bullx

R422-E2/R422-INF-E2

Installation and User's Guide

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Hardware

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the bullx R422-E2/R422-INF-E2. Installation and maintenance should be performed by experienced technicians only.

The bullx R422-E2/R422-INF-E2 is a 1U Twin (two serverboards in a 1U chassis) rackmount server chassis and two R422-E2/R422-INF-E2 serverboards. The R422-E2/R422-INF-E2 serverboards supports Intel® 5500 Series Processor platform.

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 bullx R422-E2/R422-INF-E2 serverboard and the bullx R422-E2/R422-INF-E2 chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the bullx R422-E2/R422-INF-E2 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 bullx R422-E2/R422-INF-E2.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the R422-E2/R422-INF-E2 serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the R422-E2/R422-INF-E2 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS/SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

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

Appendix A: BIOS Error Beep Codes

Appendix B: Intel HostRAID Setup Guidelines

Appendix C: Adaptec HostRAID Setup Guidelines

Appendix D: System Specifications

Notes

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Chapter 1. Introduction

1-1 Overview

The bullx R422-E2/R422-INF-E2 is a "1U Twin" server comprised of the 1U chassis and two (twin) R422-E2/R422-INF-E2 serverboards. Please refer to our web site for information on operating systems that have been certified for use with the bullx R422-E2/R422-INF-E2.

In addition to the serverboard and chassis, various hardware components may have been included with the bullx R422-E2/R422-INF-E2, as listed below.

- Four (4) CPU heatsinks (SNK-P0017)
- SATA Accessories:
  Four (4) SATA hard drive carriers [MCP-220-00001-03(01)]
  One (1) internal SATA backplane (BPN-SAS-808)
  One (1) SATA cable set (CBL-0201L)
- Two (2) PCI-E x16 riser cards (RSC-R1U-E16R)
- Six (6) 4-cm high-performance fans (FAN-0085L)
- Rackmount hardware with screws (CSE-PT51L):
  Two (2) rack rail assemblies
  Six (6) brackets for mounting the rack rails in a rack/telco rack
- One (1) CD containing drivers and utilities

1-2 Serverboard Features

At the heart of the bullx R422-E2/R422-INF-E2 lies two R422-E2/R422-INF-E2 dual processor serverboards, which are based on Intel's 5520 chipset. Below are the main features of the bullx R422-E2/R422-INF-E2 serverboard. Note that the features on each board are doubled for the server.

Processors

Each bullx R422-E2/R422-INF-E2 serverboard supports two Intel® 5500 series (LGA 1366) processors, each processor supporting two full-width Intel QuickPath Interconnect (QPI) links with a total of up to 51.2 GT/s Data Transfer Rate (6.4 GT/s per direction). Please refer to our web site for a complete listing of supported processors (http://www.bull.com).

Chipset

Intel 5520 chipset, including the 5520 (North Bridge) and the ICH10R (South Bridge).

Memory

The bullx R422-E2/R422-INF-E2 serverboard has twelve 240-pin DIMM sockets that can support up to 48 GB of DDR3 registered ECC 1333/1066/800 MHz memory (with maximum of 8 GB per DIMM module) (see Section 5.6 in Chapter 5 for DIMM Module Population Configuration).

Serial ATA

The South Bridge (IOH-36D/ICH10R) of the 5520 chipset includes a Serial ATA controller for 3 Gb/s SATA drives. The hot-swappable SATA drives are connected to a backplane that provides power, bus termination and configuration settings. RAID 0 and 1 are supported.

PCI Expansion Slots

Each bullx R422-E2/R422-INF-E2 serverboard has one PCI-Express 2.0 x16 slot, so two PCI-Express 2.0 x16 slots are provided in the server. In the bullx R422-E2/R422-INF-E2 server configuration, riser cards have been pre-installed to support two low-profile PCI-Express 2.0 x16 add-on cards.

Ethernet Ports

Two Intel® 82563EB network controllers are integrated into each of the serverboards to support a total of four Gigabit LAN ports (100/1000Base-T/1000BaseTX, RJ45 output).

Onboard Controllers/Ports

Onboard I/O backpanel ports include one COM port, a VGA port, two USB ports, two Gigabit LAN (NIC) ports and (on the bullx R422-INF-E2 only) an InfiniBand® (MT25204 controller) 20 Gbps port. There are two sets of I/O ports included in the server (one set for each severboard).

InfiniBand Port Bracket: The InfiniBand port bracket is a small "U" shaped bracket that secures the connector to the I/O port shield. This allows the I/O shield, not the serverboard, to support the cable's weight. The bracket can be found on the connector itself.

When installing the serverboard, remove the bracket from the InfiniBand port. Slide the port through the shield, and then replace the bracket to secure the port to the I/O shield.

ATI Graphics Controller

The bullx R422-E2/R422-INF-E2 serverboard features an integrated ATI video controller based on the ES1000 graphics chip. The ES1000 was designed specifically for servers, featuring low power consumption, high reliability and superior longevity.

Other Features

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

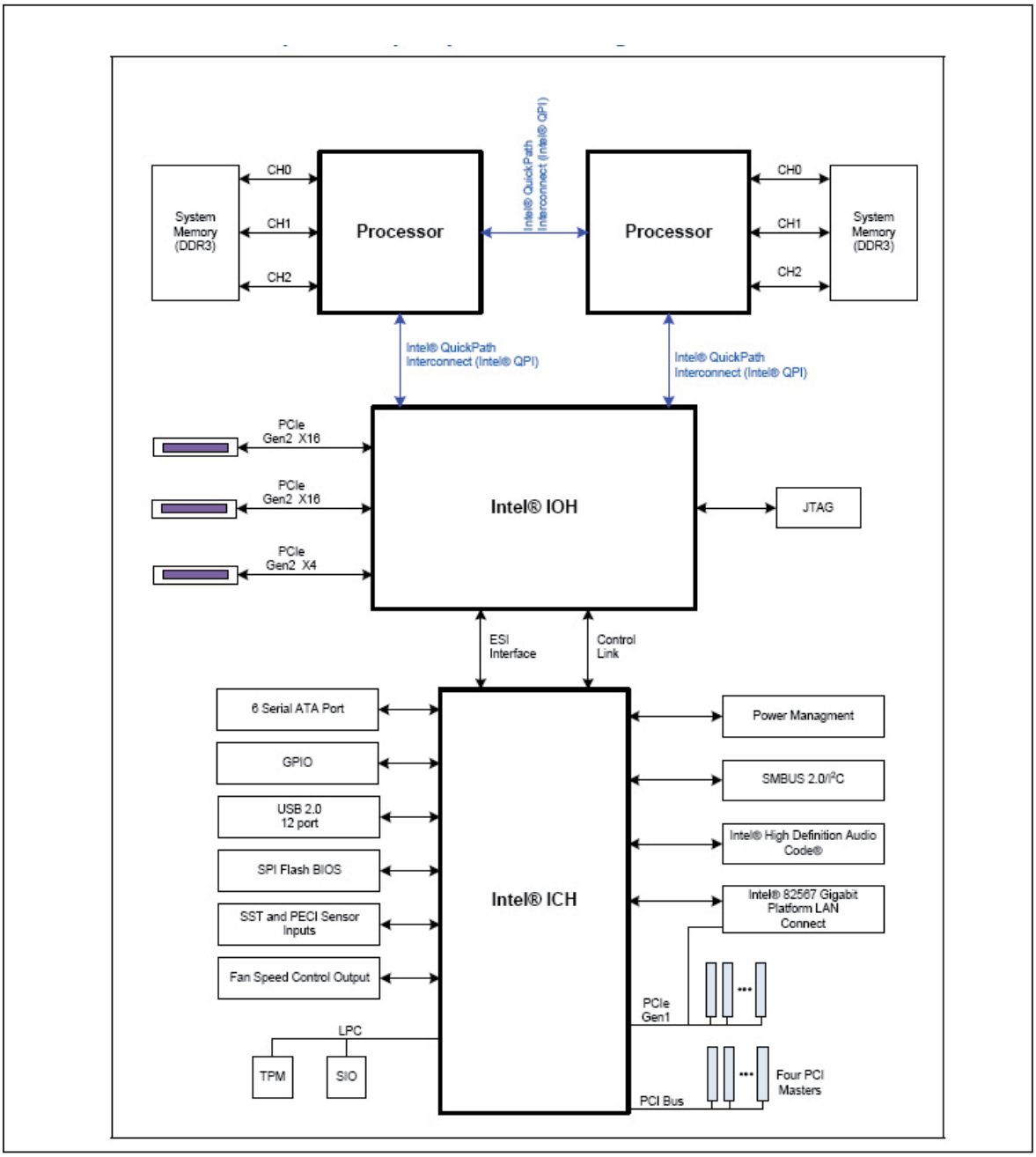


Figure 1-1. Intel 5500 Chipset: System Block Diagram

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

1-3 Server Chassis Features

The following is a general outline of the main features of the 1U chassis. Details on the chassis can be found in Chapter 6.

System Power

The bullx R422-E2 chassis includes a single 980W cold-swap power supply, which provides the power to both serverboards housed in the chassis.

SATA Subsystem

The bullx R422-E2 chassis was designed to support four SATA hard drives, which are hot-swappable units.

Control Panel

The bullx R422-E2 chassis features two independant control panels associated with each serverboard in the chassis. Each control panel has LEDs to indicate power on, network activity, hard disk drive activity and system overheat conditions. Each control panel also includes a main power button and a system reset button.

Rear I/O Panel

The bullx R422-E2 chassis is a 1U rackmount chassis. Its I/O panel provides a slot for two low-profile PCI-E x16 expansion cards, two COM ports, four USB ports, two VGA ports and four Gb Ethernet ports. The bullx R422-INF-E2 also provides two InfiniBand ports. See Chapter 6 for details.

Cooling System

The bullx R422-E2 chassis has an innovative cooling design that features two sets of triple (for a total of six) 4-cm high-performance fans. A fan speed control setting in BIOS allows fan speed to be determined by system temperature.

1-4 1U Twin: System Notes

As a 1U Twin configuration, the bullx R422-E2/R422-INF-E2 is a unique server system. With two system boards incorporated into a single chassis, there are several points you should keep in mind.

System Power

A single power supply is used to provide the power for both serverboards. Each serverboard however, can be shut down independently of the other with the power button on its own control panel.

Although they share a common power supply, the I^2C signals used for power supply monitoring are received by the primary serverboard only. (When viewed from the front of the chassis, the serverboard on the left is referred to as the primary board and the serverboard on the right as the secondary.)

SATA Backplane/Drives

As a system, the bullx R422-E2/R422-INF-E2 supports the use of four SATA drives. The SATA backplane works as a single backplane divided into two sections. This means that while a single power connector is used and functions such as overheating apply to both sections together, each pair of SATA drives is logically connected to its own serverboard. Consequently, RAID setup is limited to a two-drive scheme (RAID cannot be spread across all four drives).

Chapter 2. Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your bullx R422-E2/R422-INF-E2 up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the bullx R422-E2/R422-INF-E2 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 bullx R422-E2/R422-INF-E2. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Be sure to read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the bullx R422-E2/R422-INF-E2 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 (~63 cm/~25 inches).
- Leave approximately 76 cm (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 according to §2 of the the German Ordinance for Work with Visual Display Units.

Rack Precautions

Warnings and Precautions!

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

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

- Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections.

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

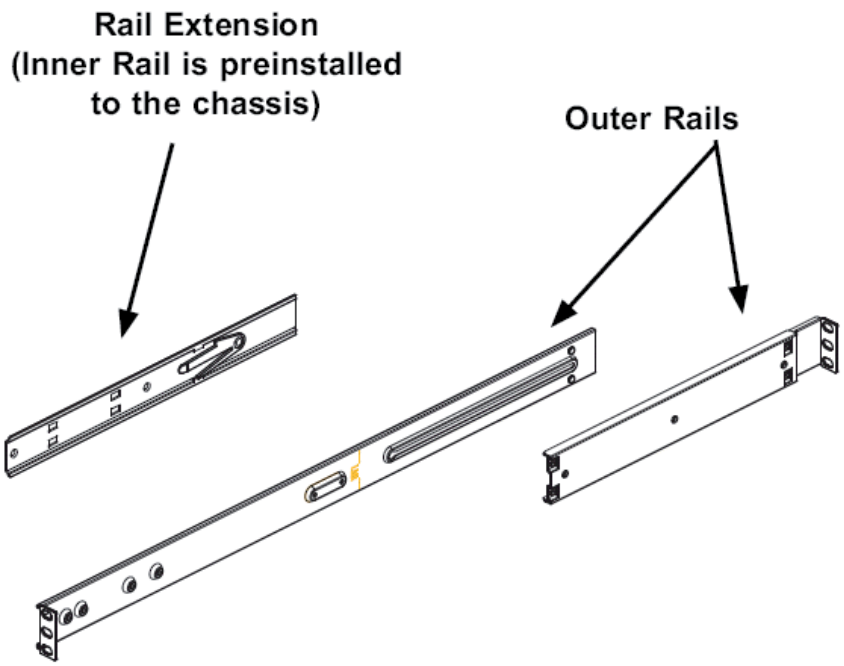
This section provides information on installing the bullx R422-E2/R422-INF-E2 into a rack unit with the rack rails provided. If the system has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

The chassis package includes two rack rail assemblies in the rack mounting kit.

Each assembly consists of two sections: an inner fi xed chassis rail that secures directly to the server chassis and an outer fi xed rack rail that secures directly to the rack itself..

Figure 2-1. Identifying the Sections of the Rack Rails (right side rail shown)



Installing the Inner Rails

Both the left and right side inner rails have been pre-attached to the chassis. Proceed to the next step.

Figure 2-2. Identifying the Sections of the Rack Rails (right side rail shown)

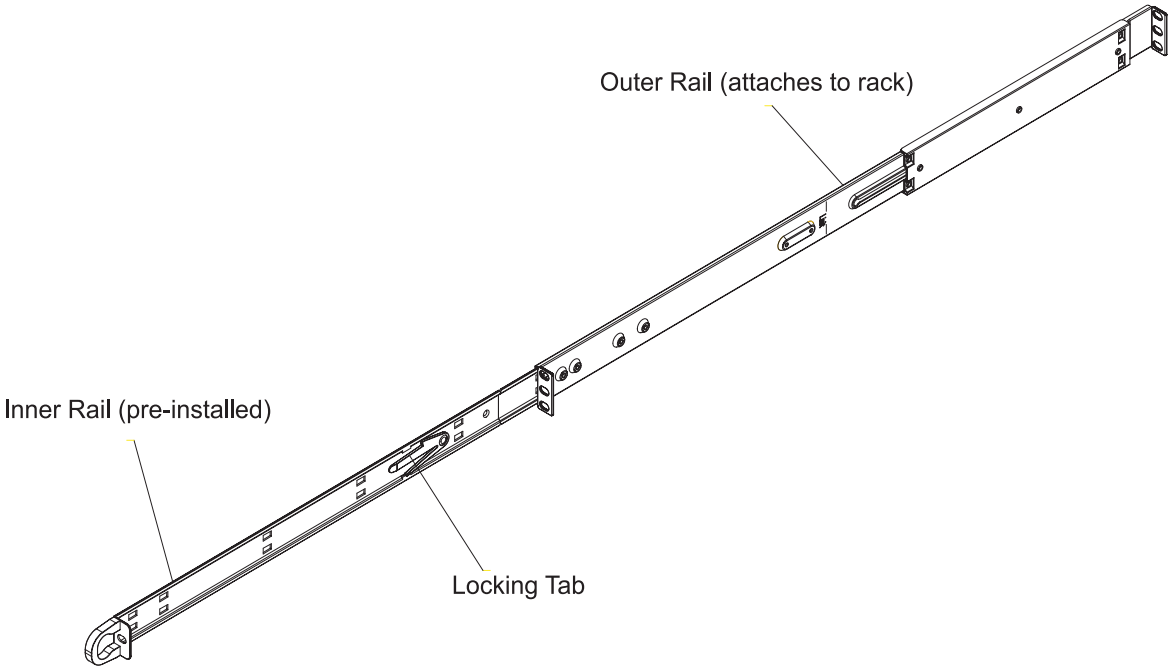
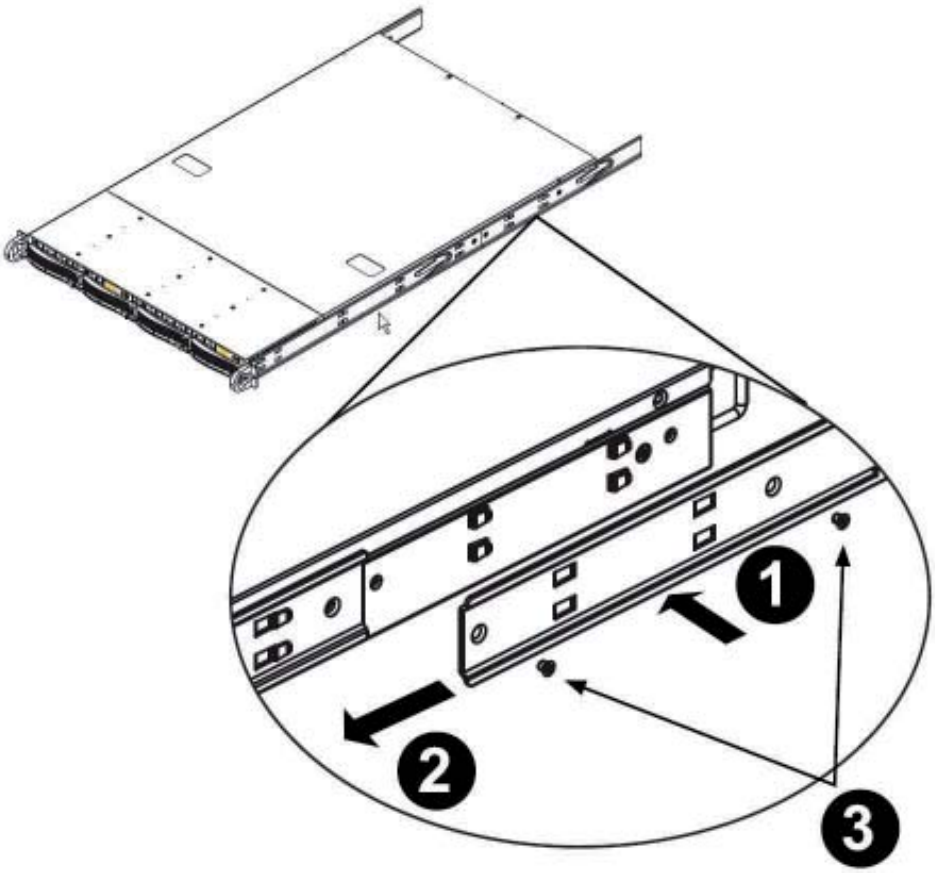


Figure 2-3. Identifying the Sections of the Rack Rails (right side rail shown)



Installing the Inner Rail Extension

The chassis includes a set of inner rails in two sections: inner rails and inner rail extensions. The inner rails are preattached and do not interfere with normal use of the chassis if you decide not to use a server rack. Attach the inner rail extension to stabilize the chassis within the rack.

To install the inner rails:

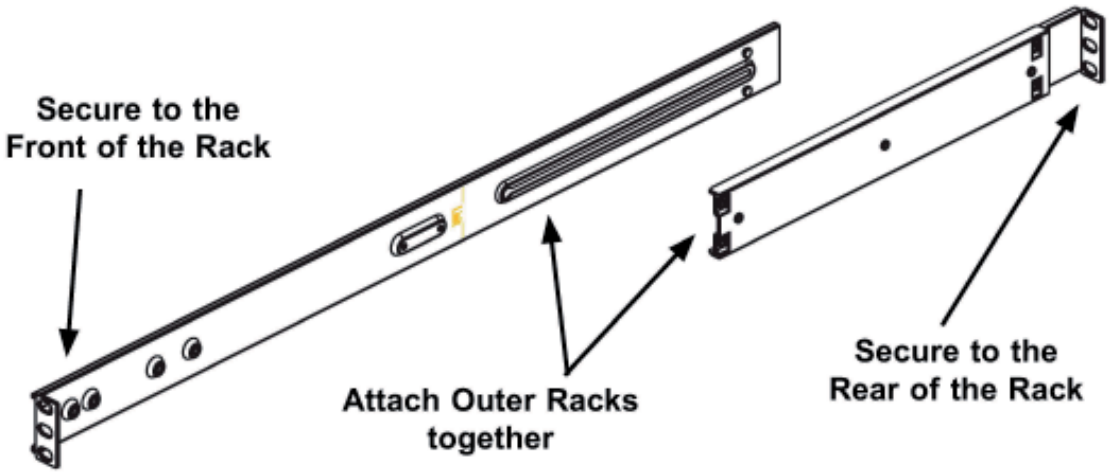
1. Place the inner rack extensions on the side of the chassis aligning the hooks of the chassis with the rail extension holes. Make sure the extension faces "outward" just like the preattached inner rail.

