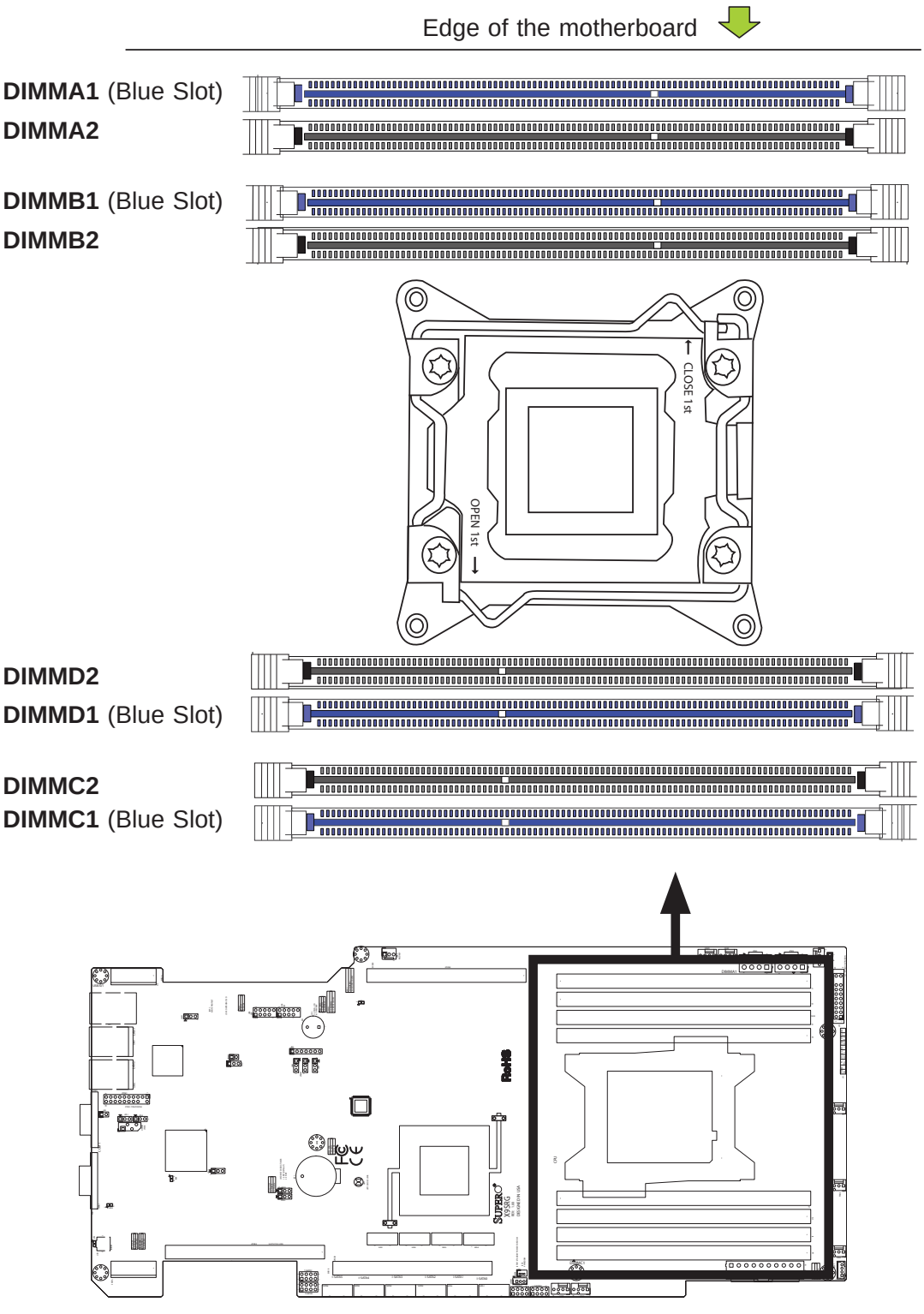
To Remove:
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.

Figure 5-3. DIMM Installation



Top View of DDR3 Slot

Memory Population Guidelines



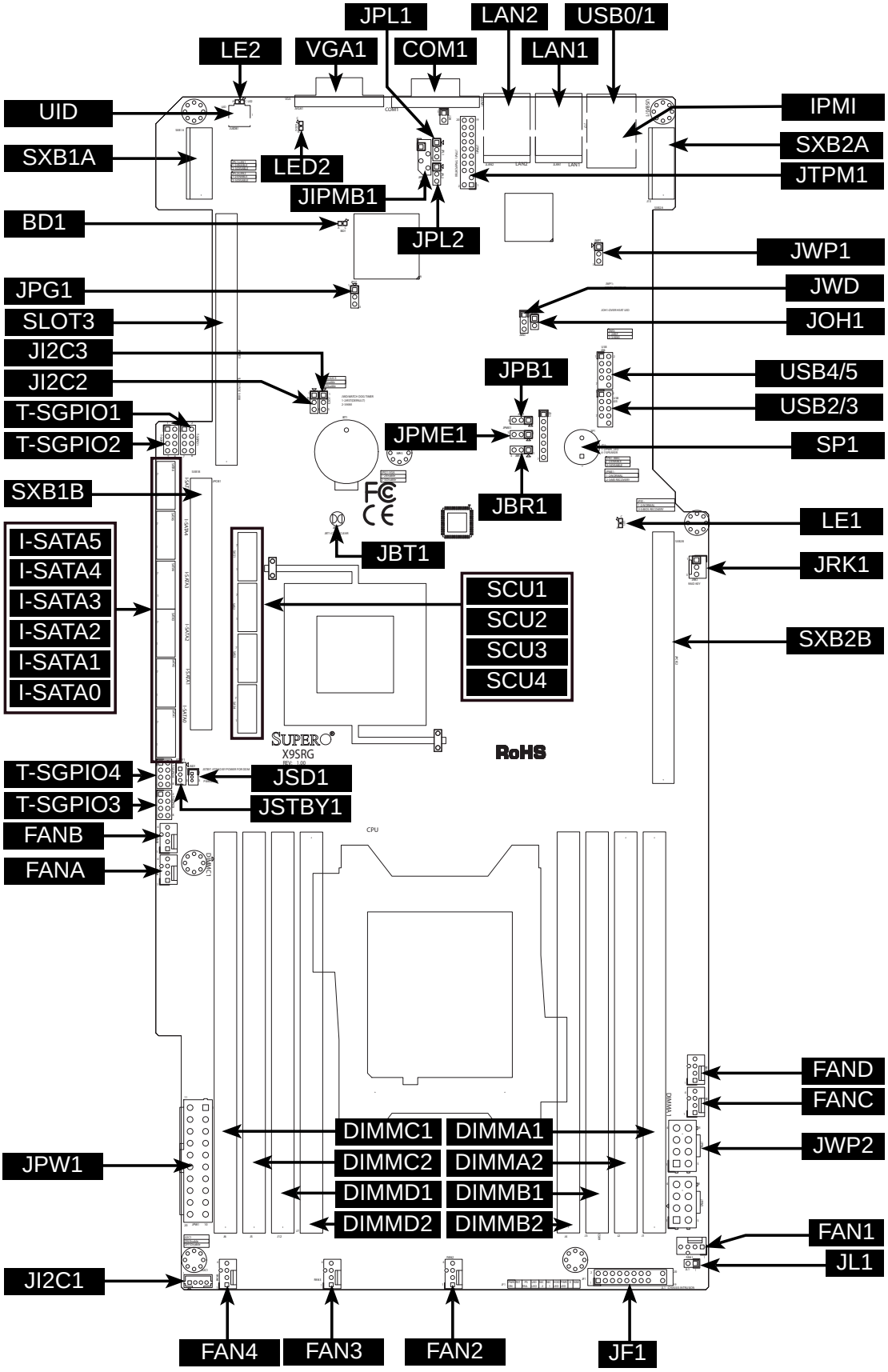
5-6 Expansion Cards

In addition to offering support for two GPU cards, the 5017GR-TF supports one low-profile PCI-Express 3.0 x8 expansion card (in x16 slot). A riser card (p/n RSC-R1U-E16R) is required to support the expansion card.

Refer to Chapter 6 for instructions on installing an expansion card in the system..

5-7 Motherboard Details

Figure 5-5. X9SRG-F Layout



X9SRG-F Quick Reference	
Connector/Switch	**Description**
UID	Unit ID Switch
SXB1A, SXB1B	Slot for Supermicro riser card P/N RSC-R1UG-E16-X9S
SXB2A, SXB2B	Slot for Supermicro riser card P/N RSC-R1UG-E16R-X9S
SLOT3	Slot for Supemicro riser card P/N RSC-R1UG-UR
T-SGPIO1~T-SGPIO4	Serial Link General Purpose I/O Headers (5V Gen1/Gen 2)
I-SATA0, I-SATA1	SATA 3.0 Ports via PCH (6Gb/s)
I-SATA2~I-SATA5	SATA 2.0 Ports via PCH (3Gb/s)
SCU1~SCU4	SATA 2.0 Ports via SCU (3Gb/s, RAID 0,1,10,5)
FAN1~FAN4	System/CPU Fan Connectors
FANA~FAND	I/O Fan Connectors
JSD1	SATA Disk On Module (DOM) Power Connector
JSTBY1	Legacy Wake On LAN Header
JPW1	24-pin Main ATX Power Connector
JPW2	8-pin Secondary Power Connector for the GPU
JI2C1	Power Supply SMBus I2C Header
JF1	Front Panel Control Header
JL1	Chassis Intrusion Header
JRK1	Intel / LSI Software RAID Key Firmware Upgrade Header
SP1	Internal Speaker/Buzzer
USB0, USB1	Read USB Ports
USB4/5, USB2/3	Internal USB Headers
JOH1	Overheat LED/Fan Fail LED Header
JTPM1	Trusted Platform Module (TPM) Header
LAN1/LAN2	LAN Ports (1Gb)
COM1	Rear Serial Port (COM1)
VGA1	Rear VGA Port
DIMMA1~DIMMD2	Memory Expansion Slots
JIPMB1	4-pin External BMC I2C Header

LED	Description	State/Status
BD1	IPMI Heartbeart	Green Blinking: IPMI Normal
LED2	Standby Power LED	Green Solid On: Standby Power On
LE1	Power On LED	Green Solid On: System is On/Running
LE2	Unit ID LED	Blue Solid On: Unit ID Switch is On

Jumper	Description	Default
JPG1	Onboard VGA Enable	Pins 1-2 (Enabled)
JI2C1~JI2C2	SMB to PCI Slots	Pins 1-2 (Enabled)
JWD	Watch Dog Timer Reset	Pins 1-2 (Reset)
JWP1	BIOS Write Protect	Pins 1-2 (Enabled)
JPL1/JPL2	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPB1	BMC Enable	Pins 1-2 (Enabled)
JPME1	Intel ME Mode Select	Pins 1-2 (Enabled)
JBR	BIOS Recovery	Pins 1-2 (Off)
JBT1	CMOS Clear	See Section 5-8

Notes

Jumpers not indicated are for test purposes only.

"■" indicates the location of Pin 1.

5-8 Connector Definitions

ATX Main Power & GPU Power Connectors

The 24-pin main power connector (JPW1) is used to provide power to the motherboard. The 8-pin GPU PWR connector JPW2 is required for the GPU card poistioned on the right side of the chassis when viewed from the front. These power connectors meet the SSI EPS 12V specification. See the tables on the right for pin definitions.

ATX Power 24-pin Connector Pin Definitions (JPW1)

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

12V 8-pin Power Connector Pin Definitions

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

(Required)

Power Button

The Power Button connection is located on pins1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 7). To turn off the power in the suspend mode, press the button for at least 4 seconds. Refer to the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin#	Definition
1	Signal
2	+3V Standby

Reset Button

The reset button is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)

Pin#	Definition
3	Reset
4	Ground

Power Fail LED

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

PWR Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	Vcc
6	Ground

Power Fail LED Status	
State	Definition
Off	Normal
On	Power Failure

Unit ID LED (Front Panel)

Connect a cable to the Unit ID connection on pins 7 and 8 of JF1 to connect to the Unit ID LED on the chassis. The Unit ID LED is used together with the Unit ID (UID) Switch (see 2-16).

Unit ID LED Pin Definitions (JF1)	
Pin#	Definition
7	Vcc
8	UID LED

Unit ID LED Status	
State	Definition
Off	UID Off
On	UID On

NIC1/NIC2 (LAN1/LAN2)

The NIC (Network Interface Controller) LED connection for LAN ports 1 and 2 are located on pins 11 and 12 and pins 9 and 10 of JF1, respectively. Attach NIC LED cables to the NIC1 and NIC2 LED indicators to display network activity. Refer to the table on the right for pin definitions.

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9/11	Vcc
10/12	Ground

NIC LED Status	
State	Definition
Off	No Activity
Blinking	NIC Busy

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a cable here to indicate the status of HDD-related activities, including IDE, SATA activities. See the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	+5V
14	HD Active

HDD LED Status	
State	Definition
Off	No Activity
Blinking	HDD Busy

Power LED

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

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	+5V
16	Ground

Power LED Status	
State	Definition
Off	System Off
On	System Running

NMI Button

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

NMI Button Pin Definitions (JF1)

Pin#	Definition
19	Control
20	Ground

Universal Serial Bus (USB)

Two (2) Universal Serial Bus 2.0 ports are located on the I/O back panel. There are also four (4) USB 2.0 ports on two headers on the motherboard that may be used to provide front chassis access using USB cables (not included). See the tables below for pin definitions.

Back Panel USB 2.0 (USB #0)
Back Panel USB 2.0 (USB #1)
Front Panel USB 2.0 (USB #2/3)
Front Panel USB 2.0 (USB #4/5)

Back Panel USB (2.0) Pin Definitions

Pin#	Definition	Pin#	Definition
1	+5V	5	+5V
2	USB_PN1	6	USB_PN0
3	USB_PP1	7	USB_PP0
4	Ground	8	Ground

Front Panel USB (2.0) Header Pin Definitions

Pin #	Definition	Pin #	Definition
1	+5V	2	+5V
3	USB_PN2	4	USB_PN3
5	USB_PP2	6	USB_PP3
7	Ground	8	Ground
9	Key	10	Ground

Ethernet Ports (LAN1/LAN2)

Two Ethernet ports (LAN1/LAN2) are located next to the USB ports on the I/O backpanel. These ports provide networking connectivity with speeds up to 1Gb/s. Please see the table on the left for the pin definitions.

LAN Ports Pin Definition

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

(NC: No Connection)

IPMI Port

In addition to the two Ethernet ports (LAN1/LAN2) this motherboard also features a dedicated IPMI port. This provides remote system management access through a standard IP protocol network.

Serial Ports

One COM port (COM1) is provided on the motherboard, located on the I/O backpanel. See the table on the right for pin definitions.

Serial Ports-COM1/COM2 Pin Definitions

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

Unit Identifier Switch (UID)

The Unit ID switch is located on the I/O backpanel. When the Unit ID switch is turned on, both the blue rear Unit ID LED and front panel Unit LED on JF1 (if attached to the front Unit ID LED on the chassis) will activate. Push the Unit ID switch again to turn off both Indicators. These Unit ID LED indicators provide easy identification of the system unit when installed in a server cabinet for instance.

Fan Headers

The X9SRG-F series has eight fan headers (Fan 1~Fan 4 and Fan A~Fan D). These are 4-pin fan headers with pins 1-3 being backward compatible with traditional 3-pin fans. It is recommended that 4-pin fans are used to allow the fan speed control setting (via IPMI) to automatically adjust fan speeds based on the system temperature. Refer to the table on the right for pin definitions.

Fan Header Pin Definitions

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

Fan Header Recommended Usage

Fan#	Definition
1~4	CPU/System
A~D	I/O & Addon Cards

Chassis Intrusion

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

Chassis Intrusion Pin Definitions (JL1)

Pin#	Definition
1	Intrusion Input
2	Ground

Legacy Wake-On-LAN Header

The onboard LAN ports (LAN1 and LAN2) do not need a WOL header to support a Wake-On-LAN function. The legacy WOL header was rereserved to provide convenience for some embedded customers who need an internal power source from the board. See the table on the right for pin definitions.

Wake-On-LAN (JSTBY1) Pin Definitions

Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

System Management Bus

A System Management Bus header for the IPMI slot is located at JIPMB1. Connect the appropriate cable here to use the IPMB I2C connection on your system.

System Management Bus (JIPMB1)

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

Power Supply I2C

The Power Supply I2C Connector, located at JI2C1, monitors the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

PWR Supply (I2C) Pin Definitions

Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	3.3V

DOM PWR Connector

The Disk-On-Module (DOM) power connector, located at JSD1, provides 5V (Gen1/Gen) power to a solid-state DOM storage device connected to one of the SATA ports. See the table on the right for pin definitions.

DOM PWR (JSD1) Pin Definitions

Pin#	Definition
1	5V
2	Ground
3	Ground

T-SGPIO1~4 Headers

Four T-SGPIO (Serial-Link General Purpose Input/Output) headers are located next to the I-SATA ports on the motherboard. These headers are used to communicate with the enclosure management chip in the system. See the table on the right for pin definitions.

Serial Link General-Purpose Headers (SGPIO) Pin Definitions

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

TPM Header

This header is used to connect a Trusted Platform Module (TPM), which is available from a third-party vendor. A TPM is a security device that supports encryption and authentication in hard drives. It enables the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. See the table on the right for pin definitions.

Trusted Platform Module Header (JTPM1) Pin Definitions

Pin #	Definition	Pin #	Definition
1	LCLK	2	GND
3	LFRAME#	4	No Pin
5	LRESET#	6	+5V (X)
7	LAD3	8	LAD2
9	3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4	14	SMB_DAT4
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)

Overheat/Fan Fail LED

The JOH1 header is used to connect an LED to provide warnings of chassis overheat. This LED will also blink to indicate a fan failure. Refer to the table on right for pin definitions.

OH/Fan Fail LED (JOH1) Pin Definitions

Pin#	Definition
1	5vDC
2	OH Active

OH/Fan Fail LED (JOH1) Pin Definitions

State	Message
Solid	Overheat
Blinking	Fan Fail

RAID Key Header

The RAID key header supports an optional RAID key (available separately). When plugged into this header, it will allow the user to enable the onboard SAS controller for software RAID 5 support (Intel or LSI).

RAID Key Header (JRK1) Intel/LSI

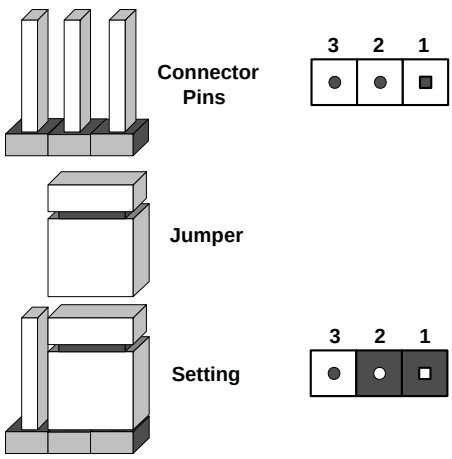
Pin#	Definition
1	RAID Key PCH
2	Ground
3	PCH DYN SKU

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 motherboard layout pages for jumper locations.

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



CMOS Clear

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

To clear CMOS,

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

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

VGA Enable/Disable

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

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

LAN1/2 Enable/Disable

Jumpers JPL1 and JPL2 enable or disable LAN ports 1 and 2, respectively. See the table on the right for jumper settings. The default setting is enabled.