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

3. Secure the chassis with 2 screws as illustrated.

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

Figure 2-4. Assembling the Outer Rails



To install the outer rails of the rack:

1. Attach the short bracket to the outside of the long bracket. You must align the pins with the slides. Also, both bracket ends must face the same direction.

2. Adjust both the short and long brackets to the proper distance so that the rail fi ts snugly into the rack.

3. Secure the long bracket to the front side of the outer rail with two M5 screws- and the short bracket to the rear side of the outer rail with three M5 screws.

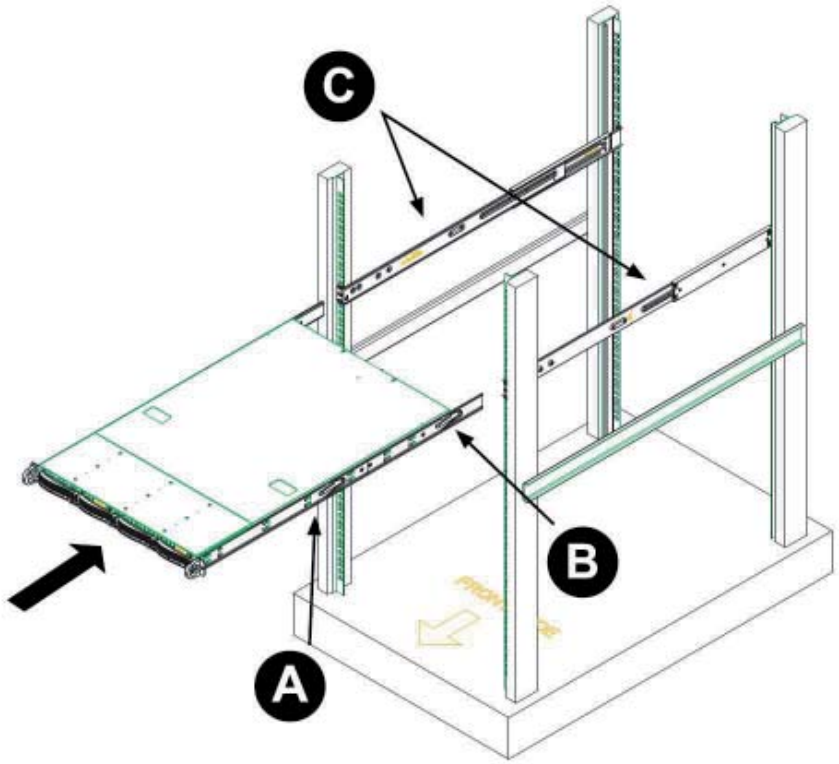
4. Repeat steps 1-3 for the other outer rail.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-5.

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

Figure 2-5. Installing the Server into a Rack



To install the chassis into a rack:

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

2. Line chassis rails (A and B) with the front of the rack rails (C).

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.

2-5 Checking the Serverboard Setup

After you install the bullx R422-E2/R422-INF-E2 in the rack, you will need to open the top cover to make sure the serverboard is properly installed and all the connections have been made.

Accessing the Inside of the System

1. Release the retention screws that secure the system to the rack.

2. Grasp the two handles on either side and pull the system straight out until it locks (you will hear a "click").

3. Remove the four screws (two on the sides and two on the top) that secure the top cover to the chassis. Place your thumbs in the two rectangular recesses and push the cover away from you (toward the rear of the chassis) until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server (see Figure 2-6).

4. To remove the system from the rack completely, depress the locking tabs in the chassis rails (push the right-side tab down and the left-side tab up) to continue to pull the system out past the locked position.

Checking the Components and Setup

1. You may have one or two processors already installed in each of the two serverboards. Each processor needs its own heatsink. See Chapter 5 for instructions on processor and heatsink installation.

2. Your server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

3. You can install two add-on cards to the system. See Chapter 5 for details on installing PCI add-on cards.

4. Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections.

2-6 Preparing to Power On

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

Checking the SATA drives

1. All drives are accessable from the front of the server. The SATA disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

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

Checking the Airflow

1. Airflow is provided by six sets of 4-cm fans (each set of fans consists of two fans that are mounted back to back) and an air shroud. The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat.

2. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

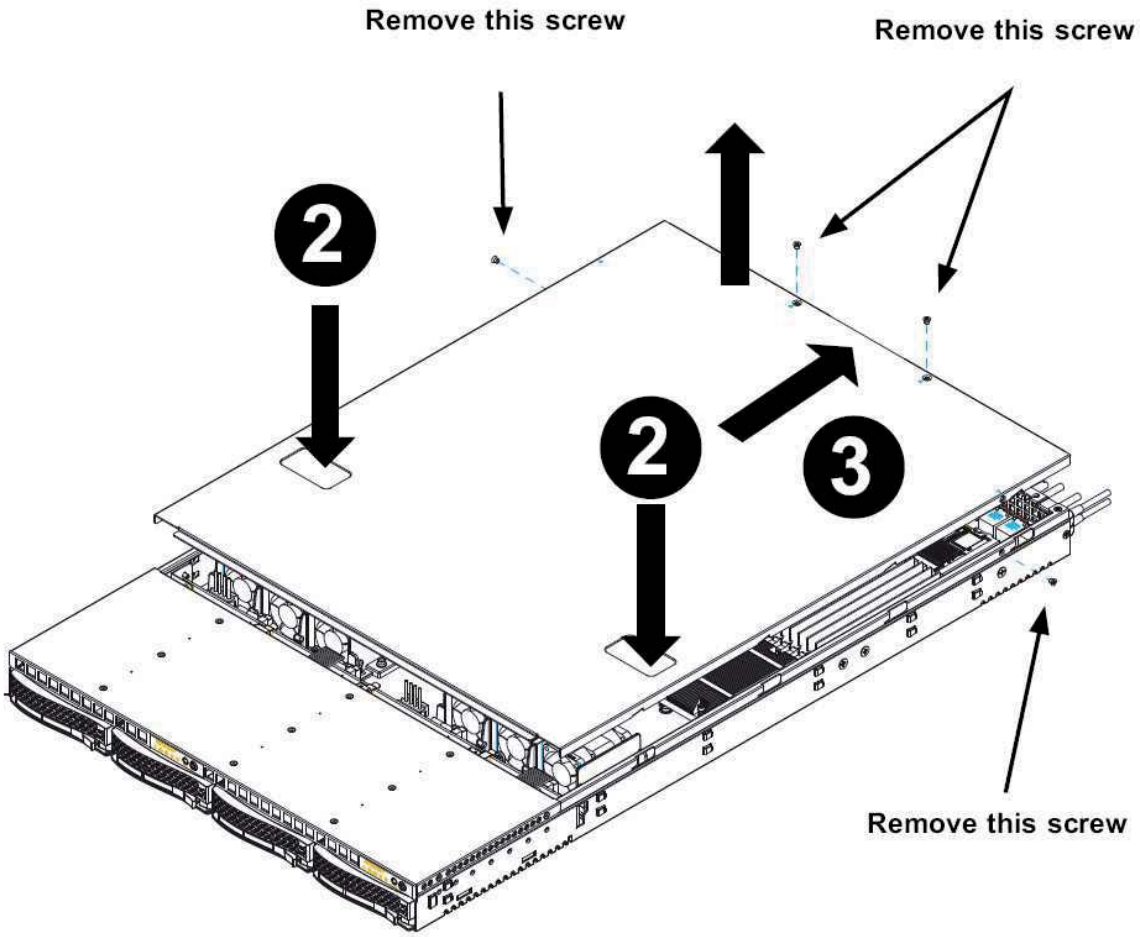
Providing Power

1. Plug the power cords from the power supplies unit into a high-quality power strip that offers protection from electrical noise and power surges.

2. It is recommended that you use an uninterruptible power supply (UPS).

3. Finally, depress the power on button on the front of the chassis.

Figure 2-6. Accessing the Inside of the System



Notes

Chapter 3. System Interface

3-1 Overview

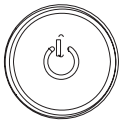
There are several LEDs on the two control panels as well as others on the SATA drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on each control panel. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take. Note that the server has two control panels, one for each serverboard installed in the system. This allows each severboard to be controlled independently of the other.

3-2 Control Panel Buttons

There are two push-buttons located on each control panel: a reset button and a power on/off button.

Reset

Depressing the reset button will reboot only the serverboard it is associated with.



Power

This is the main power button, which is used to apply or turn off the main system power only to the serverboard it is connected to. Depressing this button removes the main power but keeps standby power supplied to the serverboard.

3-3 Control Panel LEDs

Each of the two control panels located on the front of the bullx R422-E2/R422-INF-E2 chassis has five LEDs. Each LED provides you with critical information related its own specific serverboard. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

Overheat/Fan Fail

When this LED flashes, it indicates a fan failure. 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.

NIC2

Indicates network activity on LAN2 when flashing

NIC1

Indicates network activity on LAN1 when flashing.

HDD

Channel activity for the hard disk drives. This light indicates SATA drive activity on the bullx R422-E2/R422-INF-E2 when flashing.

Power

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

3-4 SATA Drive Carrier LEDs

Each SATA drive carrier has two LEDs.

- **Green:** When illuminated, the 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.

- **Red:** The red LED to indicate an SAS/SATA drive failure. If one of the SAS/SATA drive fails, you should be notified by your system management software..

Notes

Chapter 4. System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the bullx R422-E2/R422-INF-E2 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.

- 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. Dispose of used batteries according to the manufacturer's instructions.

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

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the bullx R422-E2/R422-INF-E2 clean and free of clutter.

- The bullx R422-E2/R422-INF-E2 weighs approximately 40 lbs (~18.2 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

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

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

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

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

4-3 ESD Precautions

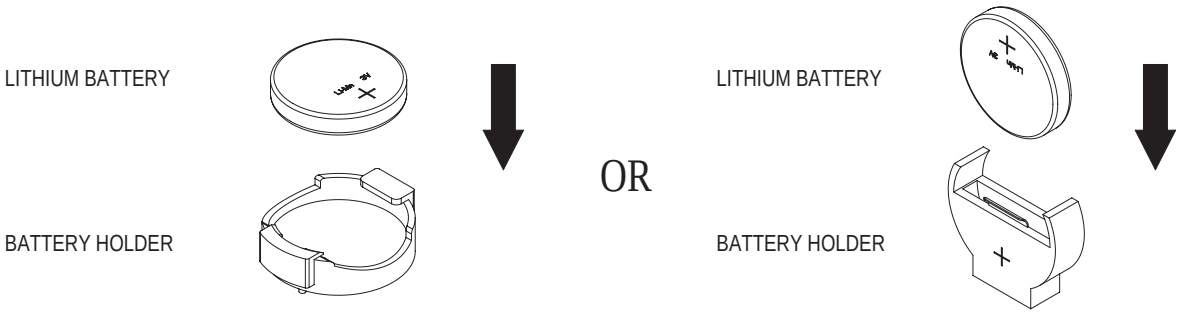
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient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

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the Nova-Scale R422-E2/R422-INF-E2 is operating to assure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Battery model: CR2032 3 Volts or equivalent type (Varta, Sony, Matsushita, Panasonic, FDK).

Chapter 5. Advanced Serverboard Setup

This chapter covers the steps required to install the bullx R422-E2/R422-INF-E2 serverboard into the chassis, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the serverboard to better cool and protect the system.

5-1 Handling the Serverboard

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

Precautions

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

Unpacking

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

5-2 Installing the Serverboard

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

Accessing the Inside of the System

1. Remove all four screws securing the top cover of the chassis: two at the top rear of the cover and one on each side lip, also near the back.

2. Place both thumbs in the indentations and push the cover back until it slides off.

3. Lift the top cover from the chassis to gain full access to the inside of the server. (If already installed in a rack, you must first release the retention screws that secure the unit to the rack, then grasp the two handles on either side and pull the unit straight out until the rails lock into place. See Figure 2-5.)

Check Compatibility of Serverboard Ports and I/O Shield

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

Mounting the Serverboard onto the Serverboard Tray

1. Carefully mount the serverboards by aligning the board holes with the raised metal standoffs that are visible in the chassis.

2. Insert screws into all the mounting holes on your serverboards that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads).

3. Metal screws provide an electrical contact to the serverboard ground to provide a continuous ground for the system.

5-3 Connecting Cables

Now that the serverboards are installed, the next step is to connect the cables to the boards. These include the data cables for the peripherals and control panel and the power cables.

Connecting Data Cables

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

- SATA drive cables (I-SATA0 ~ I-SATA1)
- Control Panel cable (JF1)

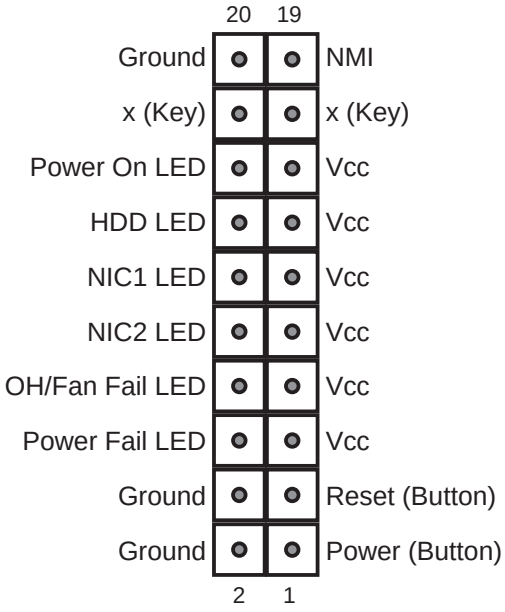
Connecting Power Cables

The bullx R422-E2/R422-INF-E2 serverboard has two 20-pin ATX power supply connectors for connection to the ATX power supply. Only one of these from each board should be connected to the power supply. The "Primary ATX Power Header" is used to supply power to the primary serverboard and the "Secondary ATX Power Header" is used to supply power to the secondary serverboard. Connect the power supply to only one of these on both boards (primary = left, secondary = right when viewed from front of server). See Section 5-9 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators. All JF1 wires have been bundled into a single 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.

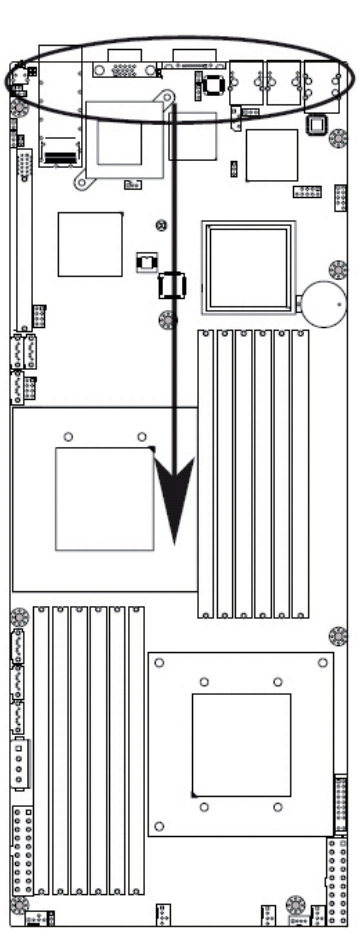
Figure 5-1. Control Panel Header Pins



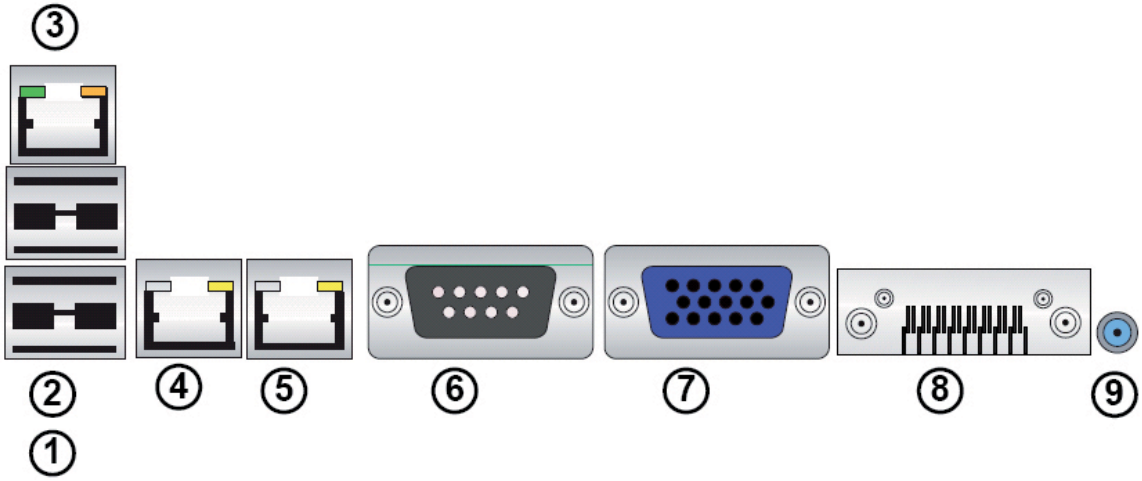
5-4 Control Panel Connectors/IO Ports

The I/O ports are color coded in conformance with the PC 99 specifi cation. See the picture below for the colors and locations of the various I/O ports.

Figure 5-2. Back Panel Connectors/IO Ports



1.	USB 0
2.	USB 1
3	IPMI_dedicated LAN (R422-E2/ R422-INF-E2)
4.	LAN 1
5.	LAN 2
6.	COM Port 1 (Black)
7.	VGA (Blue)
8.	Infiniband (R422-INF-E2)
9.	UID switch



5-5 Installing Processor and Heat Sink

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

Notes:

1. 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.

2. Make sure to install the motherboard into the chassis before you install the CPU heatsink and heatsink fans.

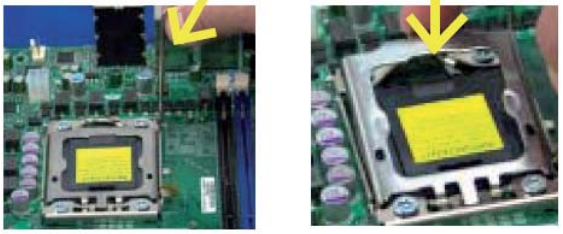
3. When purchasing a 5500 Series processor or when receiving a motherboard with a 5500 Series processor pre-installed, make sure that the CPU plastic cap is in place, and none of the CPU pins are bent; otherwise, contact the retailer immediately.

4. Refer to the MB Features Section for more details on CPU support.

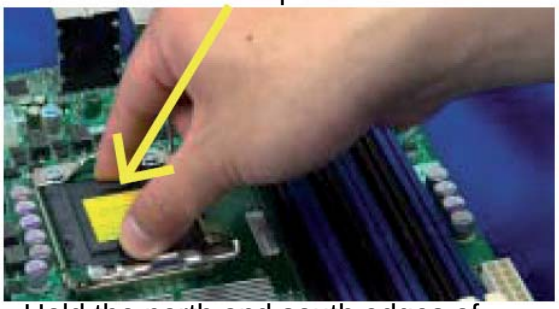
Installing an LGA 1366 Processor

1. Press the socket clip to release the load plate, which covers the CPU socket, from its locking position..

2. Gently lift the socket clip to open the load plate.



3. Hold the plastic cap at its north and south center edges to remove it from the CPU socket.



4. After removing the plastic cap, using your thumb and the index finger , hold the CPU at the north and south center edges.

5. Align the CPU key, the semi-circle cutout, against the socket key, the notch below the gold color dot on the side of the socket.

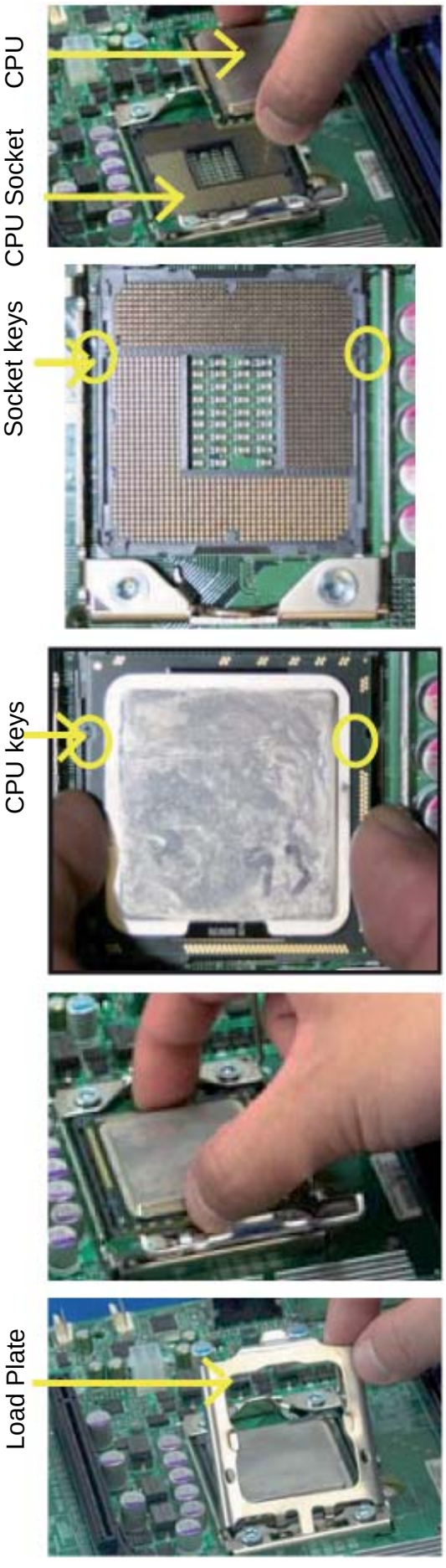
6. Once both the CPU and the socket are aligned, carefully lower the CPU straight down into the socket. (Do not rub the CPU against the surface of the socket or its pins to avoid damaging the CPU or the socket.).

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

8. Once the CPU is securely seated on the socket, lower the CPU load plate to the socket.

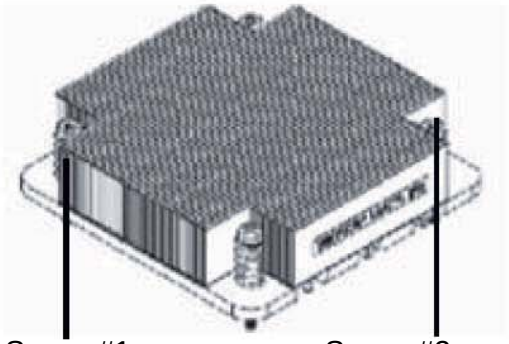
9. Use your thumb to gently push the socket clip down to the clip lock..

Warning: Please save the plastic cap. The motherboard must be shipped with the plastic cap properly installed to protect the CPU socket pins. Shipment without the plastic cap properly installed will cause damage to the socket pins..

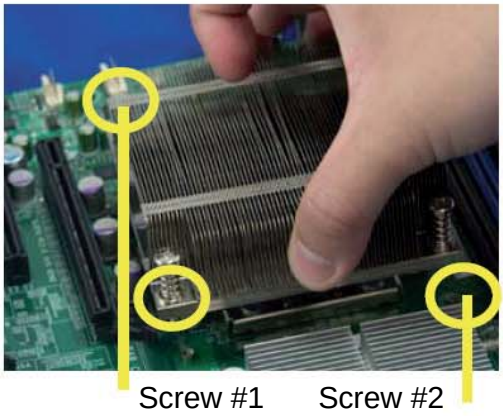


Installing a CPU Heatsink

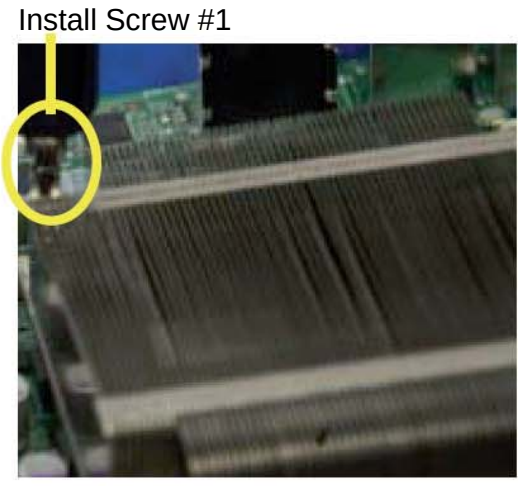
1. Do not apply any thermal grease to the heatsink or the CPU die because the required amount has already been applied.



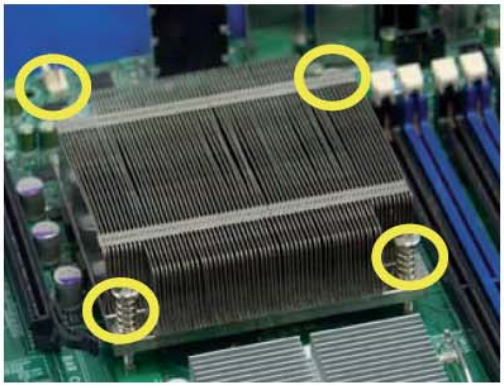
2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the retention mechanism.



3. Install two diagonal screws (ie the #1 and the #2 screws) and tighten them until just snug (-do not fully tighten the screws to avoid possible damage to the CPU.)



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



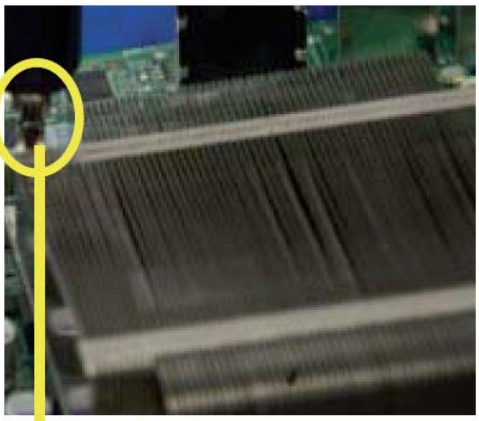
Removing the Heatsink

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

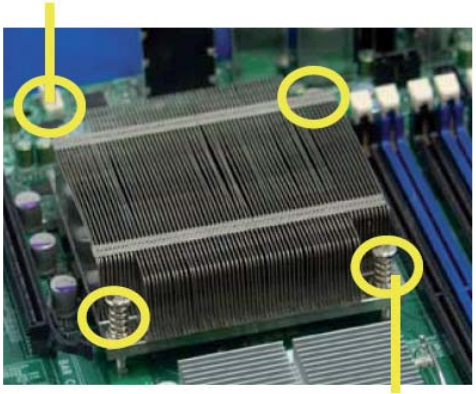
1. Unplug the power cord from the power supply.

2. Disconnect the heatsink fan wires from the CPU fan header.

3. Using a screwdriver, loosen and remove the heatsink screws from the motherboard in the sequence as show in the picture on the right.



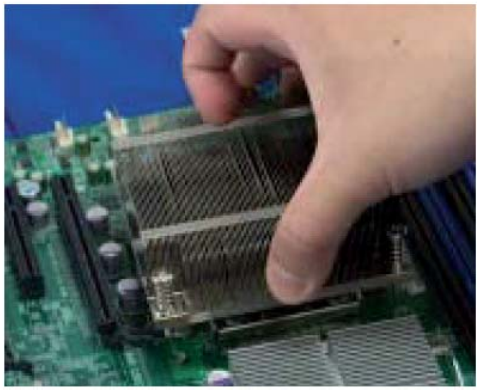
Using a screwdriver to remove Screw #1



Remove Screw #2

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

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



6. To reinstall the CPU and the heatsink, 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 reinstalling them on the motherboard.

5-6 Installing Memory

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Also note that the memory is interleaved to improve performance (See step 1).

Installing a DIMM

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. (See the Memory Installation Table Below.)

2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly.

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

Memory Population for Optimal Performance For a motherboard with One CPU (CPU1) installed						
	Branch 0		Branch 1		Branch 2	
3 DIMMs	P1-DIMM1A		P1-DIMM2A		P1-DIMM3A	
6 DIMMs	P1-DIMM1A	P1-DIMM1B	P1-DIMM2A	P1-DIMM2B	P1-DIMM3A	P1-DIMM3B

Memory Population for Optimal Performance For a motherboard with One CPU (CPU2) installed						
	Branch 0		Branch 1		Branch 2	
3 DIMMs	P2-DIMM1A		P2-DIMM2A		P2-DIMM3A	
6 DIMMs	P2-DIMM1A	P2-DIMM1B	P2-DIMM2A	P2-DIMM2B	P2-DIMM3A	P2-DIMM3B

Memory Population for Optimal Performance For a motherboard with Two CPUs installed												
	CPU1						CPU2					
	Branch 0		Branch 1		Branch 3		Branch 0		Branch 1		Branch 3	
6 DIMMs	1A		2A		3A		1A		2A		3A	
12 DIMMs	1A	1B	2A	2B	3B	3B	1A	1B	2A	2B	3A	3B

Memory Support

The R422-E2/R422-INF-E2 supports up to 48 GB Registered ECC DDR3 1333 MHz/1066 MHz/800 MHz in 12 DIMMs (w/maximum of 4 GB per DIMM). Also, memory speed support is dependent on the type of CPU used on the board.

DIMM Module Population Configuration

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

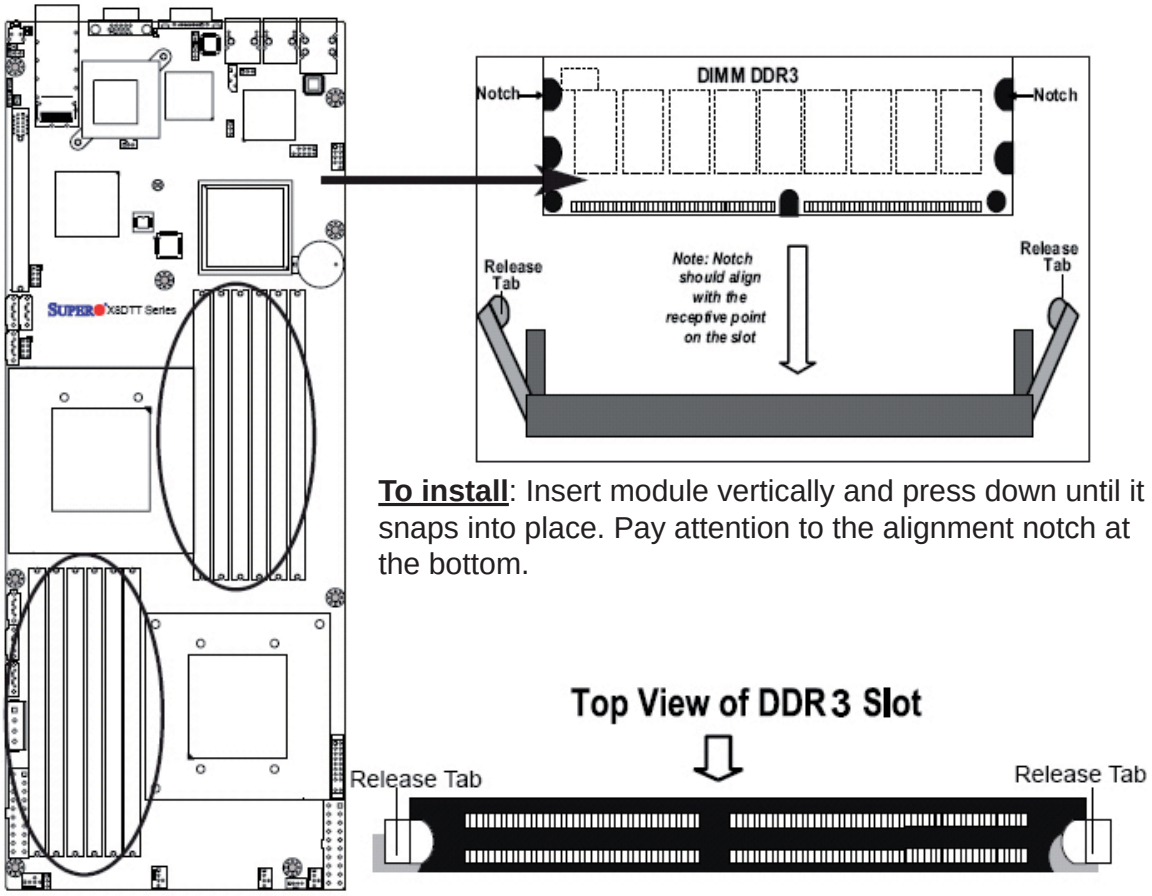
DIMM Population Table				
DIMM Slots per Channel	DIMMS Populated per Channel	DIMM Type Reg.=Registered	Speeds (in MHz)	Ranks per DIMM Any combination: SR=Single Rank, DR=Dual Rank, QR=Quad Rank.
2	1	Reg. DDR3 ECC	800, 1066, 1333	SR or DR
2	1	Reg. DDR3 ECC	800, 1066	QR
2	2	Reg. DDR3 ECC	800, 1066	Mixing SR, DR
2	2	Reg. DDR3 ECC	800	Mixing SR, DR, QR

Note 1: Due to OS limitations, some operating systems may not show more than 4 GB of memory.

Note 2: Due to memory allocation to system devices, the amount of memory that remains available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional.

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

Installing and Removing DIMMs



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

5-7 Adding PCI Cards

PCI-Express 2.0 Slot

The bullx R422-E2/R422-INF-E2 includes two preinstalled riser cards. These riser cards support two low-profile PCI-Express 2.0 (second generation PCI-E) cards to fit inside the chassis.

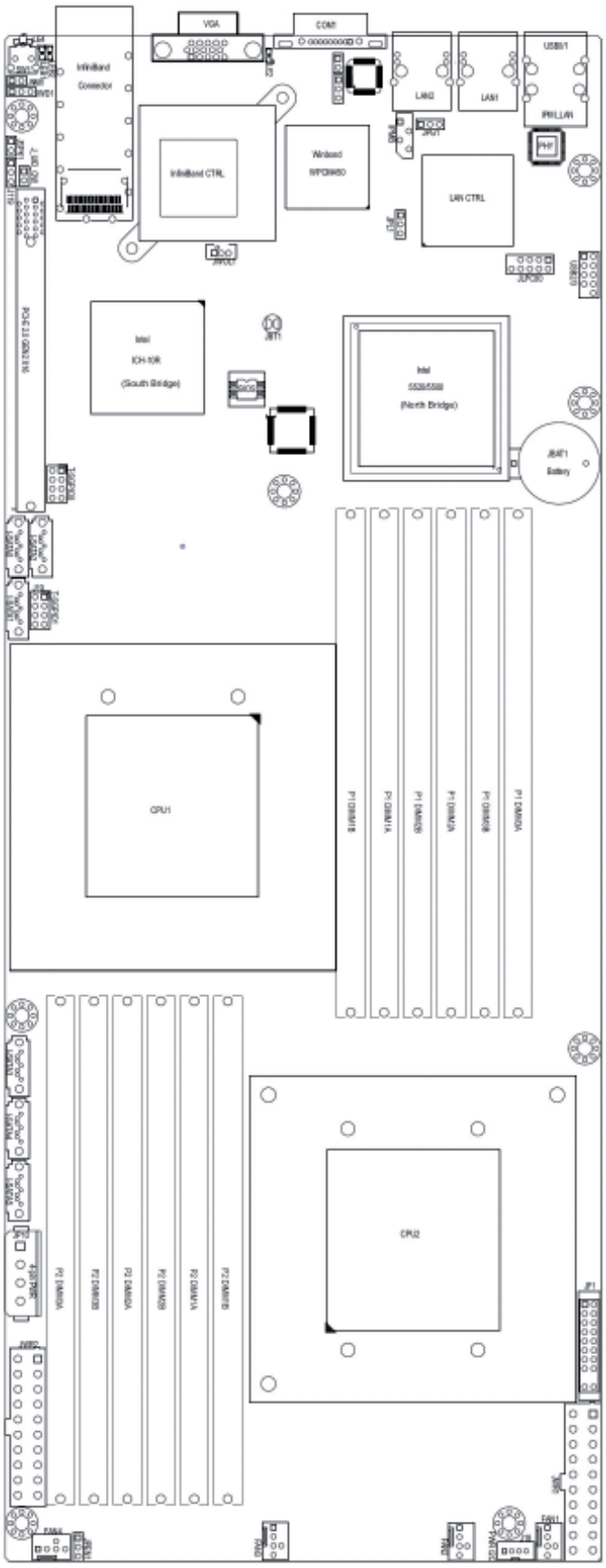
PCI Card Installation

The riser card has already been preinstalled into the serverboard. Perform the following steps to add a PCI add-on card:

1. Remove the PCI slot shield on the chassis by releasing the locking tab.
2. Insert the add-on card into the riser card.
3. Secure the add-on card with the locking tab.

5-8 Serverboard Details

Figure 5-4. bullx R422-E2/R422-INF-E2 Layout



bullx R422-E2/R422-INF-E2 Serverboard Quick Reference

Jumper	Description	Default Setting
JBT1	CMOS Clear	(See page 5-34)
JPEN1	Normal Power Enable*	Pins 1-2 (Enabled)
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPL1	LAN1/2 Enable	Pins 1-2 (Enabled)
J_UID_OW	Red LED OW (Pins 7/8 of JF1) (see page 5-36)	Off (Overwrites)
JWD	Watch Dog	Pins 1-2 (Reset)

* To use Hot-swap support on the 827 chassis, connect a cable to pins 2~3 on JPEN1. Close pins 1~2 of JPEN1 with a cap to use regular PWR setting.

Connector	Description
COM1	COM1 Serial Port
FAN 1-4	System/CPU Fan Headers
InfiniBand	InfiniBand Connector (R422-INF-E2)
IPMB	IPMB Header (for an IPMI Card) (R422-E2/R422-INF-E2)
J119	infiniBand I²C Debug Header (R422-INF-E2)
JF1	Front Panel Connector
JNM1	NMI (Non-Maskable Interrupt) Header
JP10	Onboard 4-pin Power Connector
JPSK1	Internal Speakzer/Buzzer Header
JWR1/JWR2	12V 20-pin Power Connector (see page 5-27)
JWOL1	Wake-On-LAN Header
LAN1/2	Gigabit Ethernet (RJ45) Ports
(IPMI dedicated) LAN	LAN (RJ45) Port for IPMI 2.0 (R422-E2/R422-INF-E2)
SATA0 ~ SATA5	(Intel South Bridge) SATA Ports
SMBus	System Management Bus (SMBus) I²C Header (J18)
SW1	Unit Identifier Switch

T-SGPIO-0/T-SGPIO-1	Serial General Purpose Input/Output Headers
USB0/1	Universal Serial Bus (USB) Ports 0/1, 2/3
VGA	Video Port
LED	**Description**
LE2	Onboard Standby PWR warning LED Indicator

Warning: To avoid possible system overheating, please be sure to provide adequate airflow to your system.

5-9 Back Panel Connector Pin Definitions

Universal Serial Bus (USB)

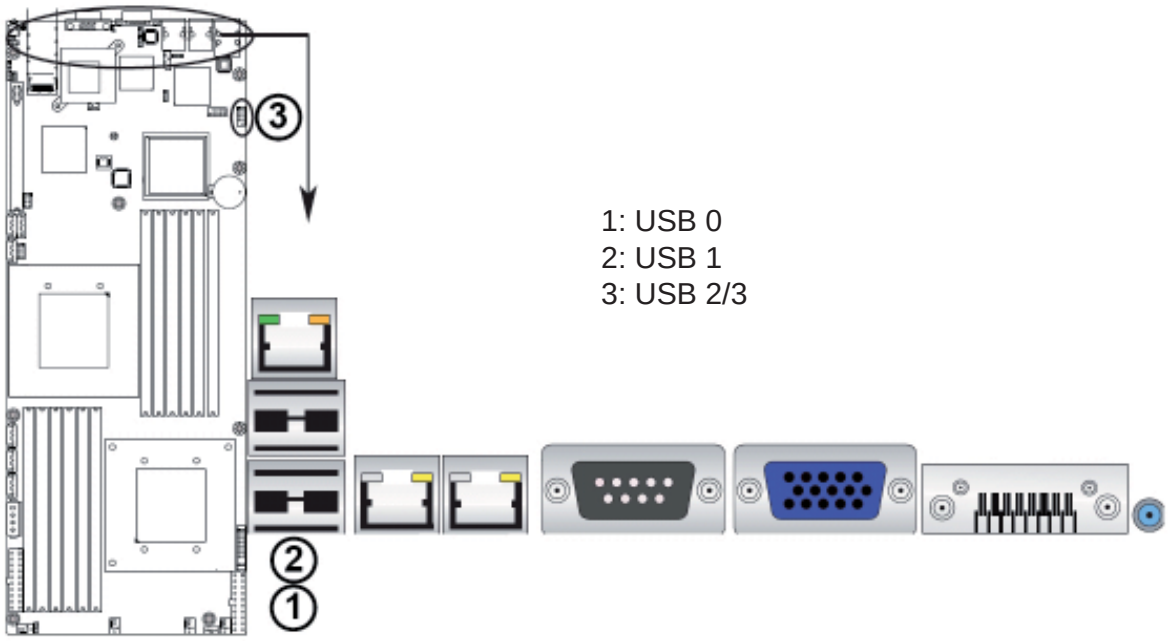
Two Universal Serial Bus ports (USB 0/1) are located on the I/O back panel. Additional two USB connections (USB 2/3) are used to provide front chassis access. Connect USB cables to these USB ports/headers to use USB connections. (USB cables are not included). See the tables on the right for pin definitions.