LAN1/2 Enable/Disable Jumper Settings

Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

PCI Slot SMB Enable

Use Jumpers JI2C2/JI2C3 to enable PCI SMB (System Management Bus) support to improve system management for the PCI slots. See the table on the right for jumper settings.

PCI Slot SMB Enable (JI2C) Jumper Settings

Setting	Definition
Short	Enabled (Default)
Open	Disabled

Watch Dog Reset

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

Watch Dog (JWD) Jumper Settings

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

BMC Enable/Disable

JPB1 is used to enable or disable the BMC (Baseboard Management Control) chip and the onboard IPMI port. This jumper is used together with the IPMI settings in the BIOS. See the table on the right for jumper settings.

BMC IPMI Enable/Disable (JPB1) Jumper Settings

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

BIOS Write Protect

The BIOS Write Protect prevents the BIOS from being updated or modified. See the table on the right for jumper settings.

BIOS Write Protect (JWP1) Jumper Settings

Setting	Definition
Pins 1-2	Protect (Default)
Pins 2-3	BIOS Writeable

BIOS Recovery

The BIOS Recovery (JBR1) is used to enable or disable the BIOS Recovery feature of the motherboard. Install the jumper on pins 2-3 to begin the recovery process.

BIOS Recovery (JBR1) Jumper Settings	
Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Recover

ME Recovery

ME Recovery (JPME1) is used to enable or disable the ME Recovery feature of the motherboard. This jumper will reset Intel ME values back to their default settings.

ME Recovery (JPME1) Jumper Settings	
Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Force Update

5-10 Onboard Indicators

LAN1/2 Port LEDs

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

LAN Link LEDs (Green/Amber/Off)	
LED Color	Definition
Off	No Connection or 10 Mbps
Green	100 Mbps
Amber	1 Gbps

Standby Power

The Standby Power LED is located at LED2 on the motherboard. When LED2 is on, it means that the AC power cable is connected and the power supply hard switch is on, indicating that power is flowing through the power supply and into the motherboard. The system may or may not be running.

Standby PWR LED (LED2) LED Status	
Status	Definition
Off	System unplugged or power supply is switched off
On	Standby Power On

Power On

The Power On LED is located at LE1 on the motherboard. When LE1 is on, it means that the AC power cable is connected, the power supply hard switch and soft switch are on, and the system is running.

Power On LED (LE1) LED Status	
Status	Definition
Off	System Off or Standby Power
On	System is On/Running

IPMI Heartbeat LED

An IPMI Heartbeat LED is located at BD1. When BD1 blinks, it means that IPMI is enabled and functioning properly.

IPMI Heartbeat LED (BD1) LED Settings	
Green: Blinking	IPMI is ready for use
Off	IPMI Disabled

Unit ID LED

The Unit ID LED is used to indicate that the Unit ID switch has been activated.

Unit ID LED (LE2) LED Settings	
Blue: Steady	Unit ID Switch is On
Off	Unit ID Switch is Off

5-11 SATA Ports

SATA Ports (I-SATA & SCU)

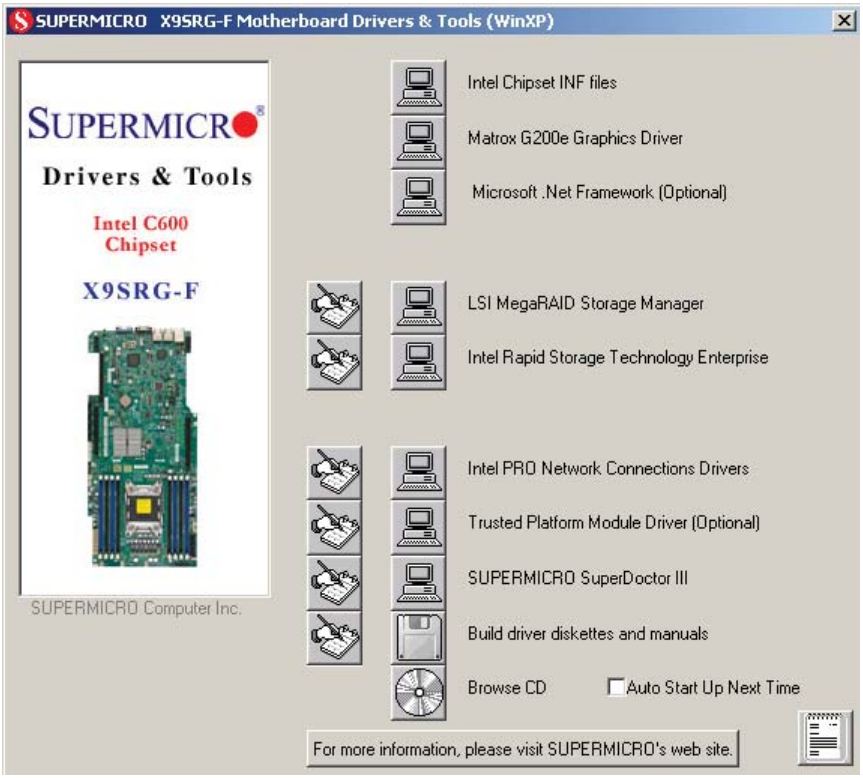
Six SATA ports (I-SATA 0~5) are located on the motherboard. I-SATA 0/1 supports data transfer rates of up to 6Gb/s (SATA 3.0), while I-SATA 2~5 supports data transfer rates of up to 3Gb/s (SATA 2.0). Please see the pin definitions on the right table.

In addition to these six SATA ports, four additional SATA ports (3Gb/s, via SCU) are also located on the X9SRG-F series (SCU 1~4).

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

5-12 Installing Software

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



Driver/Tool Installation Display Screen

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

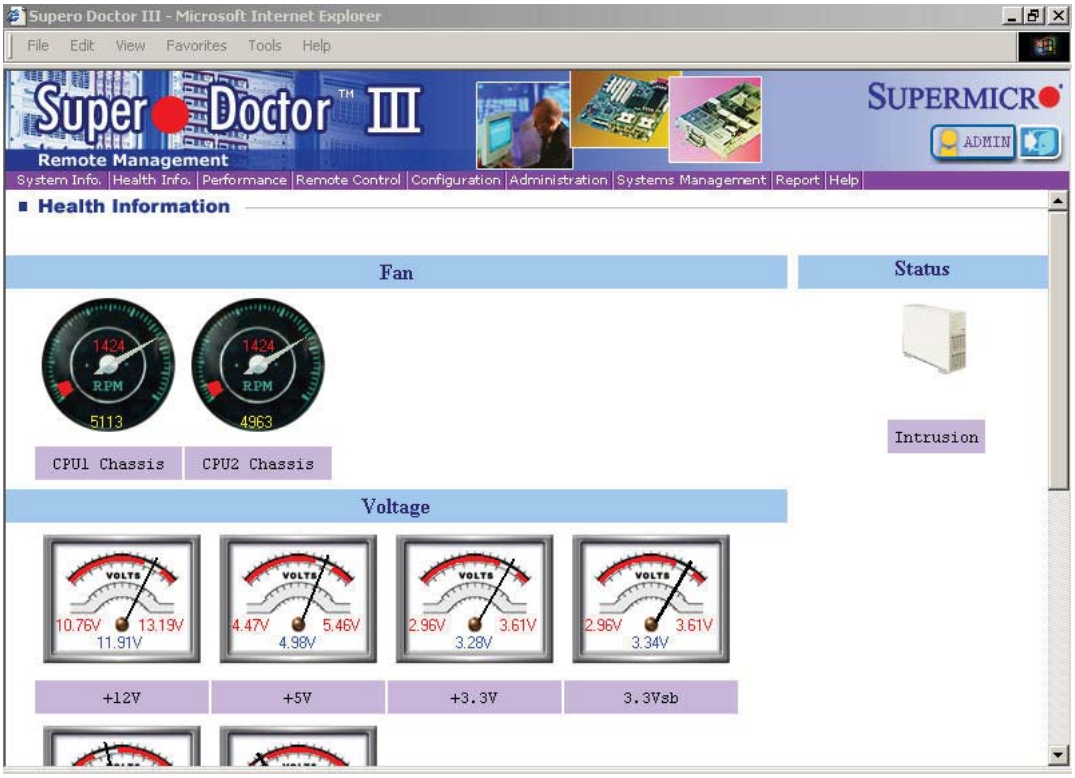
Supero Doctor III

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

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

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

Supero Doctor III Interface Display Screen (Health Information)



Supero Doctor III Interface Display Screen (Remote Control)

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

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC818G 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 next step.

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

6-1 Static-Sensitive Devices

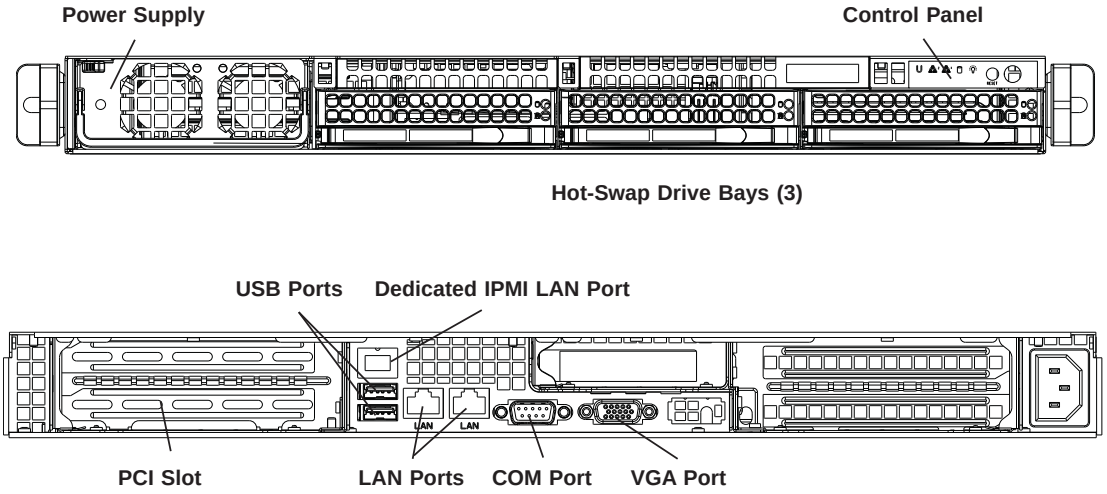
Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully.