Back Panel USB 0/1 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 2/3 Pin Definitions

Pin#	Definition	Pin #	Definition
1	+5V	5	+5V
2	USB_PN2	7	USB_PN3
3	USB_PP2	8	USB_PP
4	Ground	9	Ground
5	No Connection	10	Key



1: USB 0
2: USB 1
3: USB 2/3

Ethernet Ports

Two Ethernet ports are located next to the USB 0/1 on the IO Backplane. In addition, an IPMI Dedicated LAN is located above the USB ports 0/1. These ports accept RJ45 type cables.

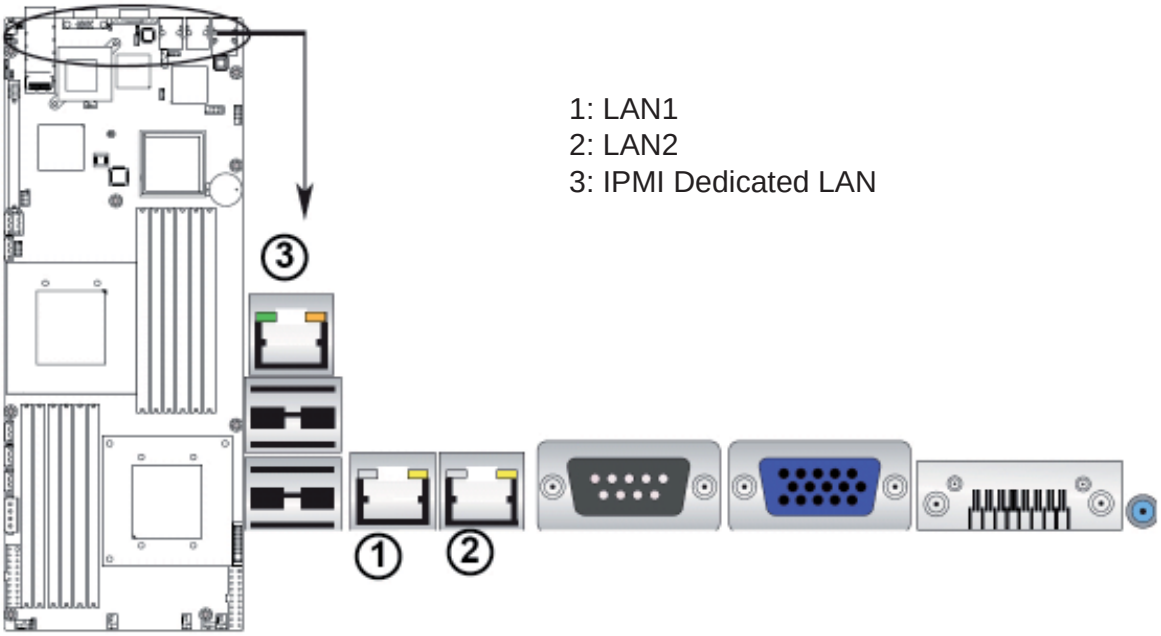
Notes:

1. The IPMI Dedicated LAN is for R22-E2/R422-INF-E2)

2. Please refer to the LED Indicator Section for LAN LED information.

LAN Ports Pin Definitions

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



1: LAN1
2: LAN2
3: IPMI Dedicated LAN

Serial Ports

A COM Port is located on the IO Backplane. See the table on the right for pin definitions..

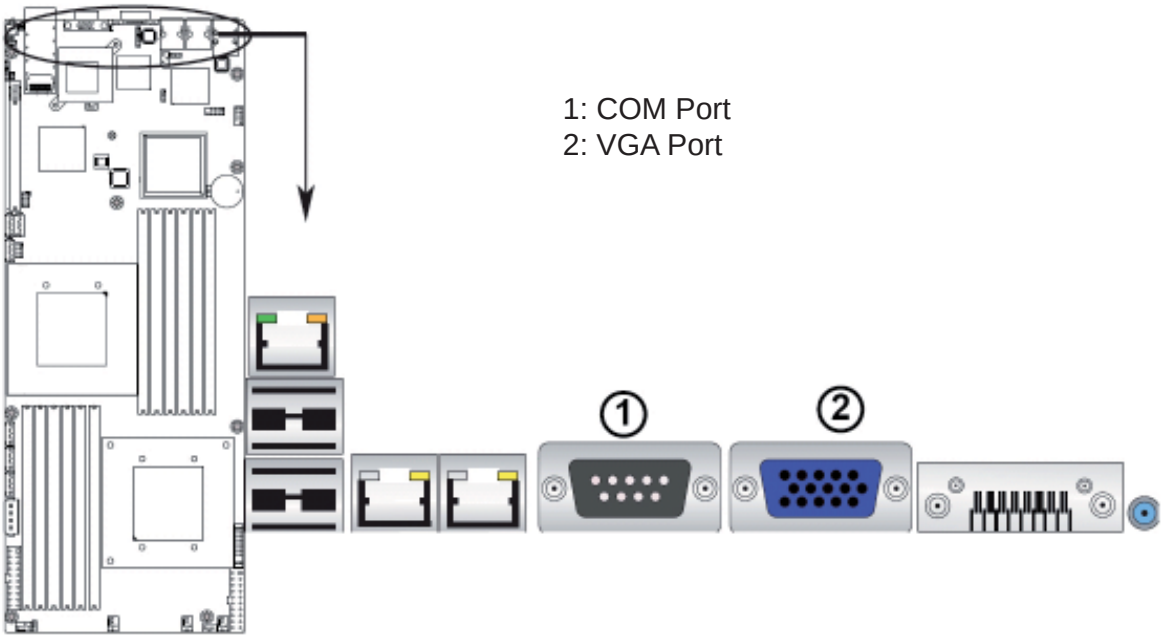
Serial Ports Pin Definitions (COM1)

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

NC: No Connection

Video Connector

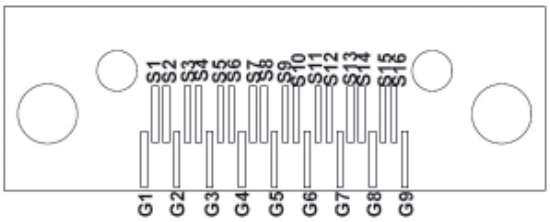
A Video (VGA) connector is located next to the COM Port on the IO backplane. This connector is used to provide video and CRT display. Refer to the board layout below for the location.



1: COM Port
2: VGA Port

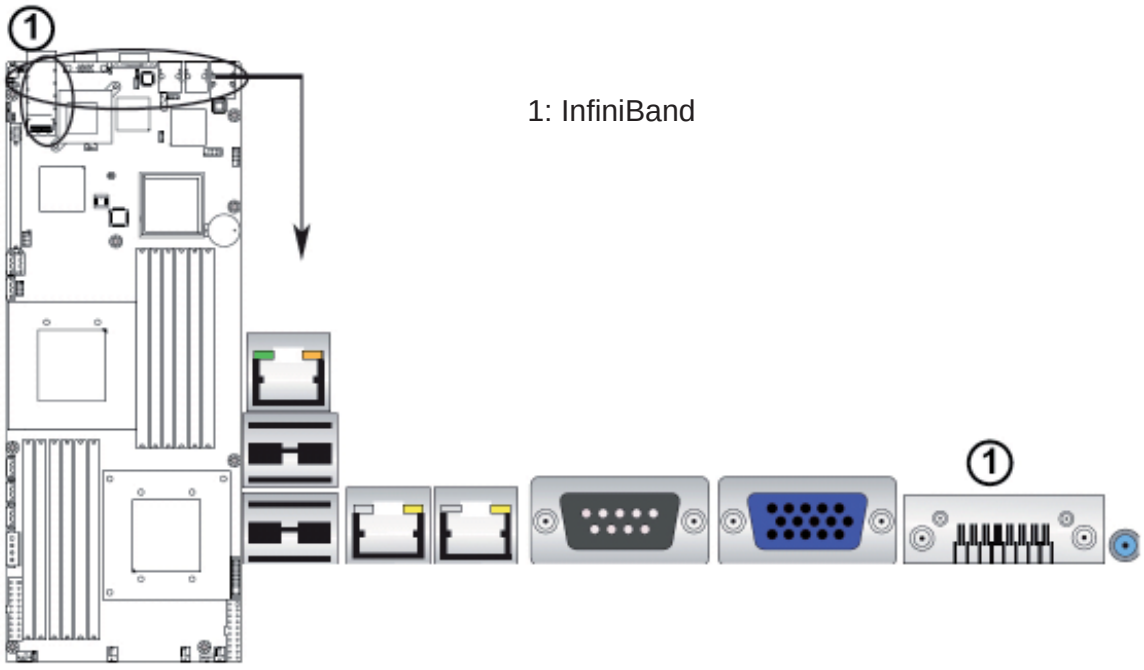
InfiniBand Connecttion (R422-INF-E2)

The onboard InfiniBand connector is located on the backplane on the motherboard. This switch is primarily used for High-performance computing. See the table on the right for pin definitions..



InfiniBand Pin Definitions

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



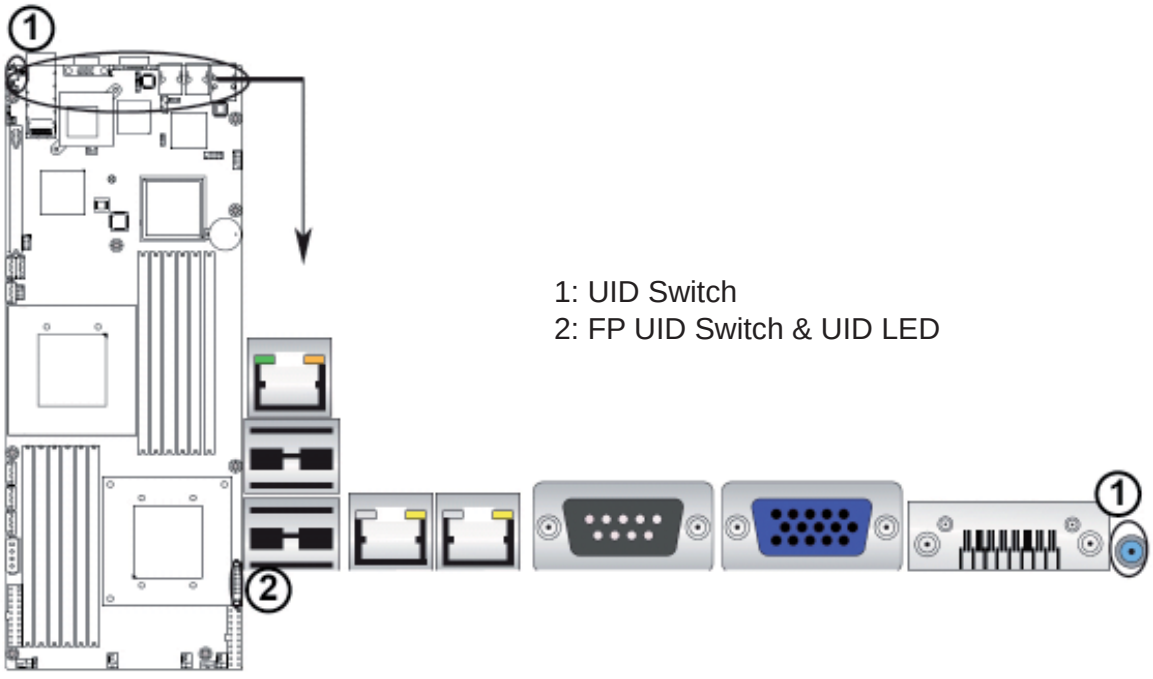
1: InfiniBand

Unit Identifier Switches

Two Unit Identifier (UID) Switches and LED Indicators are located on the motherboard. The Front Panel UID Switch is located at Pin 13 on the Front Control Panel (JF1). The Rear UID Switch is located at SW1 next to the Infi niBand Connector. The Front Panel UID LED is located at Pin 7 of JF1, and the Rear UID LED is located at LE4. When you press a UID switch on the front panel or on the back panel, both Rear UID LED and Front Panel UID LED Indicators will be turned on. Press the UID switch again to turn off both LED Indicators. These UID Indicators provide easy identifi cation of a system unit that may be in need of service. See the table on the right for pin definitions.

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

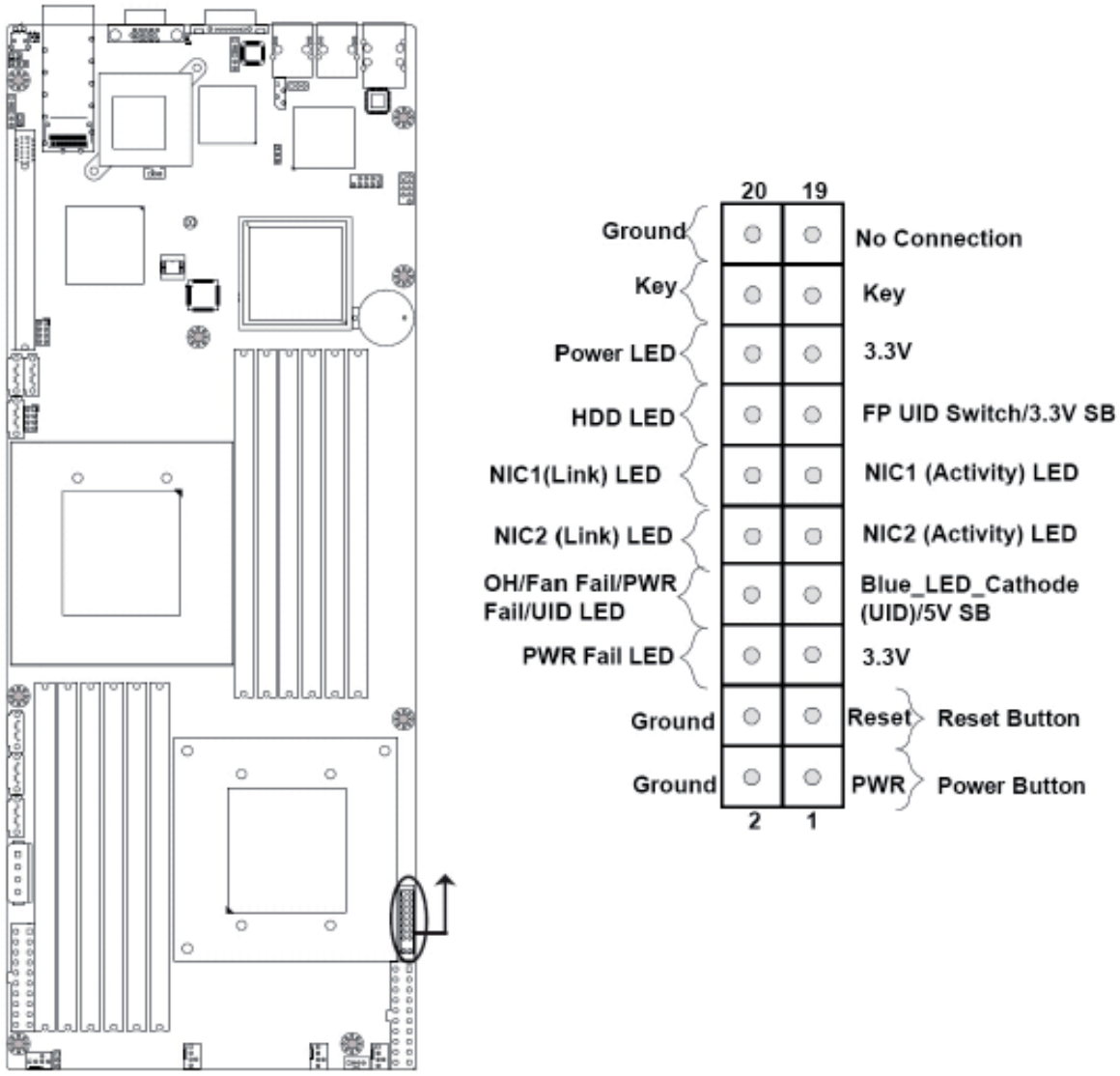
UID Switch	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Ground



1: UID Switch
2: FP UID Switch & UID LED

5-10 Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifi cally for use with Supermicro server chassis. See the figure below for the descriptions of the various control panel buttons and LED indicators. Refer to the following section for descriptions and pin definitions.



Front Control Panel Pin Definitions

Power LED

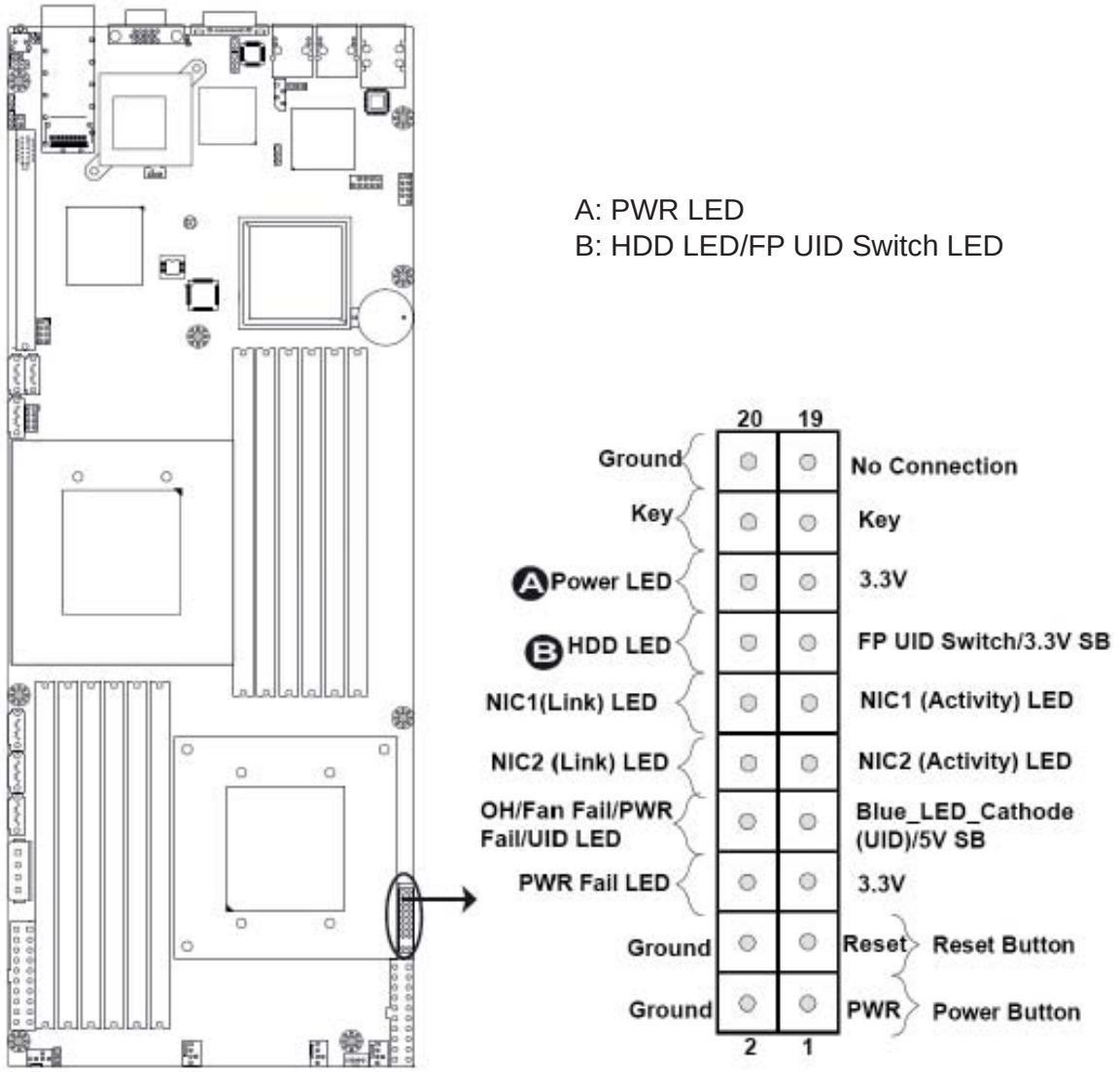
The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	+3.3V SB
16	PWR LED

HDD/FP UID Switch

The HDD/UID Switch connections are located on pins 13/14 of JF1. Attach a hard-drive LED cable to display HDD or SATA activities. This connection can also be used as a front panel UID (Unit Identifi er) switch. The UID LED on Pin 7 of JF1 works in conjunction with this UID Switch. When the user presses and releases the UID switch, the UID LED will be turned on or off to indicate the location of the unit. (Refer to Page 5-25 for more details.)

HDD/UID Switch Pin Definitions (JF1)	
Pin#	Definition
1	UID Signal/3.3V
2	HDD Active



NIC1 LED Indicator

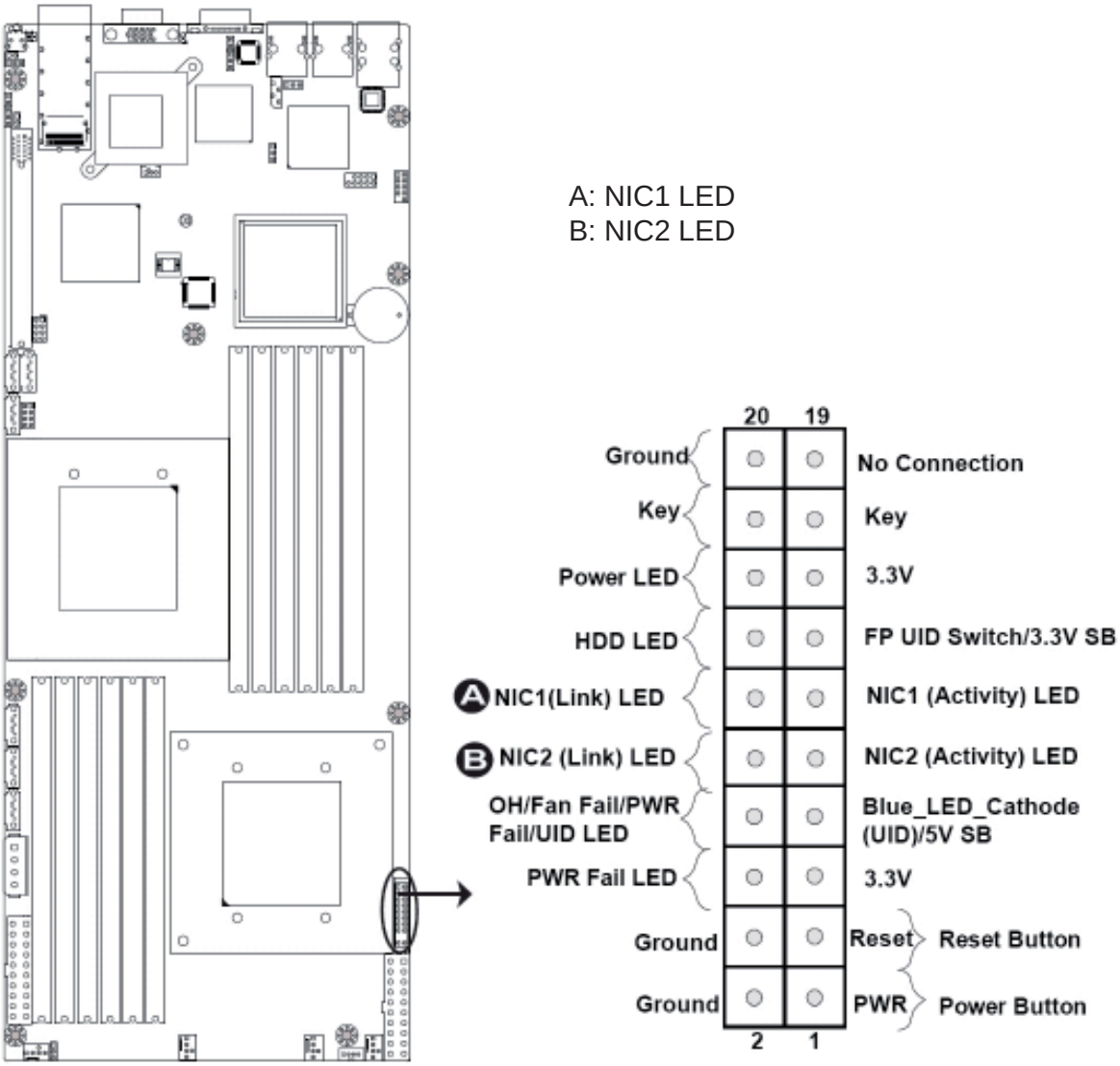
The NIC (Network Interface Controller) LED connections for GLAN port 1 are located on pins 11 and 12 of JF1. Attach a NIC LED cable to display LAN Port1 connections and activities. Refer to the table on the right for pin definitions.

GLAN1 LED Pin Definitions (JF1)	
Pin#	Definition
11	NIC1 Activity
12	NIC1 Link

NIC2 LED Indicator

The Network LED connections for GLAN port 2 are located on pins 9 and 10 of JF1. Attach a NIC LED cable to display LAN Port2 connections and activities. Refer to the table on the right for pin definitions

GLAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9	NIC2 Activity
10	NIC2 Link



Overheat (OH)/Fan Fail/UID LED

Connect an LED cable to pins 7 and 8 of JF1 to use the Overheat/Fan Fail/Power Fail and UID LED connections. The Red LED on pin 8 provides warnings of an overheat, fan failure or power failure. The Blue LED on pin 7 works as the UID LED indicator for the front panel UID switch located on pins 13~14 of JF1. When Jumper J_UID_OW is set to off (default), the Red LED takes precedence over the Blue LED. Refer to the table on the right for pin definitions.

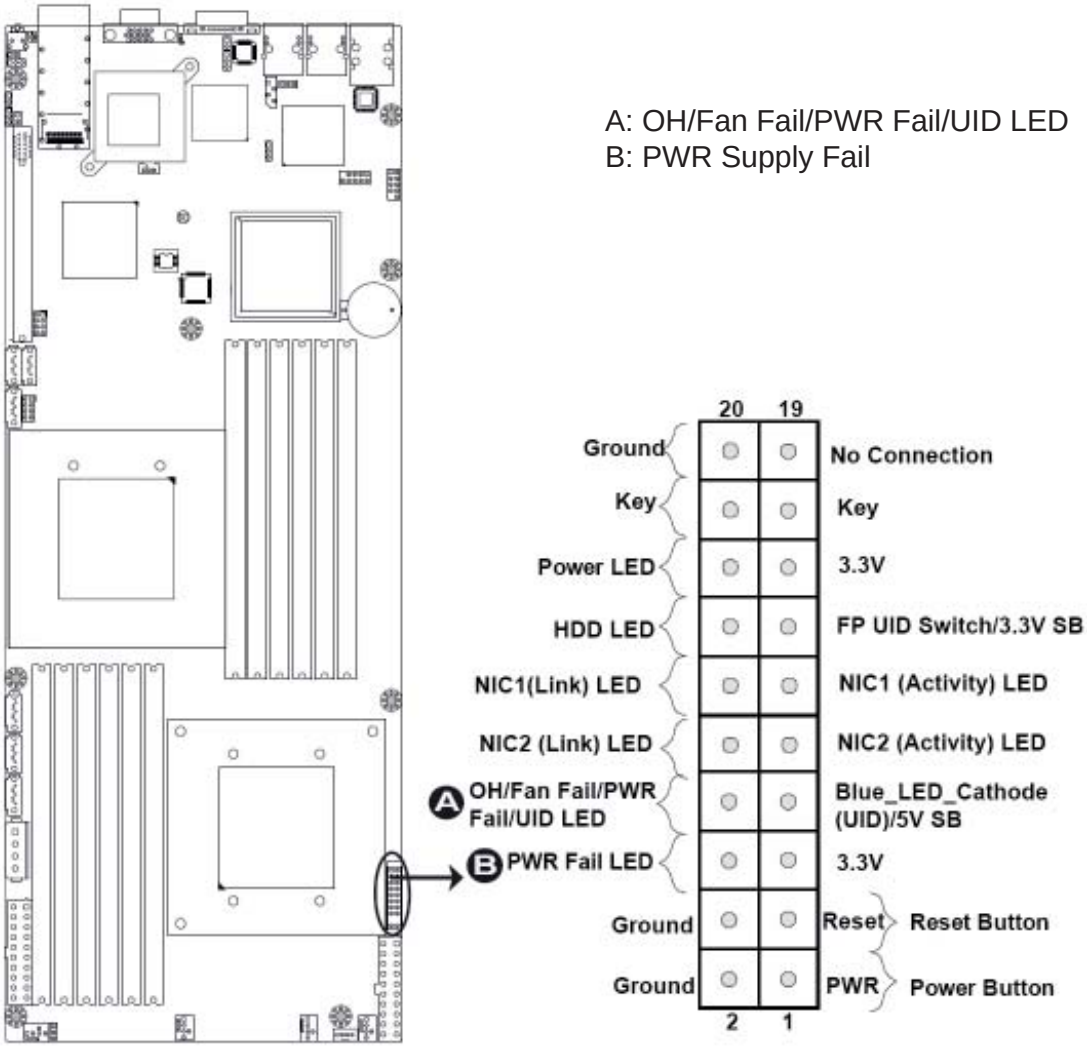
OH/Fan Fail/PWR Fail/ Blue_UID LED Pin Definitions (JF1)	
Pin#	Definition
7	Blue_LED_Cathode (UID)/5.5V.SB
8	OH/Fan fail/PWR Fail/ UID LED (red)

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

Power Fail LED

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

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



Reset Button

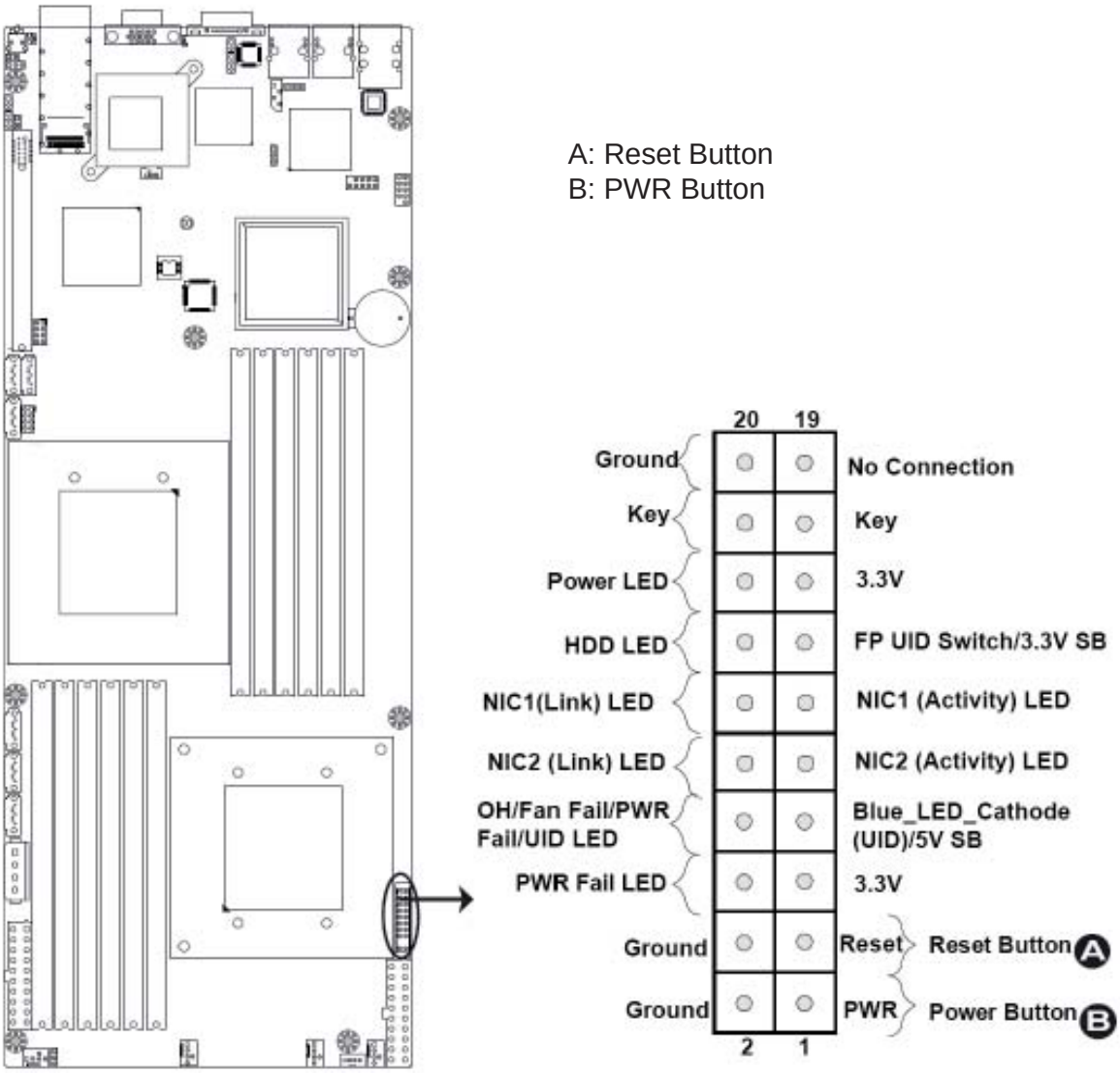
The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

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

Power Button

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

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



5-11 Connecting Cables.

20-pin Proprietary Power Connectors

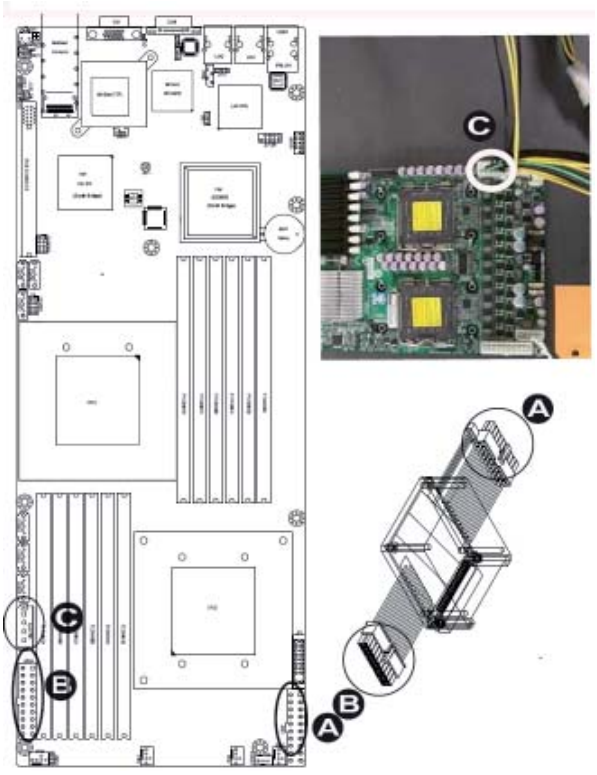
There are two 20-pin main power supply connectors (PWR1, PWR2) and a 4-pin auxiliary power connector (JP10) on the motherboard. These power connectors meet the SSI EPS 12V specification. For power supply to work properly, please follow the instructions given below. See the table on the right for pin definitions. Also refer to the layout below for the PWR connector locations.

20-pin Main Power Connector Pin Definitions

Pin #	Definition	Pin #	Definition
11	PS On	1	Ground
12	5VSB	2	Ground
13	Ground	3	Ground
14	Ground	4	Ground
15	Ground	5	Ground
16	NC2	6	NC1
17	12V	7	12V
18	12V	8	12V
19	12V	8	12V
20	12V	10	12V

Note 1: You cannot use both 20-pin power connectors: PWR1 (the right connector) and PWR2 (the left connector) as input power supply at the same time. Only one connector can be used for input power supply to the motherboard at a time. For proper use of these proprietary PWR Connectors, please customize your PWR cables based on Supermicro PWR Connector Pin-Out Definitions listed above.

Note 2: The black square (dot) on a power connector indicates the location of Pin 1. (See the pictures below for the power cable connections.)



A: Right 20-pin connector & cable (PWR1)
B: Left 20-pin connector & cable (PWR2)
C: 4-pin PWR Connector

4-pin Auxiliary Power Connector

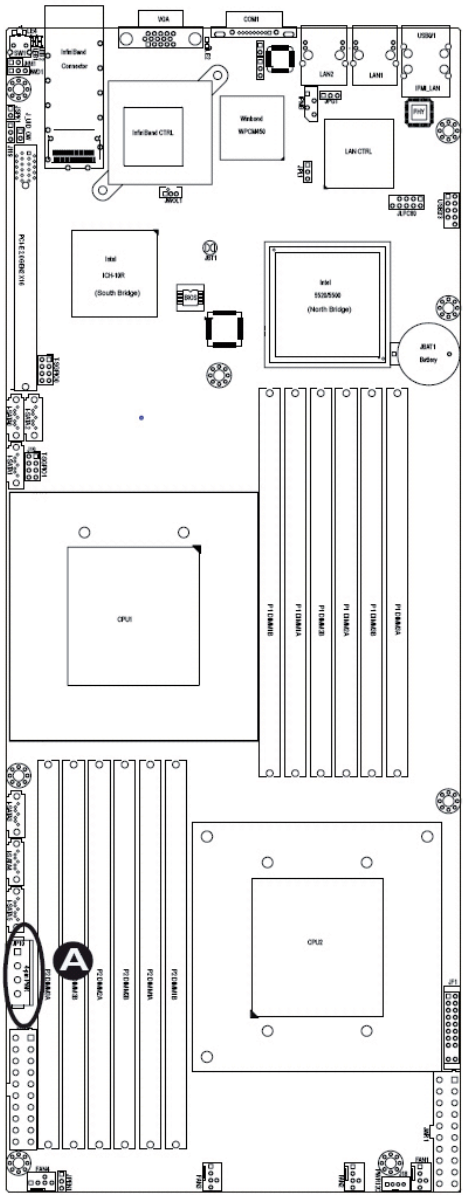
In addition to two 20-pin power connectors, a 4-pin 12V PWR supply is located at JP10 on the motherboard. This power connector is used to provide power supply to hard drive disks. Refer to the layout below for the location.

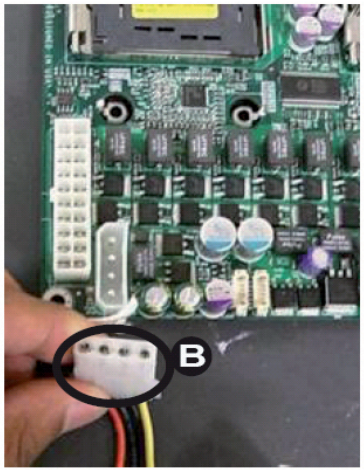
Note 1: The 4-pin Auxiliary Power Connector is used for power supply output to HDDs only.

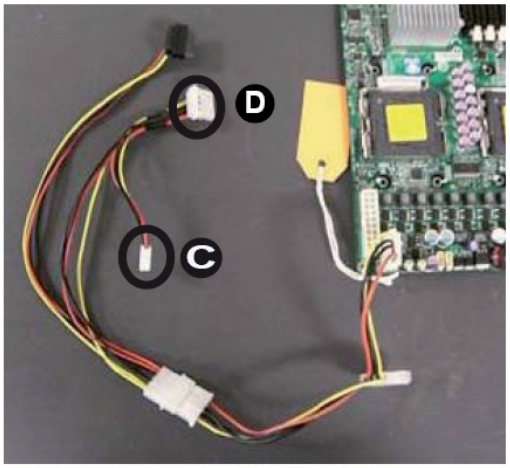
Note 2: The black square (dot) on the power connector indicates the location of Pin 1. (See the pictures below for the power cable connections.)