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.

Figure 6-1. Chassis: Front and Rear Views



6-2 Control Panel

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

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

6-3 System Cooling

Four 4-cm counter-rotating fans provide the cooling for the system. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels.

It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components. See Figure 6-2.

System Fan Failure

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

Replacing a System Fan (Figure 6-2)

1. If IPMI is not being utilized to determine which fan has failed, open the top cover of the chassis while the system is running to locate the position of the failed fan. Never run the server for an extended period of time with the top cover open.

2. Turn off the power to the system and unplug the AC power cord.

3. Remove the failed fan's wiring from the backplane.

4. Remove the four pins securing the fan to the fan tray.

5. Lift the failed fan from the fan tray and out of the chassis.

6. Place the new fan into the vacant space in the fan tray, 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 in the same fan tray.

7. Reconnect the fan wires to the exact same chassis fan headers as the previous fan.

8. Reconnect the AC power cord, power up the system and check that the fan is working properly before replacing the chassis cover.

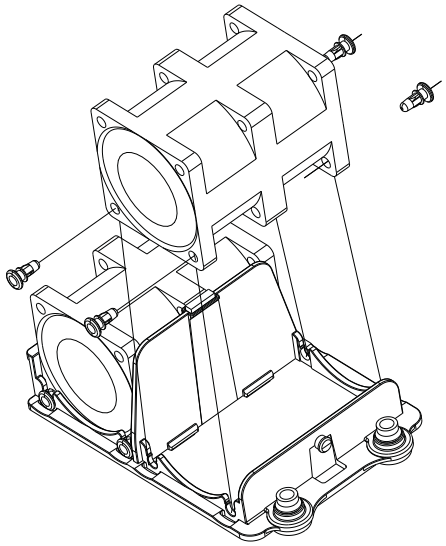


Figure 6-2. Removing a Fan from the Fan Tray

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

Hard Drives: Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace hard drives. Proceed to the next section for instructions.

Peripheral Drives: The SC818G chassis includes space for a variety of peripheral drive options, including a 2.5" hard disk drive, DVD-ROM or floppy drive. For a complete listing of peripheral drive options, visit the Supermicro web site.

Hard Drive Installation

The hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis.

Removing Hard Drive Carriers from the Chassis

1. Press the release button on the drive carrier. This extends the drive carrier handle.

2. Use the handle to pull the drive carrier out of the chassis.

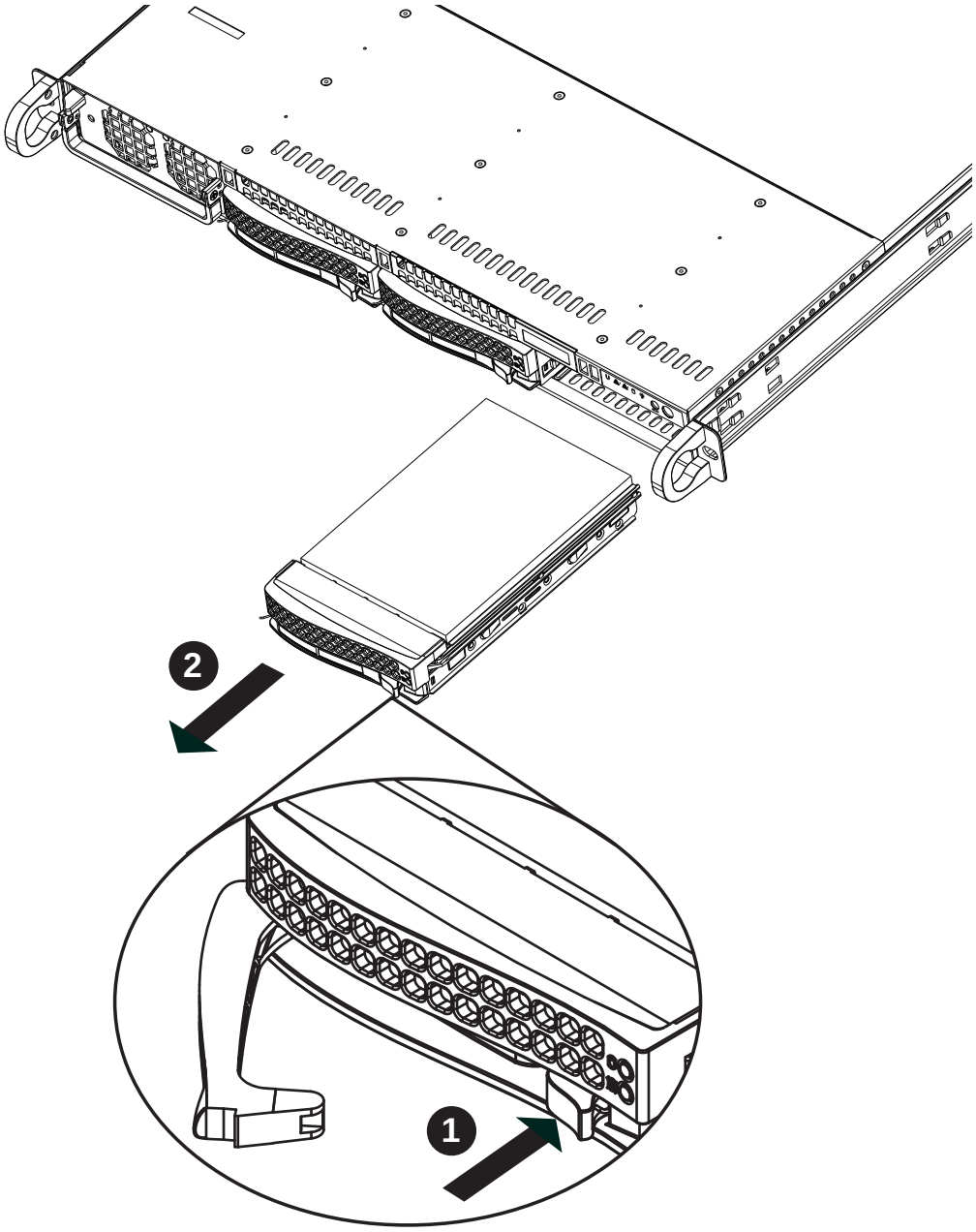


Figure 6-3. Removing a Hard Drive Carrier

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

Installing a Hard Drive to the Hard Drive Carrier

1. Remove the two screws securing the dummy drive to the carrier.
2. Remove the dummy drive from the carrier.
3. Install a new drive into the carrier with the printed circuit board side facing downward so that the mounting holes align with those in the carrier.
4. Secure the hard drive by tightening all six screws.

Installing a Hard Drive Carrier Into the Chassis

1. Insert the loaded hard drive carrier into the drive bay of the chassis
2. Push the drive carrier into the drive bay, pushing in the handle of the carrier until it clicks into the locked position.

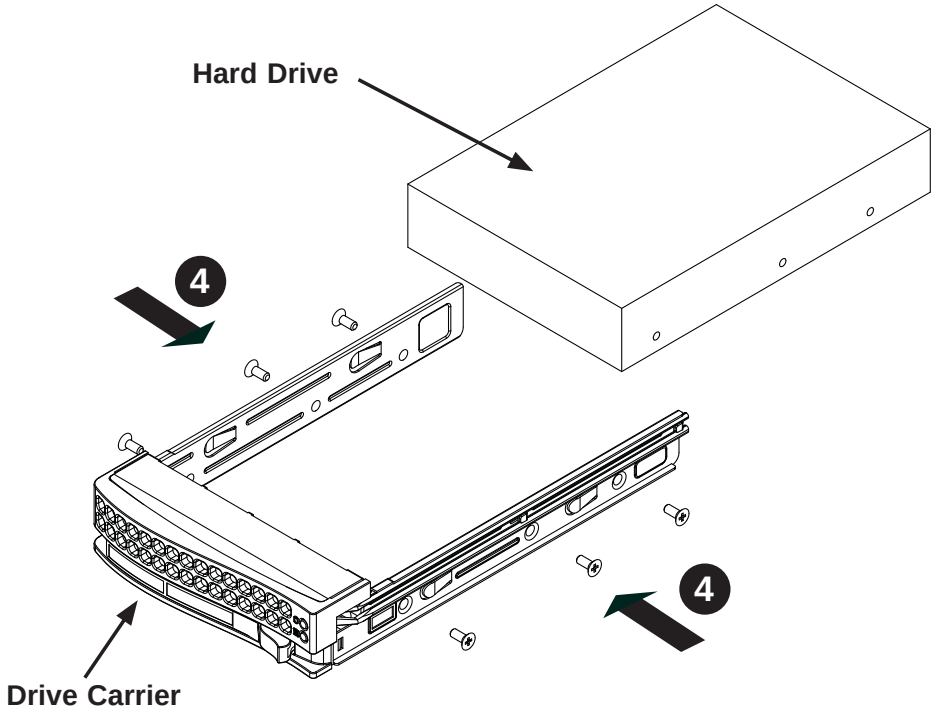


Figure 6-4. Installing a Hard Drive to the Carrier

Note: When installing the hard drive carrier that is next to the power supply, the power supply handle must be lifted before extending the hard drive carrier handle, or before inserting the hard drive carrier into the drive bay.

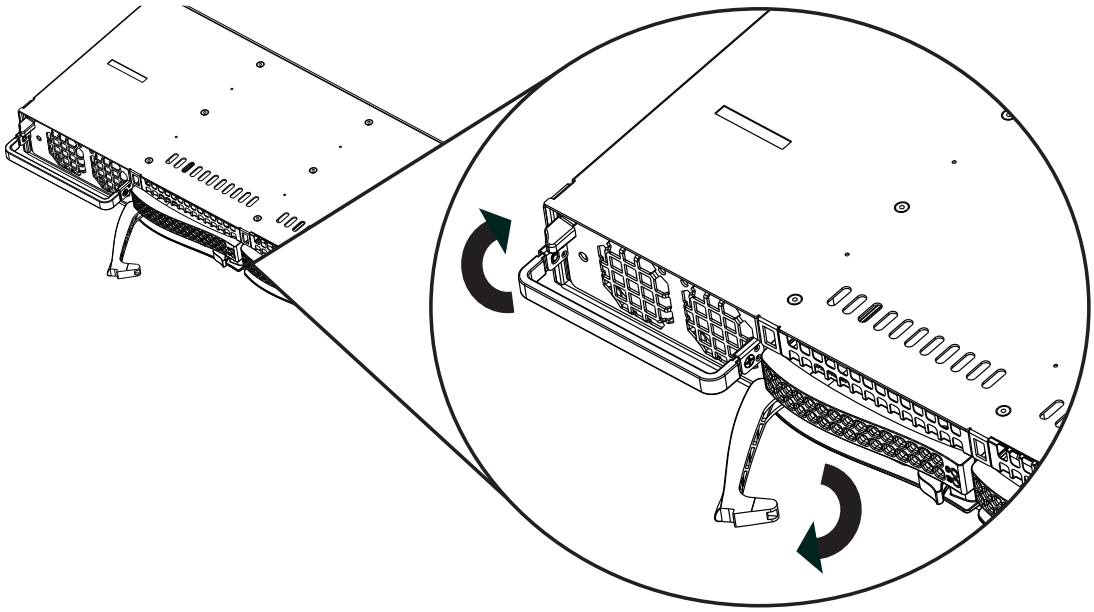


Figure 6-5. Installing/Removing the Carrier Next to the Power Supply

Peripheral Drive Installation

Installing or Replacing a Peripheral Drive

1. Unplug the main power cord to the chassis.

2. Unplug the power and data cables from the motherboard and/or backplane.

3. If you are adding a new drive: Remove the dummy tray from the drive bay The mini-bezel can be removed by pulling out the hard drive beneath the drive bay, then pulling the mini-bezel forward.
   If you are replacing a drive: Locate the locking tab at the rear (left hand side when viewed from the front) of the peripheral drive. Push the tab toward the drive and push the drive unit out the front of the chassis.

4. Insert the new drive unit in the slot until the tab locks in place.

5. Reconnect the data and power cables.

6. Replace the chassis cover (replace the server in the rack, if necessary) and power up the system.

6-5 Installing the Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The air shroud for the SC818G chassis does not require screws to set up.

Installing the Air Shroud

1. Position the air shroud in the chassis as illustrated above.

2. Align the notch (A) on the air shroud with the pin (B) on the add-on card bracket.

3. Slide the pin (B) into the back of the notch (A)

4. Lower the front of the air shroud over the fan tray, sliding the front notches (C) over the pins on the fan tray (D).

Checking the Air Flow

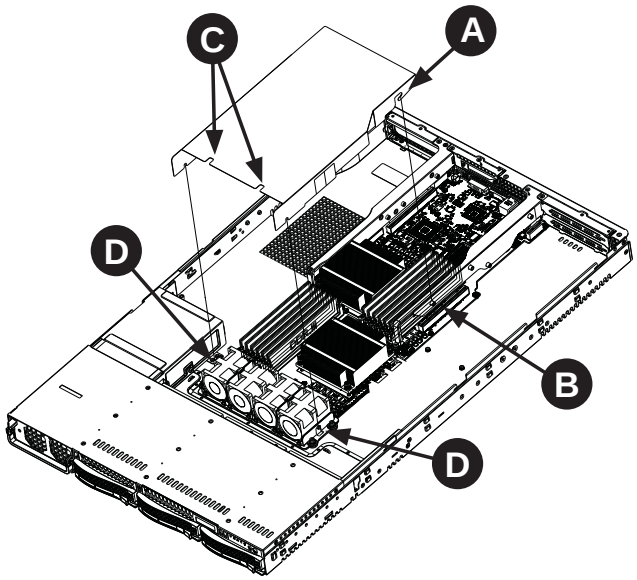
Checking the Server's Air Flow

1. Make sure there are no wires or other objects obstructing the airflow in and out of the server. Pull all excess cabling out of the airflow path.

2. Do not operate the server without all drive carriers installed in the drive bays. Use only recommended server parts.

3. The control panel LEDs inform you of the overall system status. See “Chapter 3 System Interface” for details on the LEDs and the control panel buttons.

Figure 6-6. Installing the Air Shroud



6-6 Power Supply

The system includes a single 1400 watt power supply, which is auto-switching capable. Power must be removed from the system when replacing the power supply.

Power Supply Failure

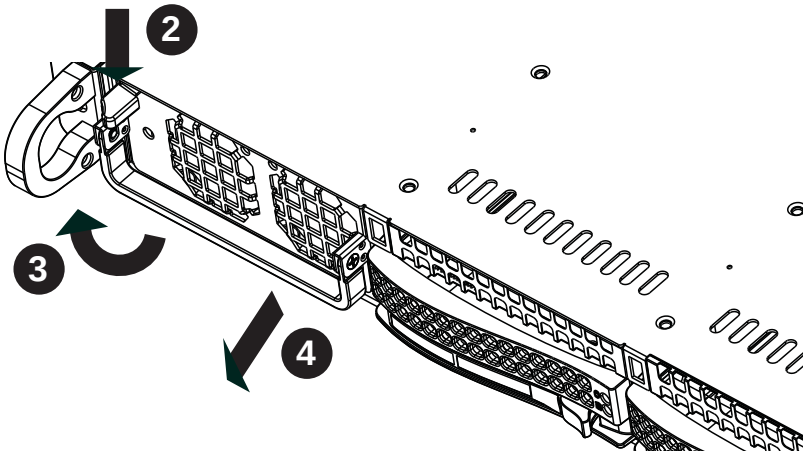
If the power supply module fails, the system will shut down and you will need to replace the module. Replacements can be ordered directly from Supermicro (see contact information in the Preface).

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

Removing/Replacing the Power Supply (Figure 6-6)

1. Power down the server and unplug the AC power cord.
2. Push the release tab on the front of the power supply.
3. Pull the power supply out using the attached handle.
4. Replace the failed power module with the same model (See Appendix C).
5. Push the new power supply module into the power bay until you hear a click.
6. Reconnect the AC power cord and depress the power button on the control panel to restart the system.

Figure 6-7. Removing/Replacing the Power Supply



Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the X9SRG-F Motherboard. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

Note: For instructions on BIOS recovery, please refer to the instruction guide posted at http://www.supermicro.com/support/manuals/.

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.

How to Start the Setup Utility

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

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

7-2 Main Setup

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

System Overview: The following BIOS information will be displayed:

System Time/System Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Enter new values through the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.)

Supermicro X9SRG-F

Version: This item displays the version of the BIOS used in the system.

Build Date: This item displays the day this version of BIOS was built.

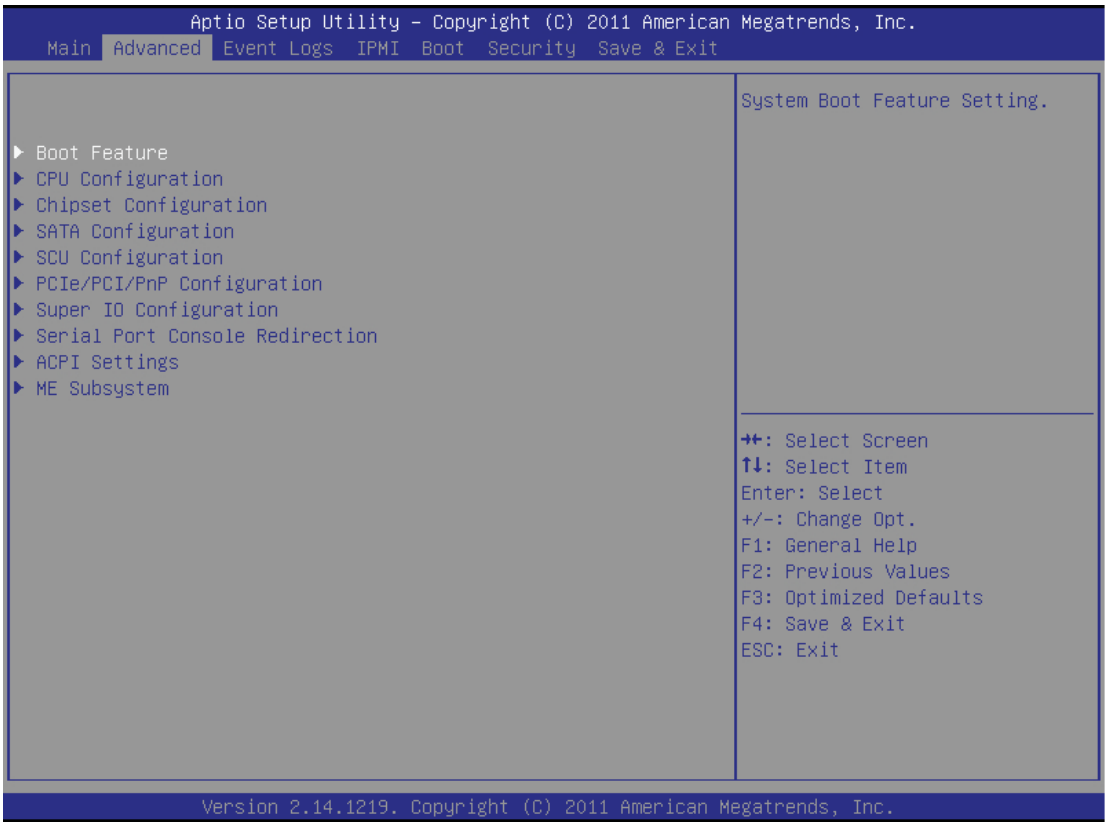
Memory Information

Total Memory

This displays the size of memory available in the system:

7-3 Advanced Setup Configurations

Use the arrow keys to select Boot Setup and hit <Enter> to access the submenu items:



▶BOOT Feature

Quiet Boot

This option allows the bootup screen options to be modified between POST messages or 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 sets the display mode for Option ROM. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock

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

Wait For 'F1' If Error

This forces 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 boot 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

This feature controls how the system shuts down when the power button is pressed. Select 4-Seconds Override to force the user to press and hold the Power Button for 4 seconds before the system turns off. Select Instant Off if you want the system to instantly power off when the Power Button is pressed. The options are 4 Seconds Override and **Instant Off.**

Restore on AC Power Loss

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

▶CPU Configuration

Warning: Take Caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency or incorrect DRAM timing may cause system to become unstable. When this occurs, revert to the default setting.