4-pin Power Pin Definitions	
Pin#	Definition
1	+12V
2	Ground
3	Ground
4	+5V

Required Connection





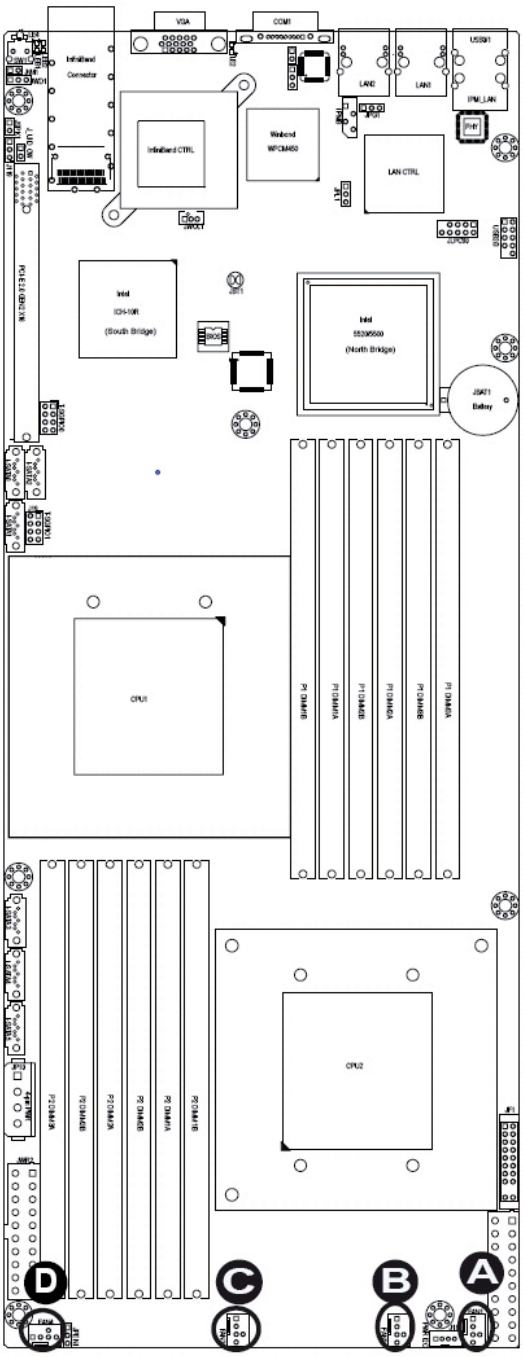


A: 4-pin Aux. PWR
B: One male (receptacle) PWR Connector
C & D: Two female PWR connectors

Fan Headers

The R422-E2/R422-INF-E2 has four chassis/system fan headers (Fan1 to Fan4) on the motherboard. All these 4-pin fans headers are backward compatible with the traditional 3-pin fans. 3-pin fans do not support fan speed control. However, fan speed control is available for 4-pin fans. The fan speeds are controlled by Thermal Management via Hardware Monitoring in the Advanced Setting in the BIOS. (The Default setting is Disabled.) See the table on the right for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation



A: Fan1
B: Fan2
C: Fan3
D: Fan4

NMI Header

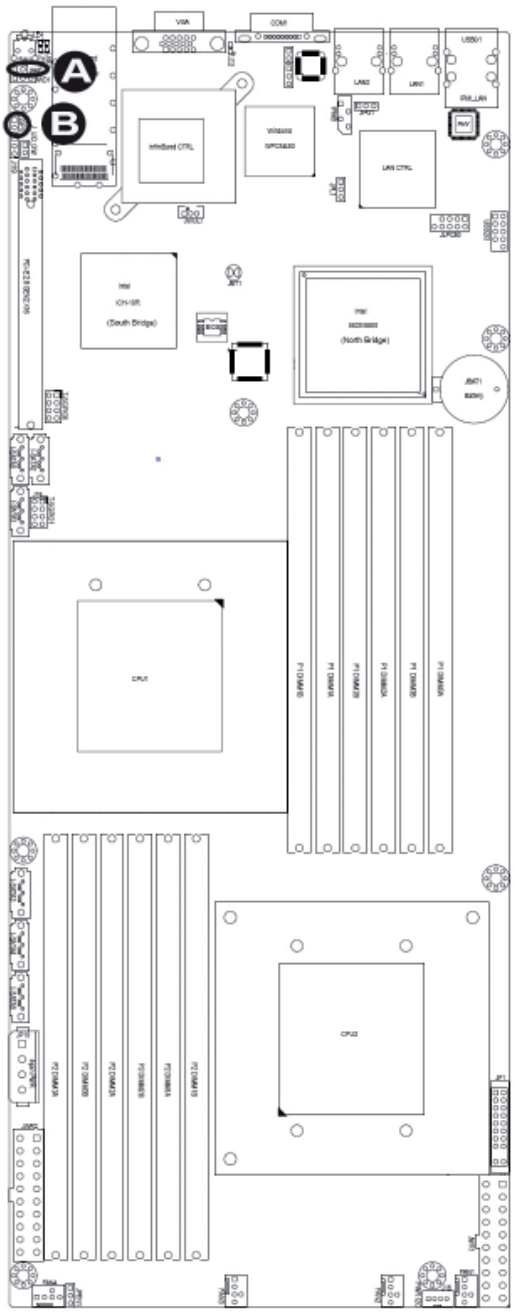
The non-maskable interrupt header is located at JNMI1. Refer to the table on the right for pin definitions.

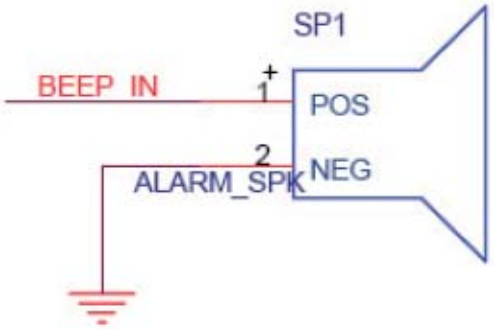
NMI Button Pin Definitions (JF1)	
Pin#	Definition
1	Control
2	Ground

Internal Buzzer

The Internal Buzzer, located at JSPK1, can be used to provide audible alarms for various beep codes. See the table on the right for pin defi nitions. Refer to the layout below for the locations of the Internal Speaker/ Buzzer.

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





A: NMI Header
B: Internal Speaker

Wake-on-LAN

The Wake-On-LAN header is located at JWOL1 on the motherboard. You must also have a LAN card with a Wake-On-LAN connector and a cable to use this feature. See the table on the right for pin definitions.

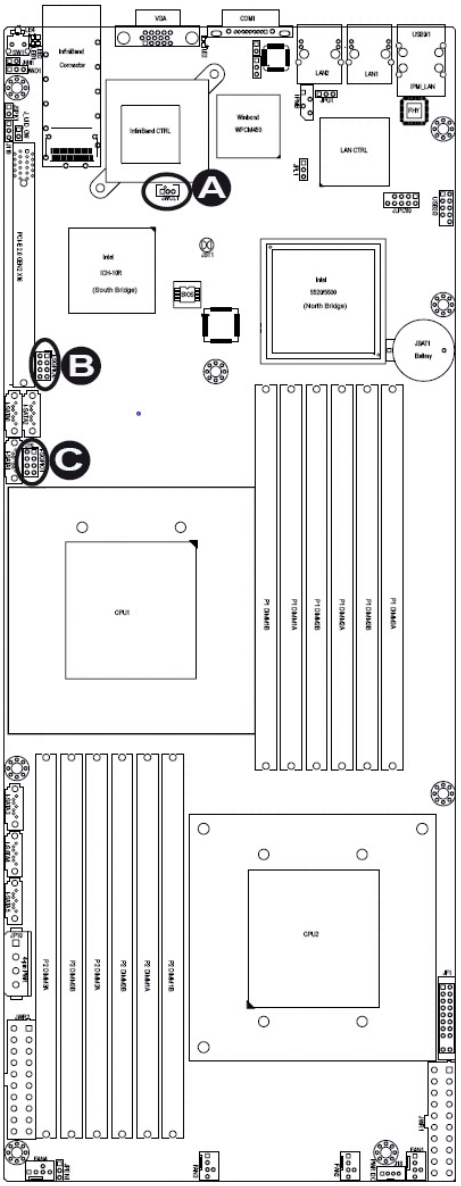
Wake-on-Lan Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

T-SGPIO Headers

Two SGPIO (Serial-Link General Purpose Input/ Output) headers (T-SGPIO-0/T-SGPIO-1) are located on the motherboard. These headers support serial link interfaces for the onboard SATA connectors. See the table on the right for pin defi nitions. Refer to the board layout below for the location.

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

NC: No Connections



A: Wake-On-Lan
B: T-SGPIO0
C: T-SGPIO1

SMB (I²C) Connector

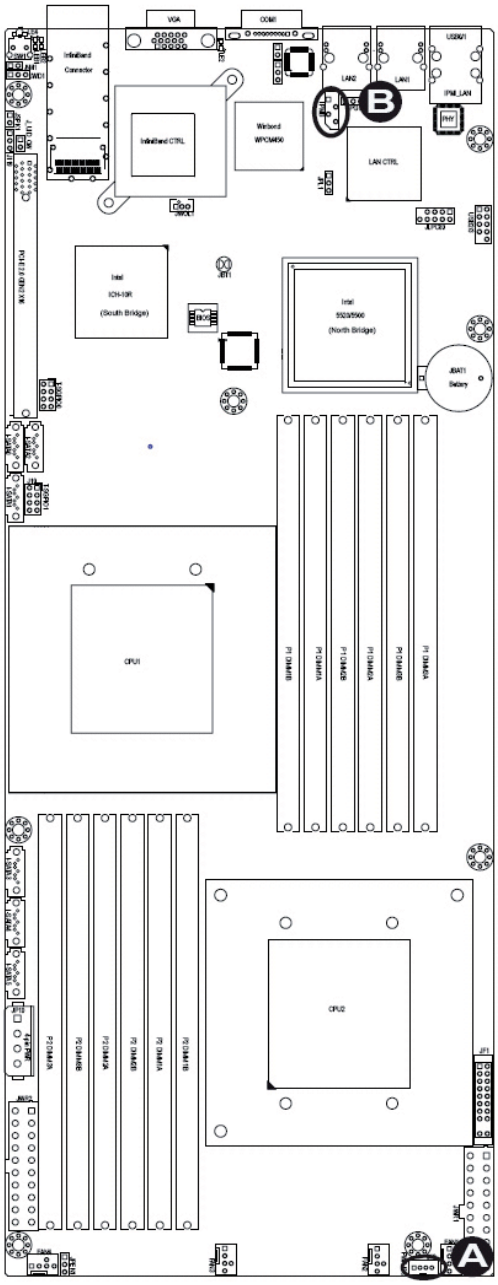
System Management Bus (I2C) Connector (J18) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

PWR SMB Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground

IPMB I²C SMB

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

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

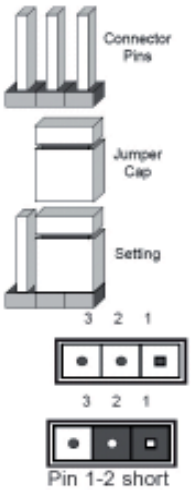


A: PWR SMB
B: IPMB SMB

5-12 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 identifi ed with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.

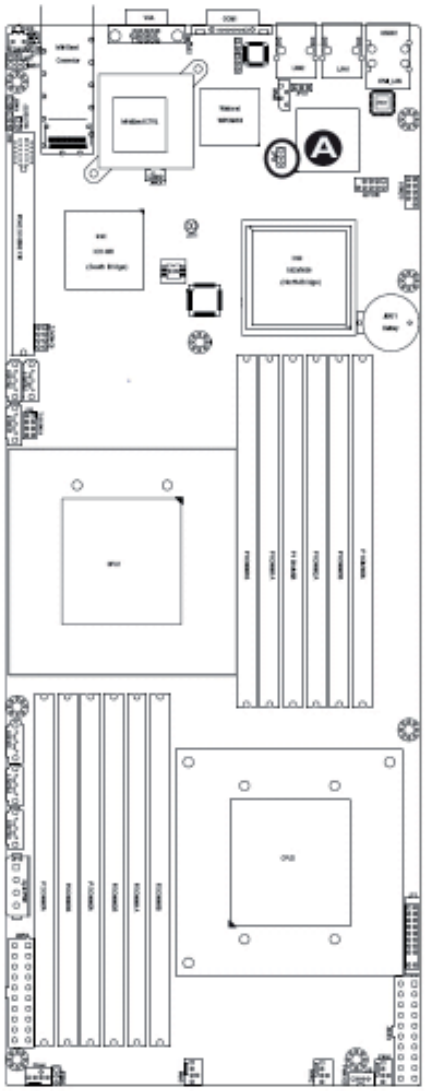


Note: On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

GLAN Enable/Disable

JPL1 enables or disables the GLAN Ports 1/2 on the motherboard. See the table on the right for jumper settings.

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



A: GLAN Port 1/2 Enable

CMOS Clear

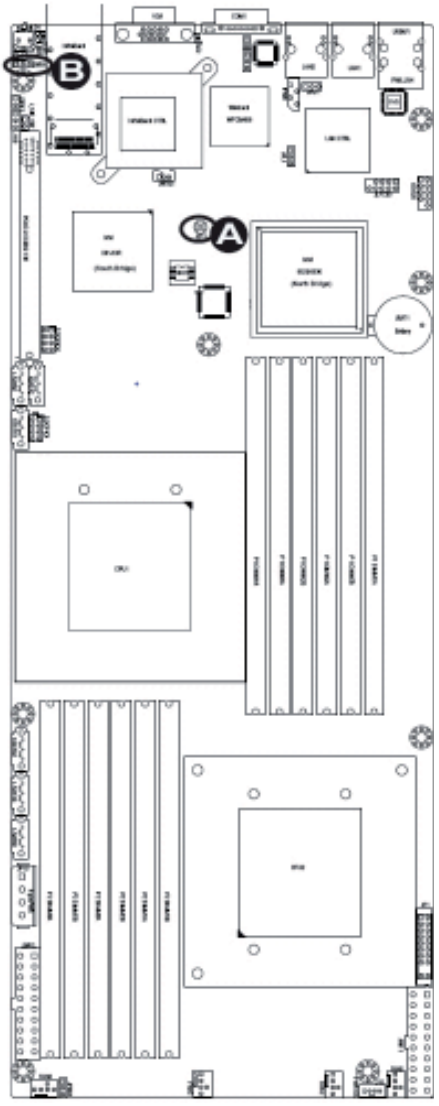
JBT1 is used to clear CMOS. Instead of pins, this "jumper" consists of contact pads to prevent the accidental clearing of CMOS. To clear CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection. Always remove the AC power cord from the system before clearing CMOS.

Note: For an ATX power supply, you must completely shut down the system, remove the AC power cord and then short JBT1 to clear CMOS.

Watch dog Enable/Disable

Watch Dog (JWD1) is a system monitor that reboots 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 Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset (default)
Pins 2-3	NMI
Open	Disabled



A: Clear CMOS
B: Watch Dog Enable

Power Setting Select

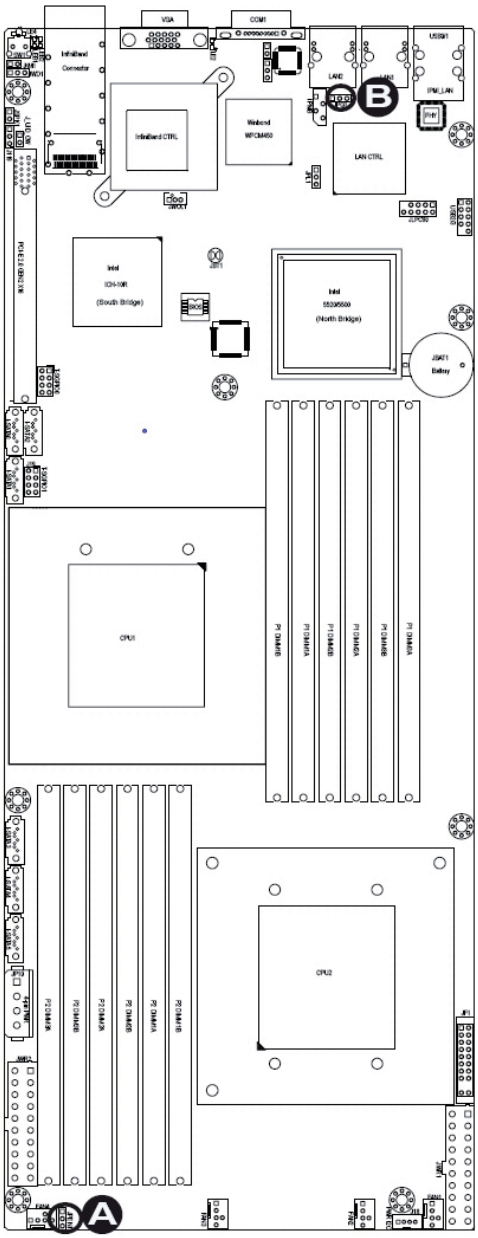
JPEN1 allows you to confi gure power settings for hot-swap support on the Hot-Swap version of Chassis 827. To enable hot-swap support for this model of chassis, connect a cable to Pins 2~3 of JPEN1. To use the regular power setting for other chassis, close Pins 1~2 on JPEN1 with a cap. See the table on the right for jumper settings.

Power Setting Select Jumper Settings	
Jumper	Definition
Pins 1-2	Onboard PWR setting
Pins 2-3	Hot Swap support

VGA Enable

JPG1 allows you to enable or disable the onboard VGA connection supported by the onboard VGA Controller. 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 (JPG1)	
Both Jumpers	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

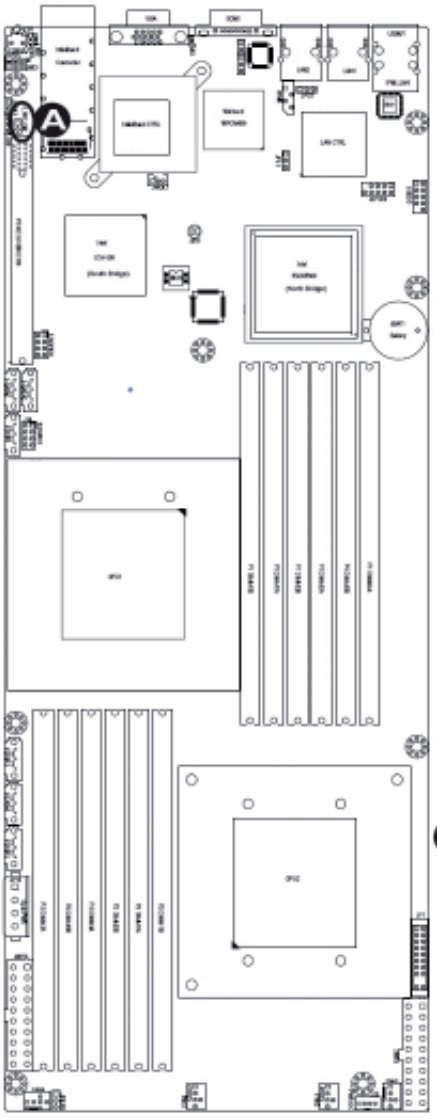


A: PWR Setting Select
B: VGA Enable

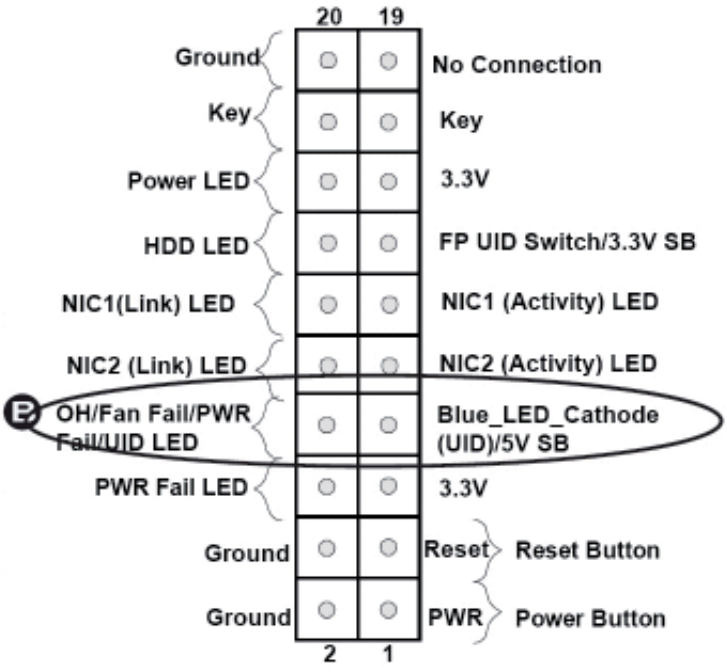
J_UID_OW (-Overwriting)

When the jumper J_UID_OW is set to Off (default), the Red LED (Overheat/Fan Fail/PWR Fail/UID LED) located on Pin 8 of the Front Control Panel (JF1) will take precedence over the Blue UID_LED located on Pin 7 of JF1. In this case, when the Red LED is on, the Blue LED will be turned off. When the RED LED is off, the Blue UID_LED can be on or off. In other words, the Red LED signal overwrites the Blue UID_LED signal if J_UID-OW is set to off. When the jumper J_UID_OW is On, the Red LED (OH/Fan Fail/PWR Fail/UID LED) and the Blue_UID_LED work independently. The Red LED will have no effects on the Blue LED. See the table on the right for jumper settings.

J_UID_OW (-Overwriting) Jumper Settings	
Jumper	Definition
Off (Default)	Red OH/Fan Fail/PWR Fail LED (Pin 8 of JF1) takes precedence over (overwrites) the Blue UID_LED (Pin 7 of JF1). Red LED: On, Blue LED: Off, Red LED: Off, Blue LED: On or Off
On	Red LED (OH/Fan Fail/ PWR Fail LED) and the Blue UID_ LED function independently.Red LED does not overwrite the Blue LED. The Red LED has no effects on the Blue_UID LED Red LED: On, Blue LED: On,Off Red LED: Off, Blue LED: On, Offt



A: J_UID LED
B: OH/Fan fail/PWR Fail/UID LED

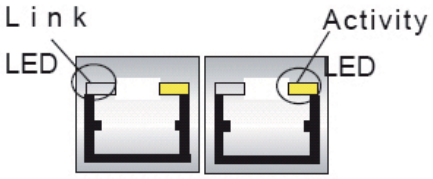


5-13 Onboard Indicators

LAN1/LAN2 LEDs

There are two GLAN ports on the motherboard. An additional IPMI dedicated LAN port is also located on the R422-E2/R422-INF-E2. Each Gigabit Ethernet LAN port has two LEDs. The yellow LED indicates activity, while the Link LED may be green, amber or off to indicate the speed of the connection. See the tables at right for more information.

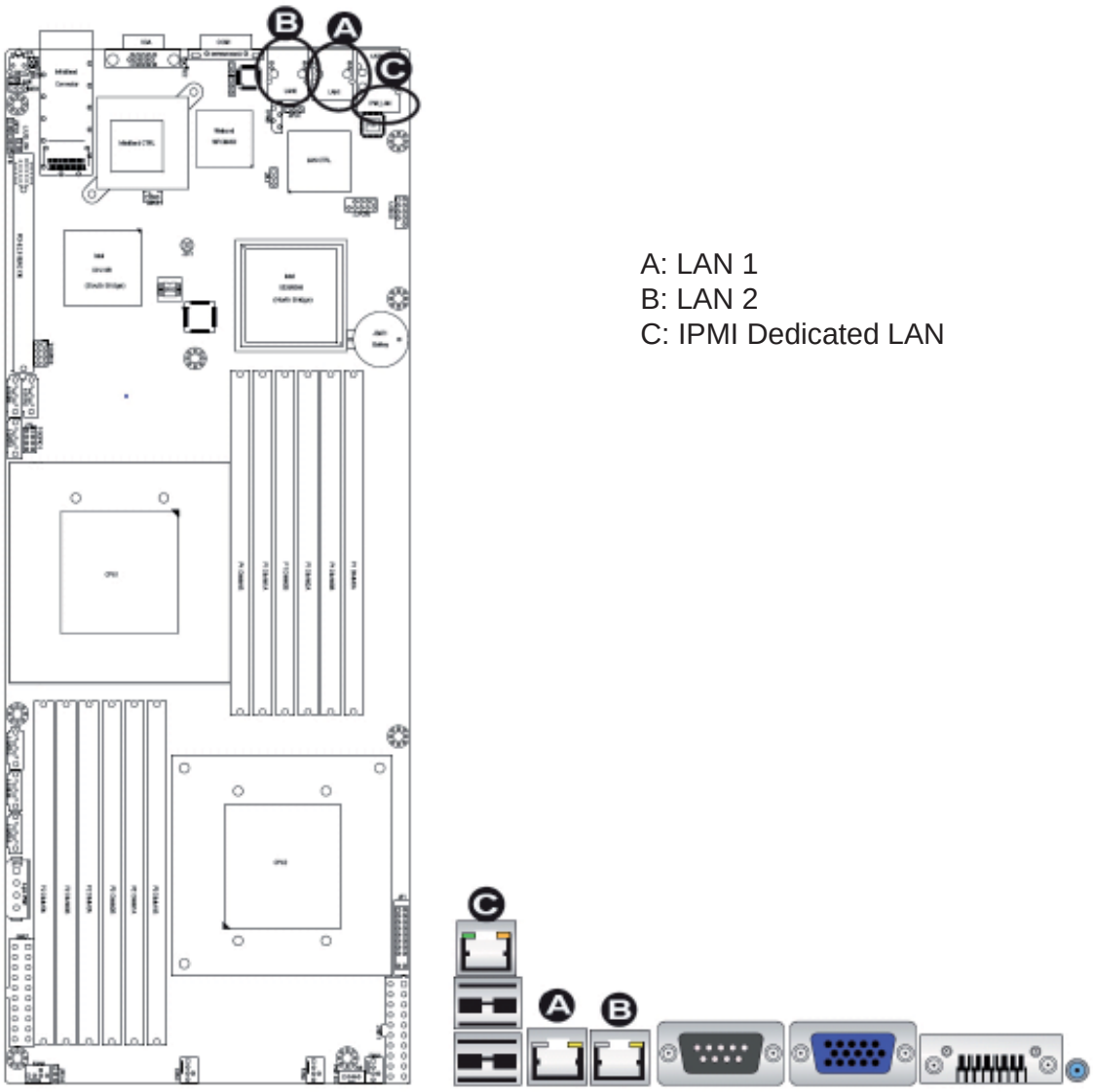
Note: IPMI dedicated LAN does not operate at 1 Gbps.



Rear View (when facing the rear side of the chassis)

GLAN Activity Indicator LED Settings		
Color	Status	Definition
Yellow	Flashing	Active

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



A: LAN 1
B: LAN 2
C: IPMI Dedicated LAN

InfiniBand LED Indicators (LEB1/LEB2)

Two Infi niBand LED Indicators (LEB1/LEB2) are located on the motherboard. The green LED (LEB1) is the Infi niBand Link LED. The yellow LED (LEB2) indicates activity. Refer to the table on the right for details. Also see the layout below for the LED locations.

Onboard Power LED

An Onboard Power LED is located at LE2 on the motherboard. When this LED is on, the system power is on. Be sure to turn off the system and unplug the power cord before removing or installing components. See the tables at right for more information.

InfiniBand Link LED (LEB1) Settings

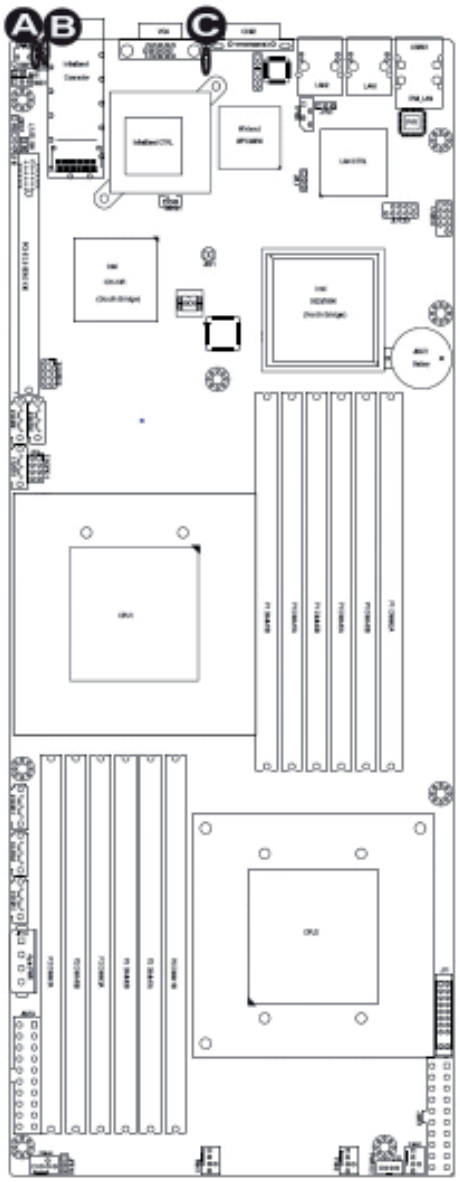
Color	Status	Definition
Green	Solid	InfiniBand connected
Off	Off	No connection

InfiniBand Link LED (LEB2) Settings

Color	Status	Definition
Yellow	Solid	InfiniBand active
Yellow	Off	InfiniBand: connected Activity: idle
Off	Off	No connection

Onboard PWR LED Indicator Settings

LED Color	Definition
Off	System Off (PWR cable not connected)
Green	System On
Green: flashing quickly	ACPI S1 State



A: LEB1
B: LEB2
C: LE2

5-14 Serial ATA and PCI-E Connections

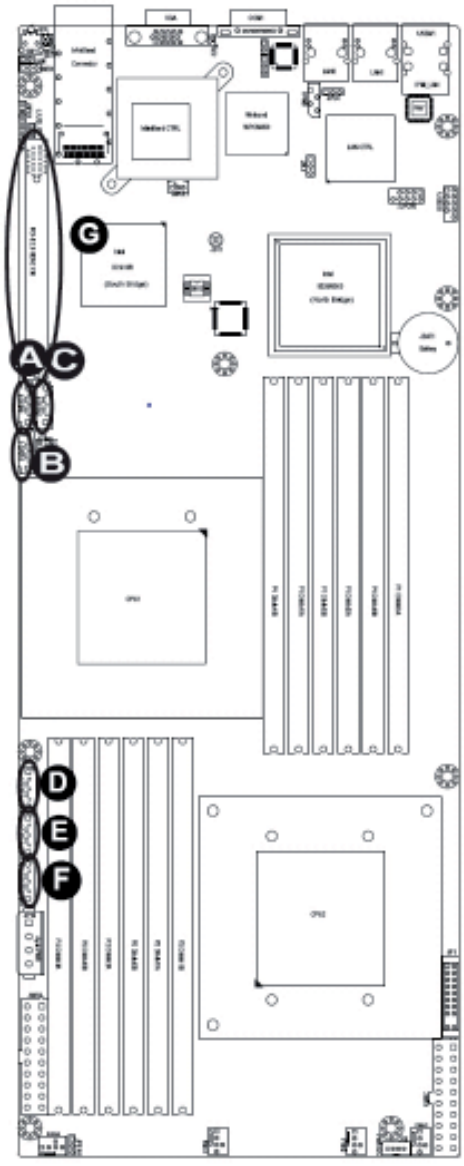
Serial ATA Ports

Six Serial ATA Ports (I-SATA0~I-SATA 5) are located at JS1~JS6 on the motherboard. These ports provide serial-link signal transmission, which is faster than that of the traditional Parallel ATA. See the table on the right for pin definitions..

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

PCI-Express x16 Gen. 2 Slot

A PCI-Express x16 (Gen. 2) Slot is located next to the SATA ports on the motherboard. Refer to the layout below for the InfiniBand Connector location.



A: I-SATA0
B: I-SATA1
C: I-SATA2
D: I-SATA3
E: I-SATA4
F: I-SATA5
G: PCI-E x16 Gen. 2

Notes

Chapter 6. Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the bullx R422-E2 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows. 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 discharge.

Precautions

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

Unpacking

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

Figure 6-1. Chassis Front View

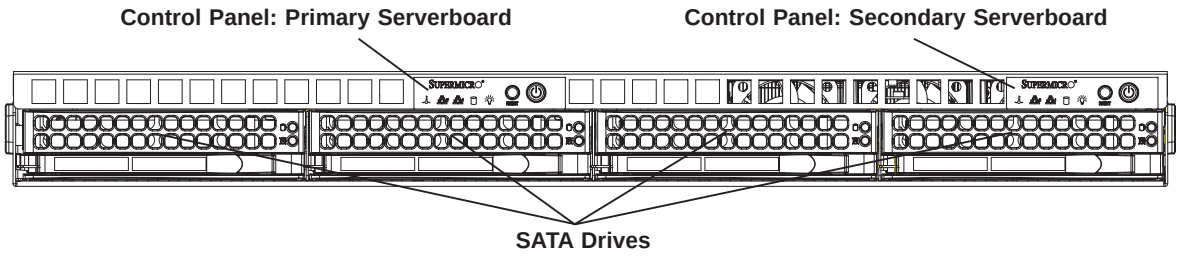
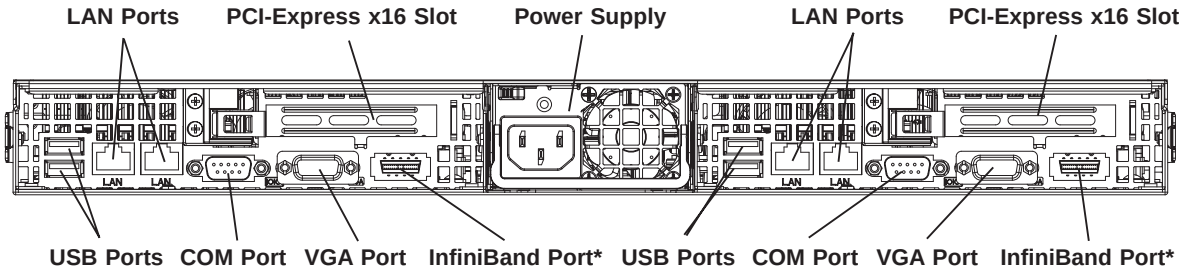


Figure 6-2. Chassis Rear View



*The InfiniBand ports are included on the bullx R422-INF-E2 only.

6-2 Control Panel

Each control panel on the front of the chassis must be connected to the JF1 connector on its associated serverboard to provide you with system control buttons and status indicators. (When viewed from the front of the chassis, the serverboard on the left is referred to as the primary serverboard and the serverboard on the right as the secondary.)

These wires have been bundled together in a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the control panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path. The LEDs inform you of system status for the serverboard it is connected to. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3 System Fans

Each serverboard has its own set of three 4-cm high-performance fans (for a total of six in the chassis) to provide the cooling for the bullx R422-E2/R422-INF-E2. Fan speed may be controlled by a setting in BIOS (see Chapter 7).

System Fan Failure

If a fan fails, the remaining fans will ramp up to full speed and the overheat/fan fail LED on the control panel will blink on and off. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Remove the top chassis cover while the system is still running to determine which of the fans has failed. Then power down the system before replacing a fan. Removing the power cord is also recommended as a safety precaution.

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

SATA 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 SATA drives. Proceed to the next step for instructions. **Note:** The operating system you use must have RAID support to enable the hot-swap capability of the SATA drives.

Use caution when working around the SATA backplane. Do not touch the backplane with any metal objects and make sure no cables touch the backplane. Also, regardless of how many SATA drives are installed, all four drive carriers must remain in the chassis to maintain proper airflow.

SATA Drive Installation

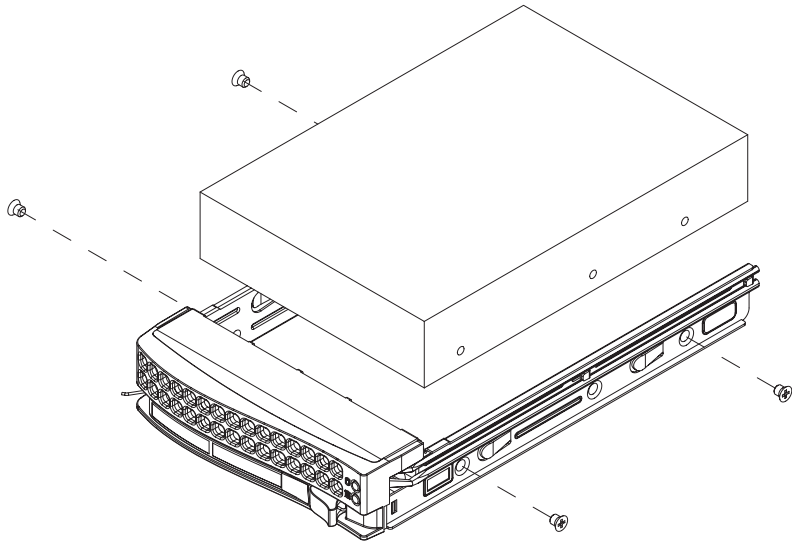
The SATA drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the system. For this reason, even empty carriers without drives installed must remain in the chassis.

Mounting a SATA Drive in a Carrier

1. Install the drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.

2. Secure the drive to the carrier with four screws, as shown in Figure 6-3.

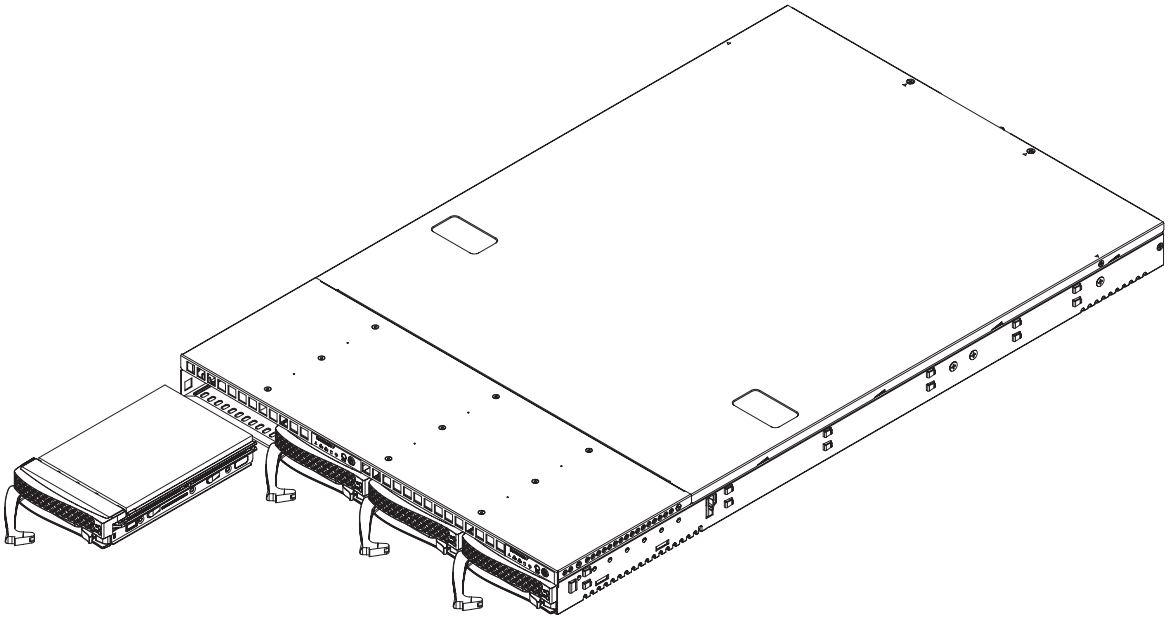
Figure 6-3. Mounting a Drive in a Carrier



Installing/Removing Hot-swap SATA Drives

1. To remove a carrier, push the release button located beside the drive LEDs.
2. Swing the handle fully out and use it to pull the unit straight out (see Figure 6-4).

Figure 6-4. Removing a SATA Drive



6-5 Power Supply

The bullx R422-E2/R422-INF-E2 has a single 980 watt power supply. This power supply has the capability of operating at 100 - 240 input volts. Depress both main power buttons on the front of the chassis and then unplug the AC power cord to completely remove power from the system before removing the power supply.

Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replacement units can be ordered directly from Bull S.A.S. (PWS-981-1S).

Replacing the Power Supply

Accessing the Inside of the System

1. Remove the top chassis cover by releasing the retention screws that secure the unit to the rack.

2. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click").

3. The top cover of the chassis is secured with four screws: two at the top rear of the cover and one on each side lip, also near the back. Remove all four, then place both thumbs in the indentations and push the cover back until it slides off.

4. Lift the top cover from the chassis to gain full access to the inside of the server.

Removing the Power Supply

1. First unplug the power cord from the system.

2. To remove the failed power unit, remove the two screws on the back of the power supply, which secure it to the chassis.