▶Socket 1 CPU Information

This item is for informational purposes only and displays CPU information including type, speed, number of cores, etc.

Clock Spread Spectrum

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

Hyper Threading

Set to Enabled to use the processor's Hyper Threading Technology feature. The options are **Enabled** and Disabled.

Active Processor Cores

Set to Enabled to use a processor's Second Core and beyond. (Please refer to Intel's web site for more information.) The options are **All,** 1, 2, 4.

Limit CPUID Maximum

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

Execute-Disable Bit Capability (Available when supported by the OS and the CPU)

Set to 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

Set to Enabled to use the processor's Advanced Encryption Standard (AES) feature. The options are **Enabled** and Disabled.

Hardware Prefetcher (Available when supported by the CPU)

If set to Enabled, the hardware pre fetcher will pre fetch streams of data and instructions from the main memory to the L2 cache in the forward or backward manner to improve CPU performance. The options are Disabled and **Enabled**.

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

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

DCU Streamer Prefetcher

This feature enables prefetch of the next L1 data line based on multiple loads in the same cache line. The options are **Enabled** and Disabled.

DCU IP Prefetcher

Set this feature to Enabled to activate the L1 Data Prefetcher based on sequential load history. The options are **Enabled** and Disabled.

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

Select Enabled to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled. **Note**: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

▶CPU Power Management Configuration

Power Technology

This feature determines what power-saving scheme the motherboard uses. The options are Disabled, **Energy Efficient** and Custom. If Custom is selected, the following options become available:

EIST

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. **Please refer to Intel's web site for detailed information.** The options are Disabled and Enabled.

Turbo Mode

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

CPU C3 Report, CPU C6, Report, CPU C7 Report

This BIOS feature enables or disables C3 (ACPI C2), C6 (ACPI C3) and C7 (ACPI C3) reporting to the operating system. The options are Disabled and Enabled. The default for C3 is **Disabled**. The default for C6 and C7 is **Enabled**.

Package C State Limit

If set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are C0, C2, **C6**, and No Limit.

Long duration power limit - this is the processor power consumption limit (in Watts) during a long duration time window.

Long duration maintained - this is the time in milliseconds where the Long Duration Power Limit is maintained.

Short duration power limit - During Turbo Mode, the system may exceed the processor's default power setting and exceed the Short Duration Power limit. By increasing this value, the processor can provide better performance for a short duration.

▶Chipset Configuration

WARNING: Setting the wrong values in the following sections may cause the system to malfunction.

▶North Bridge Configuration

This item displays the current IO chipset Revision.

▶Integrated IO Configuration

Intel® VT-d

Select Enabled to enable Intel's Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The settings 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 resources for more other tasks. The options are Disabled and **Enabled**.

DCA Support

This feature accelerates the performance of I/O devices using Direct Cache Access. The options are **Enabled** and Disabled.

IOU1-PCIe Port

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

Port 1A Link Speed

This feature enables the user to select the target link speed for this slot. The options are GEN1 , **GEN2**, and GEN3.

IOU2 - PCIe Port

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

IOU3 - PCIe Port

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

▶DIMM Configuration

Memory Configuration

This section displays memory status such as Current Memory Mode, Memory Speed, Mirroring and Sparing information.

▶DIMM Information

This feature displays information regarding the installed memory.

Memory Mode

The only option is **Independent**, a feature that allows for all DIMMs to be available to the operating system.

DRAM RAPL Mode

RAPL which stands for Running Average Power Limit is a feature that provides mechanisms to enforce power consumption limits on supported processors The options are DRAM RAPL MODE0 , **DRAM RAPL MODE1**, and Disabled.

DDR Speed

Use this option to force the system memory to run at a different frequency than the default frequency. The available options are **Auto**, Force DDR-800, Force DDR-1066, Force DDR-1333, Force DDR3-1600 and Force SPD.

Channel Interleaving

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

Rank Interleaving

This feature selects from the different rank memory interleaving methods. 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 North Bridge 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 North Bridge 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

This feature enables Data Scrambling. The options are **Enabled** and Disabled.

Device Tagging

This feature enables Device Tagging. The options are Enabled and **Disabled**.

Thermal Throttling

This feature selects from the different throttling methods. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

▶South Bridge Configuration

This item displays the current South Bridge Revision.

All USB Devices

This feature enables all USB ports/devices. The options are **Enabled** and Disabled. When set to enabled, EHCI Controller 1 and 2 (below) become available.

EHCI Controller 1 / EHCI Controller 2

This feature enables the Enhanced Host Controller Interface (EHCI). The options are **Enabled** and Disabled.

Legacy USB Support

This feature enables support for legacy USB devices. Select Auto to disable legacy support if USB devices are not present. Select Disable to have USB devices available only for EFI applications. The options are **Enabled,** Disabled and Auto.

Port 60/64 Emulation

This feature enables I/O port 60h/64h emulation support. This should be enabled for complete USB keyboard legacy support for non-USB aware Operating Systems. The options are **Enabled,** and Disabled.

EHCI Hand-Off

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

▶SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA Devices and displays the following items:

SATA Port0~Port5

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

SATA Mode

This item selects the mode for the installed drives. 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 Controller 0~1

This feature is used to activate/deactivate the SATA controller, and sets the compatibility mode. The options are Enhanced and **Compatible.** The default of Serial-ATA Controller 0 is **Compatible**. The default of Serial-ATA Controller 1 is **Enhanced**.

AHCI Mode

The following items are displayed when AHCI Mode is selected:

Aggressive Link Power Management

This feature Enables or Disables Aggressive Link Power Management support for Cougar Point B0 stepping and later. The options are **Enabled** and Disabled.

Port 0~5 Hot Plug

Set this item to Enabled to enable hot-plugging for the particular port. The options are **Enabled** and Disabled.

Staggered Spin Up

Set this item to Enabled to enable Staggered Spin-up support. The options are Enabled and **Disabled**.

RAID Mode

The following items are displayed when RAID Mode is selected:

Port 0~5 Hot Plug

Set this item to Enabled to enable hot-plugging for the particular port. The options are Enabled and **Disabled**.

▶SCU Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SAS SCU devices and displays the following items:

Storage Controller Unit (SCU)

Set this item to Enabled to activate the chipset's SCU devices. The options are **Enabled** and Disabled.

OnChip SCU Option ROM

Set this item to Enabled to activate the onboard SAS option ROM. The options are **Enabled** and Disabled.

▶PCIe/PCI/PnP Configuration

This feature allows the user to set the PCI/PnP configurations for the following items:

PCI ROM Priority

In case of multiple Option ROMs (Legacy and EFI-compatible), this feature specifies what ROM to launch. The options are **Legacy ROM** and EFI Compatible ROM.

PCI Latency Timer

This feature sets 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 PCI Bus Clocks, **64 PCI Bus Clocks**, 96 PCI Bus Clocks, 128 PCI Bus Clocks, 160 PCI Bus Clocks, 192 PCI Bus Clocks, 224 PCI Bus Clocks and 248 PCI Bus Clocks.

Above 4G Decoding

Set this item to Enabled to activate 64-bit capable devices to be decoded above the 4G address space. This works only if the system supports 64-bit PCI decoding. The options are Enabled and **Disabled**.

PERR# Generation

Set this item to Enabled to allow PCI devices to generate PERR# error codes. The options are Enabled and **Disabled**.

SERR# Generation

Set this item to Enabled to allow PCI devices to generate SERR# error codes. The options are Enabled and **Disabled**.

Maximum Payload

This feature selects the setting for the PCIE maximum payload size. The options are **Auto,** 128 Bytes**, and** 256 Bytes.

Maximum Read Request

This feature selects the setting for the PCIE maximum Read Request size. The options are **Auto,** 128 Bytes**,** 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes**.**

ASPM Support

Set this item to the desired ASPM (Active State Power Management) level. The options are **Disabled,** Auto and Force L0s.

SXB1 PCI-E 3.0 x16/x8 OPROM,
SXB2 PCI-E 3.0 x16/x8 OPROM,
CPU1 SLOT 3 PCI-E 3.0 x8 OPROM

Use this feature to enable or disable PCI-E slot Option ROMs. The options are Disabled and **Enabled.**

Onboard LAN Option ROM Select

This feature selects whether to load the iSCSI or PXE onboard LAN option ROM. The options are iSCSI and **PXE**.

Load Onboard LAN1 Option ROM / Load Onboard LAN2 Option ROM

This feature is to enable or disable the onboard option ROMs. The **d**efault for LAN 1 is **Enabled**. The default for LAN 2 is **Disabled**.

Load Onboard SAS Option ROM

This feature selects whether to load the SAS option ROM. The options **Enabled** and Disabled.

VGA Priority

This option allows the user to specify which graphics controller to be used as the primary boot device. The options are **Onboard** and Offboard.

▶Super IO Device Configuration

▶Serial Port 1 Configuration

Serial Port

Select Enabled to enable the onboard serial port. The options are **Enabled** and Disabled.

Change Settings

This option specifies the base I/O port address and the Interrupt Request address of the serial port. The options for Serial Port 1 are listed below.

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;

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 2 Configuration

Serial Port

Select Enabled to enable the onboard serial port. The options are **Enabled** and Disabled.

Change Settings

This option specifies the base I/O port address and the Interrupt Request address of the serial port. The options for Serial Port 2 are listed below.

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;

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 2 Attribute

This feature allows the user to set the serial port mode for Console Redirection. The options are **SOL** and COM.

▶Serial Port Console Redirection

These submenus allow the user to configure Console Redirection settings.

COM 1/SOL

Console Redirection

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

▶Console Redirection Settings

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

Terminal Type

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

Bits Per Second

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 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 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 mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty Keypad

Use this feature to select function key and keypad setting on Putty. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

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

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

Console Redirection

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

▶Console Redirection Settings

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

Out-of-Band-Mgmt Port

Use this feature to select the port for out-of-band management. The options are **COM1** and SOL.

Terminal Type

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

Bits Per Second

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

Flow Control

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

▶ACPI Configuration

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

ACPI Sleep State

This setting allows you to configure the ACPI (Advanced Configuration and Power Interface) sleep state for your system when it is in the Suspend mode. The options are Suspend Disabled, **S1 (CPU Stop Clock)**.

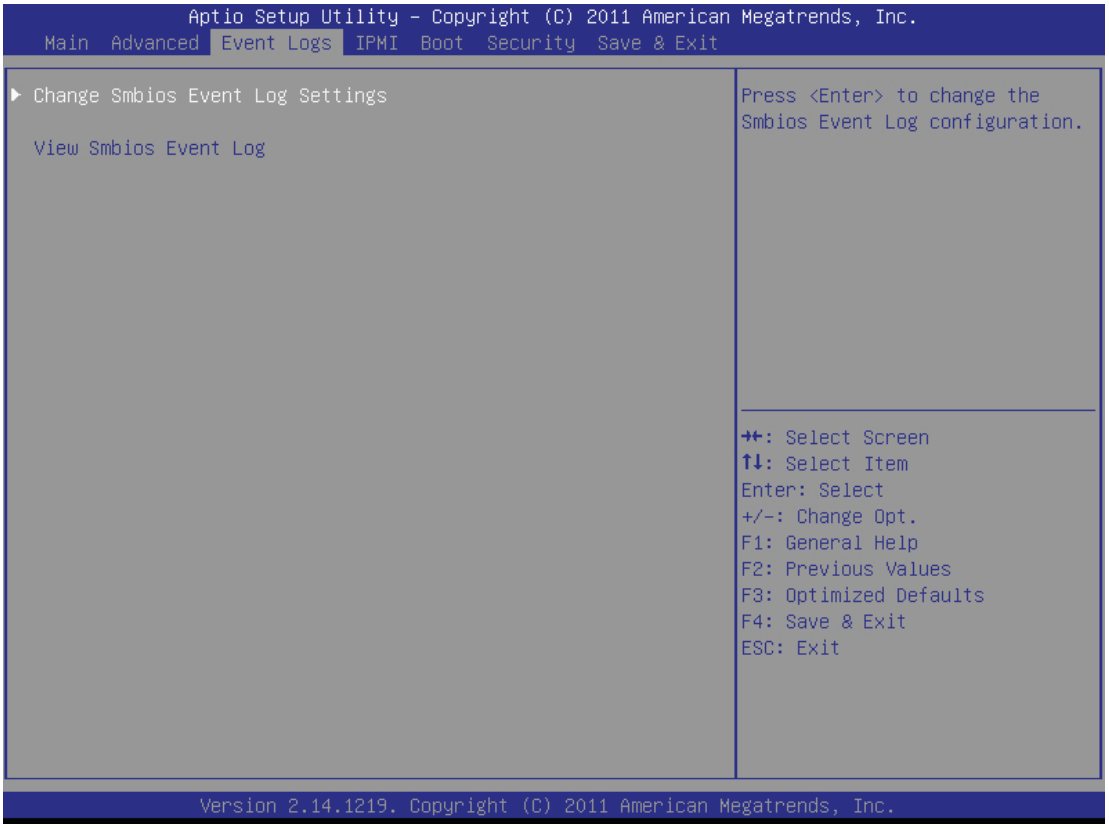
High Precision Event Timers

Select Enabled to activate the High Performance Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC 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 Subsystem

This item displays the ME Subsystem information.

7-4 Event Logs



▶Change SmBIOS Event Log Settings

Smbios Event Log

Change this item to enable or disable all features of the Smbios Event Logging during boot. The options are **Enabled** and Disabled.

Runtime Error Logging Support

Change this item to enable or disable runtime error logging. The options are **Enabled** and Disabled.

Memory Correction Error Threshold

Change this item to define the system's memory correction error threshold. Directly enter a numeric value, **default is 10**.

PCI Error Logging Support

Change this item to enable or disable runtime error logging. The options are Enabled and **Disabled**.

Erase Event Log

This option erases all logged events. The options are **No**, Yes, Next reset and Yes, Every reset.

When Log is Full

This option automatically clears the Event Log memory of all messages when it is full. The options are **Do Nothing** and Erase Immediately.

Log System Boot Event

This option toggles the System Boot Event logging to enabled or disabled. The options are **Disabled** and Enabled.

MECI

The Multiple Event Count Increment (MECI) counter counts the number of times a duplicate event must happen before the MECI counter is incremented. This is a numeric value. The default value is **1**.

METW

The Multiple Event Time Window (METW) defines number of minutes must pass between duplicate log events before MECI is incremented. This is in minutes, from 0 to 99. The default value is **60**.

View SmBIOS Event Log

This feature displays the contents of the SmBIOS Event Log..

7-5 IPMI Settings

Intelligent Platform Management Interface (IPMI) is a set of common interfaces that IT administrators can use to monitor system health and to manage the system as a whole. For more information on the IPMI specifications, please visit Intel's website at www.intel.com.

▶System Event Log

This feature is used to change the System Event Log (SEL) configuration.

SEL Components - Change this item to enable or disable all features of System Event Logging. The options are **Enabled** and Disabled. When Enabled, the following can be configured:

Erase SEL - This option erases all logged SEL events. The options are **No**, Yes, On Next reset and Yes, On Every reset.

When SEL Full

This option automatically clears the System Event Log memory of all messages when it is full. The options are **Do Nothing** and Erase Immediately.

Log EFI Status Codes

This option enables or disables the logging of Extensible Firmware Interface (EFI) status codes. The options are **Enabled** and Disabled.

▶BMC Network Configuration

Set this feature to configure the IPMI LAN adapter with a network address.

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 allowed to configure the IPMI settings at next system boot.

Configuration Source

This feature selects whether the IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server (Dynamic Host and Configuration Protocol) "Dynamic" or manually entered by the user "Static". When Dynamic is selected, all the options below are automatically assigned to the system by itself or by an external DHCP server. If Static is selected, the IP Address, Subnet Mask and Gateway Address must be manually entered below. The options are Static and **DHCP**.

Station IP Address - Enter the IP address for this machine. This should be in decimal and in dotted quad form (i.e., 192.168.10.253). The value of each three-digit number separated by dots should not exceed 255.

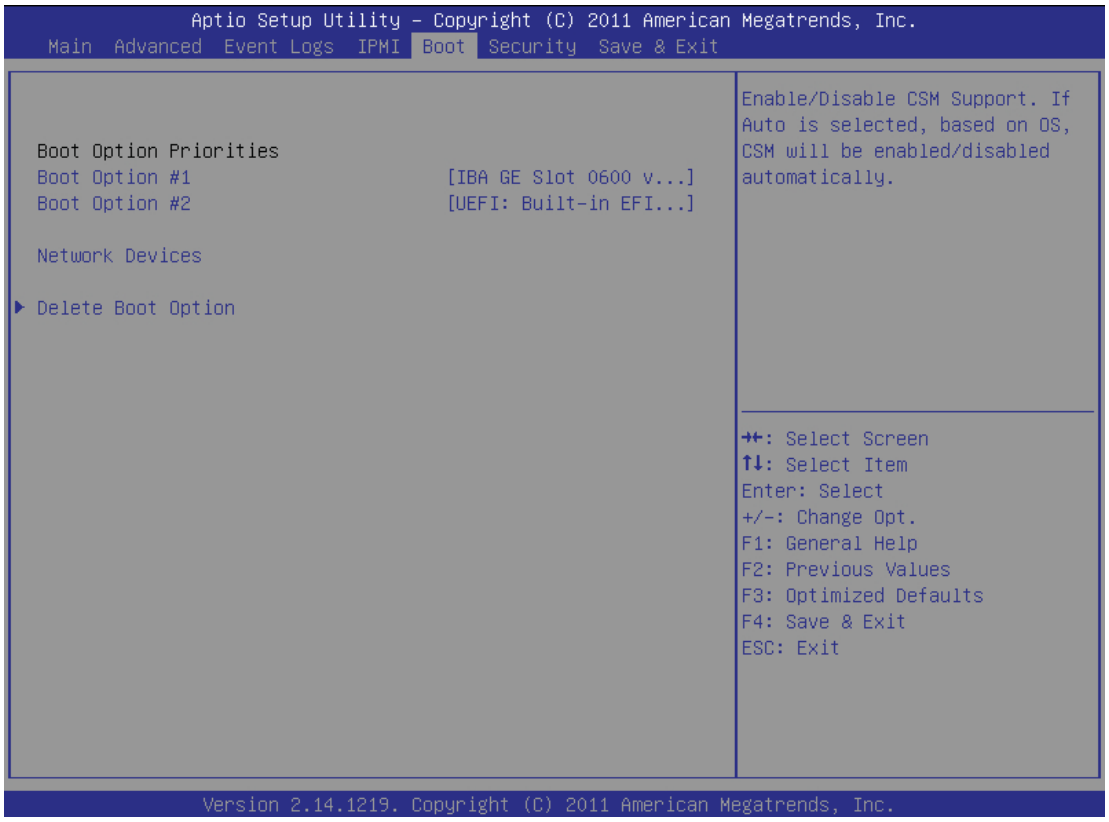
Subnet Mask - Subnet masks tell the network which subnet this machine belongs to. The value of each three-digit number separated by dots should not exceed 255.

Station MAC Address - MAC addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots (i.e., 00.30.48.D0.D4.60).

Gateway IP Address - Enter the Gateway or Router address (i.e., 192.168.10.1).

7-6 Boot Settings

Use this feature to configure Boot Settings:



Boot Options Priorities

This feature allows the user to specify which devices are boot devices and the order of priority from which the systems boots during startup.

Boot Option #1, Boot option #2, etc.

The settings are [**any detected boot device**] and Disabled.

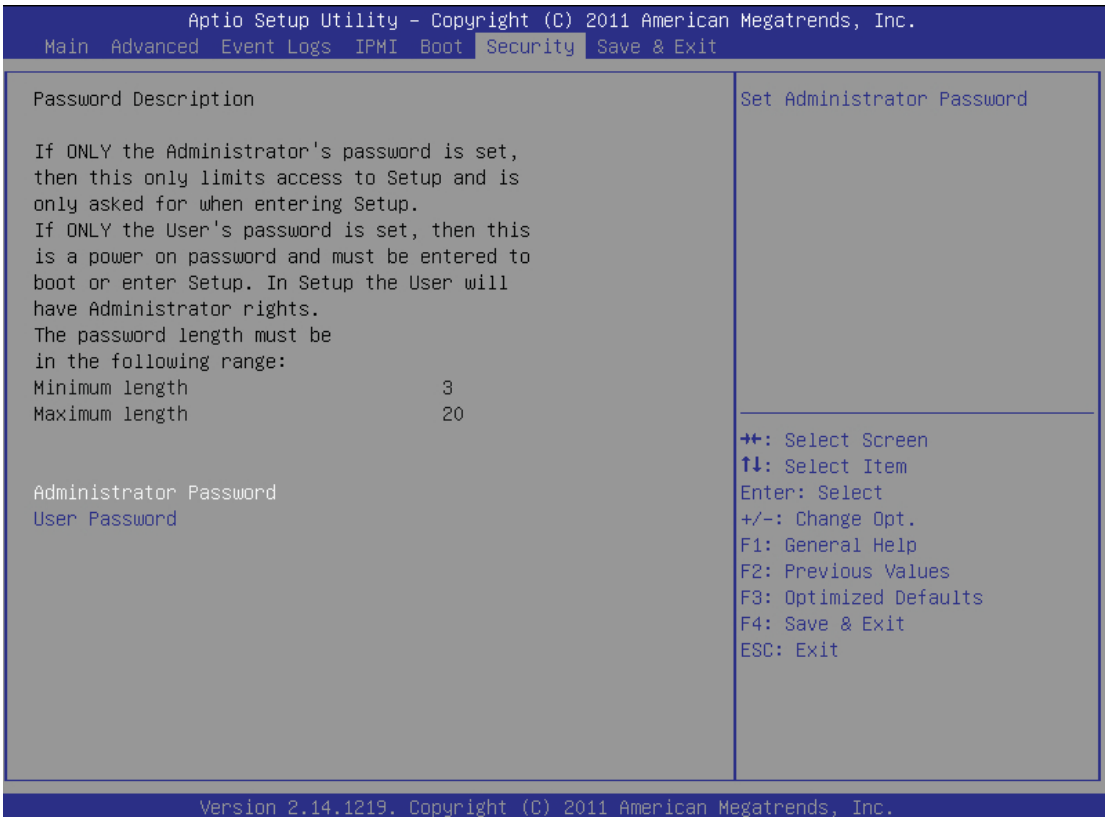
Network Devices

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

▶Delete Boot Option

This feature allows the user to delete a previously defined boot device from which the systems boots during startup. The settings are [any pre defined boot device]

7-7 Security Settings



- If the Administrator password is defined ONLY - this controls access to the BIOS setup ONLY.
- If the User's password is defined ONLY - this password will need to be entered during each system startup or boot, and will also have Administrator rights in the setup.
- Passwords must be at least 3 and up to 20 characters long.

Administrator Password

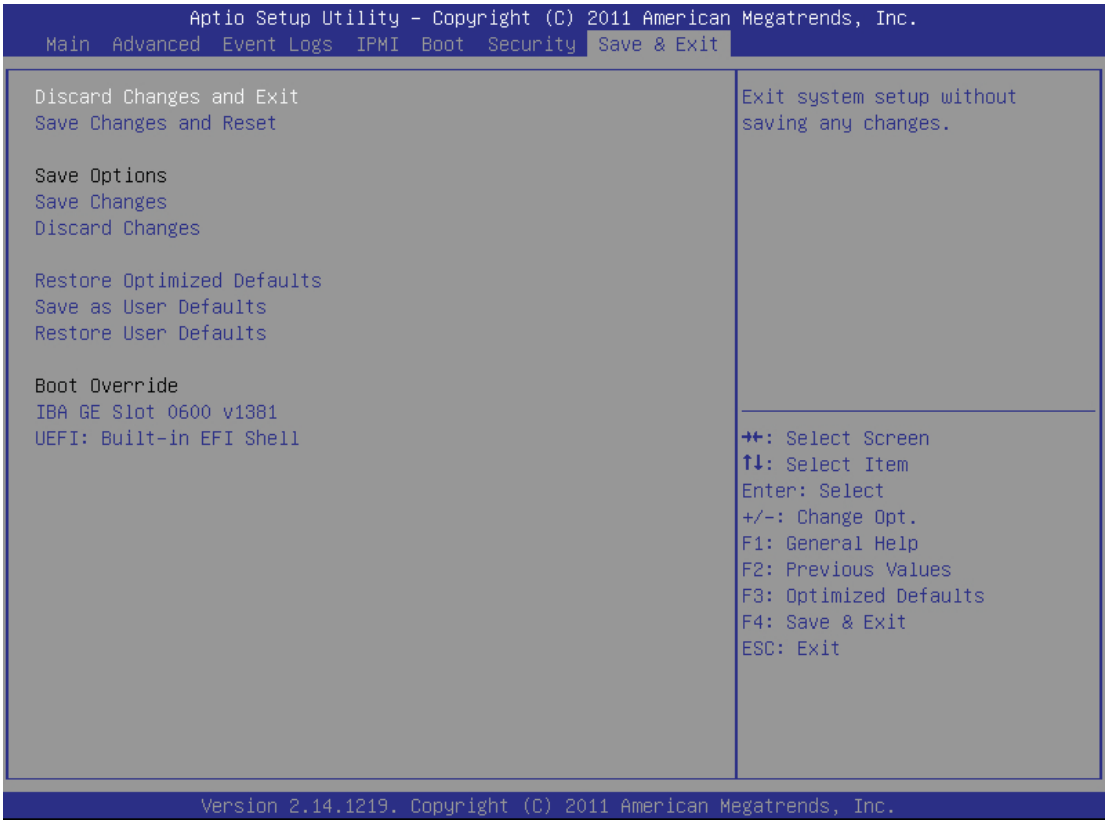
Press Enter to create a new, or change an existing Administrator password.

User Password:

Press Enter to create a new, or change an existing User password.

7-8 Save & Exit

Select the Exit tab from the BIOS Setup Utility screen to enter the Exit BIOS Setup screen.



Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Save Changes and Reset

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

Save Changes

When you have completed the system configuration changes, select this option to save any changes made. This will not reset (reboot) the system.

Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

Restore Optimized Defaults

To set this feature, select Restore Defaults from the Exit menu and press <Enter>. These are factory settings designed for maximum system stability, but not for maximum performance.

Save As User Defaults

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables the user to save any changes to the BIOS setup for future use.

Restore User Defaults

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined settings that were saved previously.

Boot Override

Listed on this section are other boot options for the system (i.e., Built-in EFI shell). Select an option and press <Enter>. Your system will boot to the selected boot option.

Appendix A

BIOS POST Error 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 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.

BIOS POST Error Codes

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

Notes

Appendix B

System Specifications

Processors

Two Intel Xeon E5-2600 series processors

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

Chipset

Intel C602

BIOS

32 Mb AMIBIOS® SPI Flash ROM

Memory Capacity

Eight DIMM sockets supporting up to 256 GB of registered ECC DDR3-1600/1333/1066/800 MHz RDIMMs or 64 GB of DDR3, unbuffered non-ECC UDIMMs up to 1600 MHz

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

GPUs (Graphics Processing Units)

A total of two GPUs are supported (true PCI-E 3.0 x16 signal)

SATA Controller

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

Drive Bays

Three 3.5" hot-swap drive bays to house SATA drives

Expansion Slots

One PCI-E 3.0 card with the use of riser card

Serverboard

X9SRG-F (proprietary ATX form factor)

Dimensions: 7.71" x 16.64" (196 x 423 mm)

Chassis

SC818G-1K43B (1U rackmount)

Dimensions: (WxHxD) 17.2 x 1.7 x 28.2 in. (437 x 43 x 716 mm)

Weight

Gross (Bare Bone): 47 lbs. (21.4 kg.)

System Cooling

Four sets of 4-cm counter-rotating cooling fans (fan speed controlled by BIOS setting)

System Input Requirements

AC Input Voltage: 180-240 VAC

Rated Input Current: 7.2A (180V) to 9.5 (240V)

Rated Input Frequency: 50-60 Hz

Power Supply

Rated Output Power: 1400W w/PFC (Part# PWS-1K41F-1R)

Rated Output Voltages: +12V (117A), +5Vsb (6A)

Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)

Non-Operating Temperature: -40º to 70º C (-40º to 158º F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-Operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

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

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

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

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

(continued from front)

Notes