3. Lift the unit straight out of the chassis. (See Figure 6-5.)

Installing a New Power Supply

1. Replace the failed unit with the exact same power supply model.

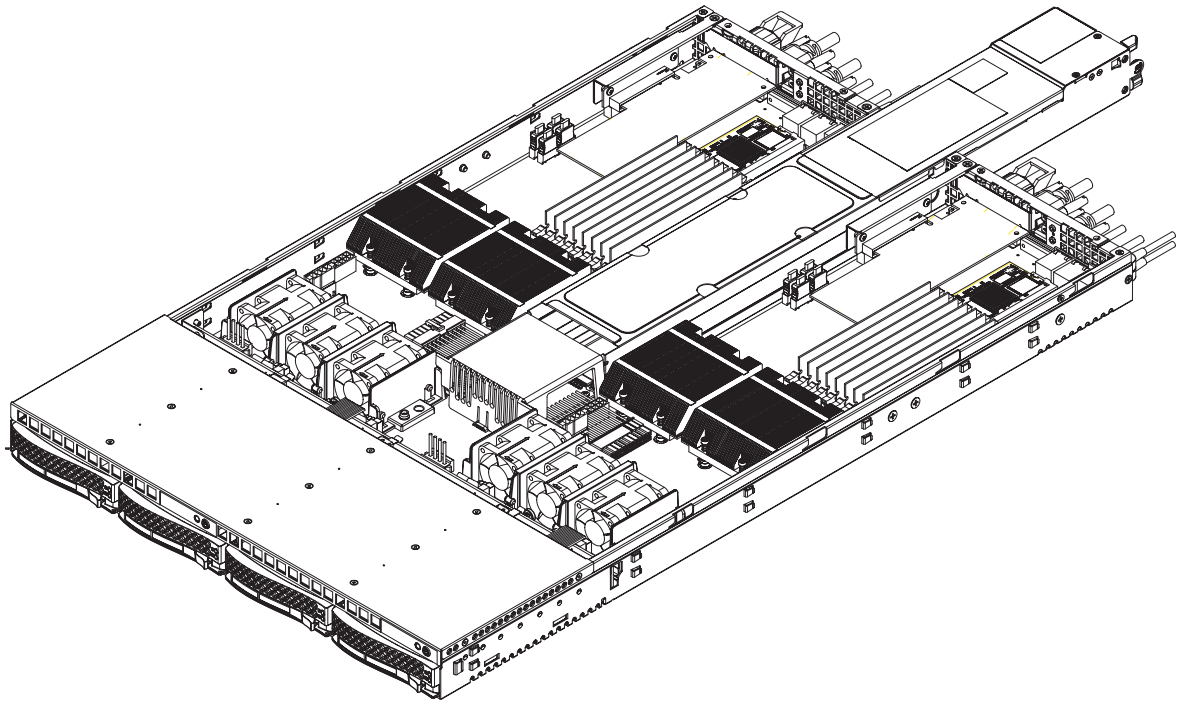
2. Carefully insert the new unit into position in the chassis and secure it with the two screws at the rear of the unit.

3. Before reconnecting the power cord, make sure the power switch on the power supply is in the off position.

4. Reconnect the power cord, replace the chassis top cover and push the unit back into the rack.

5. Finish by turning the power switch on the power supply on, and then depress the power buttons on the front of the chassis.

Figure 6-5. Removing the Power Supply



Chapter 7. BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the R422-E2/R422-INF-E2. 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.

Starting BIOS Setup Utility

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

> **Note**: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.

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

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

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

How To Change the Configuration Data

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

Starting the Setup Utility

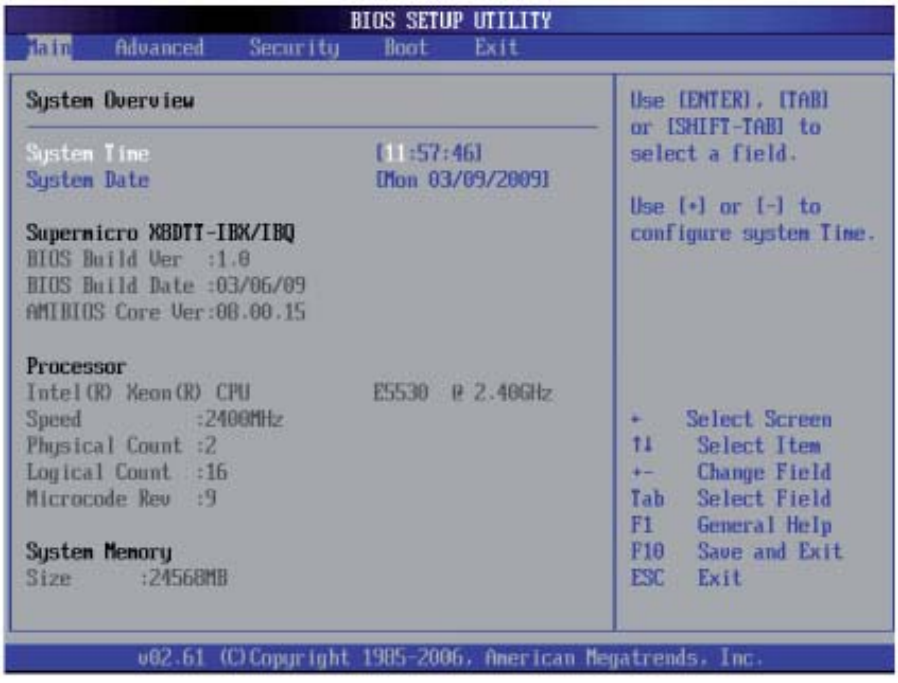
Normally, the only visible Power-On Self-Test (POST) routine is the memory test.

As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup Utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

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. Key in new values through the keyboard and press <Enter>. Press the <Tab> key 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 X8DTT/-F/-IBX/-IBXF/-IBQ/-IBQF

- BIOS Build Version: This item displays the BIOS revision used in your system.
- BIOS Build Date: This item displays the date when this BIOS was completed.
- AMI BIOS Core Version: This item displays the revision number of the AMI BIOS Core upon which your BIOS was built.

Processor

The AMI BIOS will automatically display the status of the processor used in your system:

- CPU Type: This item displays the type of CPU used in the motherboard.
- Speed: This item displays the speed of the CPU detected by the BIOS.
- Physical Count: This item displays the number of processors installed in your system as detected by the BIOS.
- Logical Count: This item displays the number of CPU Cores installed in your system as detected by the BIOS.
- Micro_code Revision: This item displays the revision number of the BIOS Micro_code used in your system.

Memory

This displays the size of memory available in the system:

- Size: This item displays the memory size detected by the BIOS.

7-3 Advanced Setup Configurations

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

▶Boot Features

Access the submenu to make changes to the following settings.

QuickBoot Mode

If Enabled, this option will skip certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and Disabled.

QuietBoot Mode

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**.

Hit 'Del' Message Display

This feature displays "Press DEL to run Setup" during POST. The options are **Enabled** and Disabled.

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**.

Power Configuration

Power Button Function

If set to Instant_Off, the system will power off immediately as soon as the user hits the power button. If set to 4_Second_Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant_Off** and 4_Second_Override.

Restore on AC Power Loss

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

Watch Dog Timer

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**.

▶Processor and Clock Options

This submenu allows the user to configure the Processor and Clock settings.

Ratio CMOS Setting

This option allows the user to set the ratio between the CPU Core Clock and the Memory Frequency. (**Note**: if an invalid ratio is entered, the AMI BIOS will restore the setting to the previous state.) The default setting depends on the type of CPU installed on the motherboard. The default setting for the CPU installed in your motherboard is **[18].** Press "+" or "-" on your keyboard to change this value.

C1E Support

Select Enabled to use the feature of Enhanced Halt State. C1E significantly reduces the CPU's power consumption by reducing the CPU's clock cycle and voltage during a "Halt State." The options are Disabled and **Enabled**.

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**.

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.

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.)

Simultaneous Multi-Threading (Available when supported by the CPU)

Set to Enabled to use the Simultaneous Multi-Threading Technology, which will result in increased CPU performance. The options are Disabled and **Enabled**.

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 and 2.

Intel® EIST Technology

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 Disable (Disable GV3) and **Enable (Enable GV3)**.

Intel® TurboMode Technology

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

Intel® C-STATE Tech

If enabled, C-State is set by the system automatically to either C2, C3 or C4 state. The options are Disabled and **Enabled**.

C-State package limit setting

If set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are **Auto**, C1, C3, C6 and C7.

C1 Auto Demotion

When enabled, the CPU will conditionally demote C3, C6 or C7 requests to C1 based on un-core auto-demote information. The options are Disabled and **Enabled**.

C3 Auto Demotion

When enabled, the CPU will conditionally demote C6 or C7 requests to C3 based on un-core auto-demote information. The options are Disabled and **Enabled**.

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. The options are **Disabled** and Enabled.

▶Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below:

▶CPU Bridge Configuration

QPI Links Speed

This feature selects QPI's data transfer speed. The options are Slow-mode, and **Full Speed**.

QPI Frequency

This selects the desired QPI frequency. The options are **Auto**, 4.800 GT, 5.866GT, 6.400 GT.

QPI L0s and L1

This enables the QPI power state to low power. L0s and L1 are automatically selected by the motherboard. The options are **Disabled** and Enabled.

Memory Frequency

This feature forces a DDR3 frequency slower than what the system has detected. The available options are **Auto**, Force DDR-800, Force DDR-1066, and Force DDR-1333.

Memory Mode

The options are **Independent**, Channel Mirror, Lockstep and Sparing.

Independent - All DIMMs are available to the operating system.

Channel Mirror - The motherboard maintains two identical copies of all data in memory for redundancy.

Lockstep - The motherboard uses two areas of memory to run the same set of operations in parallel.

Sparing - A preset threshold of correctable errors is used to trigger fail-over.

The spare memory is put online and used as active memory in place of the failed memory.

Demand Scrubbing

A memory error-correction scheme where the Processor writes corrected data back into the memory block from where it was read by the Processor. The options are Enabled and **Disabled**.

Patrol Scrubbing

A memory error-correction scheme that works in the background looking for and correcting resident errors. The options are Enabled and **Disabled**.

Throttling - Closed Loop/Throttling - Open Loop

Throttling improves reliability and reduces power in the processor by automatic voltage control during processor idle states. Available options are **Disabled** and Enabled. If Enabled, the following items will appear:

Hysteresis Temperature

Temperature Hysteresis is the temperature lag (in degrees Celsius) after the set DIMM temperature threshold is reached before Closed Loop Throttling begins. The options are Disabled, **1.5° C**, 3.0° C, and 6.0° C.

Guardband Temperature

This is the temperature which applies to the DIMM temperature threshold. Each step is in 0.5° C increment. The default is **[006]**. Press "+" or "-" on your keyboard to change this value.

Inlet Temperature

This is the temperature detected at the chassis inlet. Each step is in 0.5° C increment. The default is **[070]**. Press "+" or "-" on your keyboard to change this value.

Temperature Rise

This is the temperature rise to the DIMM thermal zone. Each step is in 0.5oC increment. The default is **[020]**. Press "+" or "-" on your keyboard to change this value.

Air Flow

This is the air flow speed to the DIMM modules. Each step is one mm/ sec. The default is **[1500]**. Press "+" or "-" on your keyboard to change this value.

Altitude

This feature defines how many meters above or below sea level the system is located. The options are **Sea Level or Below**, 1~300, 301~600, 601~900, 901~1200, 1201~1500, 1501~1800, 1801~2100, 2101~2400, 2401~2700, 2701~3000.

DIMM Pitch

This is the physical space between each DIMM module. Each step is in 1/1000 of an inch. The default is **[400]**. Press "+" or "-" on your keyboard to change this value.

▶North Bridge Configuration

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

Crystal Beach/DMA (Direct Memory Access)

This feature works with the Intel I/O AT (Acceleration Technology) to accelerate the performance of TOE devices. (Note: A TOE device is a specialized, dedicated processor that is installed on an add-on card or a network card to handle some or all packet processing of this add-on card.) When this feature is set to Enabled, it will enhance overall system performance by providing direct memory access for data transferring. The options are Enabled and **Disabled**.

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**.

IOH PCIE Port1 Bifurcation

This feature allows the user to set IOH Bifurcation configuration for the PCI-E Port 1. The options are X4X4X4X4, X4X4X8, X8X4X4, X8X8, and **X16**.

IOH PCIE Max Payload Size

Some add-on cards perform faster with the coalesce feature, which limits the payload size to 128 MB; while others, with a payload size of 256 MB which inhibits the coalesce feature. Please refer to your add-on card user guide for the desired setting. The options are 256MB and **128MB**.

▶South Bridge Configuration

This feature allows the user to configure the settings for the Intel ICH South Bridge chipset.

USB Functions

This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB ports, 4 USB ports, 6 USB ports, 8 Ports, 10 Ports and **12 USB ports**.

Legacy USB Support

Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the motherboard, and vise versa. The settings are Disabled, **Enabled** and Auto.

USB 2.0 Controller

Select Enabled to activate the onboard USB 2.0 controller. The options are **Enabled** and Disabled.

USB 2.0 Controller Mode

This setting allows you to select the USB 2.0 Controller mode. The options are **Hi-Speed (480 Mbps)** and Full Speed (12 Mbps).

BIOS EHCI Hand-Off

Select Enabled to enable BIOS Enhanced Host Controller Interface support to provide a workaround solution for an operating system that does not have EHCI Hand-Off support. When enabled, the EHCI Interface will be changed from the BIOS-controlled to the OS-controlled. The options are Disabled and **Enabled**.

▶IDE/SATA/Floppy Configuration

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

SATA#1 Configuration

If Compatible is selected, it sets SATA#1 to legacy compatibility mode, while selecting Enhanced sets SATA#1 to native SATA mode. The options are Disabled, **Compatible** and Enhanced.

Configure SATA#1 as

This feature allows the user to select the drive type for SATA#1. The options are **IDE**, RAID and AHCI. (When the option-RAID is selected, the item-ICH RAID Code Base will appear. When the option-AHCI is selected, the item-SATA AHCI will be available.)

ICH RAID Code Base (This feature is available when the option-RAID is selected)

Select Intel to enable Intel's SATA RAID firmware to configure Intel's SATA RAID settings. Select Adaptec to enable Adaptec's SATA RAID firmware to configure Adaptec's SATA RAID settings. The options are **Intel** and Adaptec.

SATA AHCI (This feature is available when the option-AHCI is selected)

Select Enable to enable the function of Serial ATA Advanced Host Interface. (Take caution when using this function. This feature is for advanced programmers only.)The options are Enabled and **Disabled**. If the option-Enabled is selected, the following item will display.

Hot Plug (This feature is available when the option-Enabled is selected)

Select Enable to enable the hot plug function for the SATA devices. The options are **Enabled** and Disabled.

SATA#2 Configuration

Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled, and **Enhanced**.

SATA#2 Configuration

Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled, and **Enhanced**

Primary IDE Master/Slave, Secondary IDE Master/Slave, Third IDE Master, and Fourth IDE Master

These settings allow the user to set the parameters of Primary IDE Master/ Slave, Secondary IDE Master/Slave, Third and Fourth IDE Master slots. Hit <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are:

Type

Select the type of device connected to the system. The options are Not Installed, **Auto**, CD/DVD and ARMD.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

Block (Multi-Sector Transfer)

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode allows transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to the device one sector at a time. Select Auto to allow data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

PIO Mode

The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4.

Select Auto to allow the AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

Select 0 to allow the AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MBs.

Select 1 to allow the AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MBs.

Select 2 to allow the AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MBs.

Select 3 to allow the AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MBs.

Select 4 to allow the AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

DMA Mode

Select Auto to allow the BIOS to automatically detect IDE DMA mode when the IDE disk drive support cannot be determined.

Select SWDMA0 to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MBs.

Select SWDMA1 to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MBs.

Select SWDMA2 to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MBs.

Select MWDMA0 to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MBs.

Select MWDMA1 to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MBs.

Select MWDMA2 to allow the BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MBs.

Select UDMA0 to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MBs. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.

Select UDMA1 to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MBs.

Select UDMA2 to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MBs.

Select UDMA3 to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 66.6 MBs.

Select UDMA4 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 100 MBs.

Select UDMA5 to allow the BIOS to use Ultra DMA mode 5. It has a data transfer rate of 133 MBs.

Select UDMA6 to allow the BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133 MBs. The options are **Auto**, SWDMAn, MWDMAn, and UDMAn.

S.M.A.R.T. For Hard disk drives

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select Auto to allow the AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent the AMI BIOS from using the S.M.A.R.T. Select Enabled to allow the AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

32Bit Data Transfer

Select Enable to enable the function of 32-bit IDE data transfer. The options are **Enabled** and Disabled.

IDE Detect Timeout (sec)

Use this feature to set the time-out value for the BIOS to detect the ATA, ATAPI devices installed in the system. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and 35.

▶PCI/PnP Configuration

Clear NVRAM

This feature clears the NVRAM during system boot. The options are **No** and Yes.

Plug & Play OS

Selecting Yes allows the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select **No** to allow the AMI BIOS to configure all devices in the system.

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, **64**, 96, 128, 160, 192, 224 and 248.

PCI IDE BusMaster

When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are Disabled and **Enabled**.

Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM

Select Enabled to enable the onboard LAN1 or LAN2 Option ROM. This is to boot computer using a network interface. The options are Enabled and **Disabled**.

▶Super IO Device Configuration

Serial Port1 Address/ Serial Port2 Address

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, **3F8/IRQ4**, 3E8/IRQ4, 2E8/IRQ3. The options for Serial Port2 are Disabled, **2F8/IRQ3**, 3E8/IRQ4, and 2E8/IRQ3.

▶Remote Access Configuration

Remote Access

This allows the user to enable the Remote Access feature. The options are Disabled and Enabled. If Remote Access is set to Enabled, the following items will display:

Serial Port Number

This feature allows the user decide which serial port to be used for Console Redirection. The options are COM 1 and **COM 2**.

Serial Port Mode

This feature allows the user to set the serial port mode for Console Redirection. The options are **115200 8, n 1**; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

Flow Control

This feature allows the user to set the flow control for Console Redirection. The options are **None**, Hardware, and Software.

Redirection After BIOS POST

Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST. (Note: This setting may not be supported by some operating systems.) Select Boot Loader to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and **Always**.

Terminal Type

This feature allows the user to select the target terminal type for Console Redirection. The options are **ANSI**, VT100, and VT-UTF8.

VT-UTF8 Combo Key Support

A terminal keyboard definition that provides a way to send commands from a remote console. Available options are **Enabled** and Disabled.

Sredir Memory Display Delay

This feature defines the length of time in seconds to display memory information. The options are **No Delay**, Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

▶Hardware Health Monitor

This feature allows the user to monitor system health and review the status of each item as displayed.

CPU Overheat Alarm

This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

Warning:
1.Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed.
2. To avoid possible system overheating, please be sure to provide adequate airflow to your system.

The options are:

- The Early Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- The Default Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5° C above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

CPU Temperature/System Temperature

This feature displays current temperature readings for the CPU and the System. The following items will be displayed for your reference only:

CPU Temperature

The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is each CPU is embedded by unique temperature information that the motherboard can read. This ‘Temperature Threshold’ or ‘Temperature Tolerance’ has been assigned at the factory and is the baseline on which the motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc). Since CPUs can have different ‘Temperature Tolerances’, the installed CPU

can now send information to the motherboard what its 'Temperature Tolerance' is, and not the other way around. This results in better CPU thermal management.

Bull has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25oC). The CPU Temperature feature will display the CPU temperature status as detected by the BIOS:

Low – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).

User intervention: No action required.

Medium – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

High – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems.

Notes:

1. The system may shut down if it continues for a long period to prevent damage to the CPU.

2. The information provided above is for your reference only. For more information on thermal management, please refer to Intel's Web site at www.Intel.com.

System Temperature: The system temperature will be displayed (in degrees in Celsius and Fahrenheit) as it is detected by the BIOS.

Fan Speed Control Monitor

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select "Disabled, (Full Speed @12V)" to disable the fan speed control function and allow the onboard fans to constantly run at the full speed (12V). The Options are: 1. **Disabled (Full Speed)**, 2. Server Mode, 3. Workstation Mode.

Fan1 ~ Fan 4 Reading

This feature displays the fan speed readings from fan interfaces Fan1 through Fan5.

Voltage Monitoring

The following items will be monitored and displayed:

CPU1 Vcore, CPU2 Vcore, +5Vin, +12Vcc (V), VP1 DIMM, VP2 DIMM, 3.3Vcc (V), and Battery Voltage

▶ACPI Configuration

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

ACPI Version Features

The options are **ACPI v1.0**, ACPI v2.0 and ACPI v3.0. Please refer to ACPI's website for further explanation: http://www.acpi.info/.

ACPI APIC Support

Select Enabled to include the ACPI APIC Table Pointer in the RSDT (Root System Description Table) pointer list.The options are **Enabled** and Disabled.

APIC ACPI SCI IRQ

When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system. The options are Enabled and **Disabled**.

Headless Mode

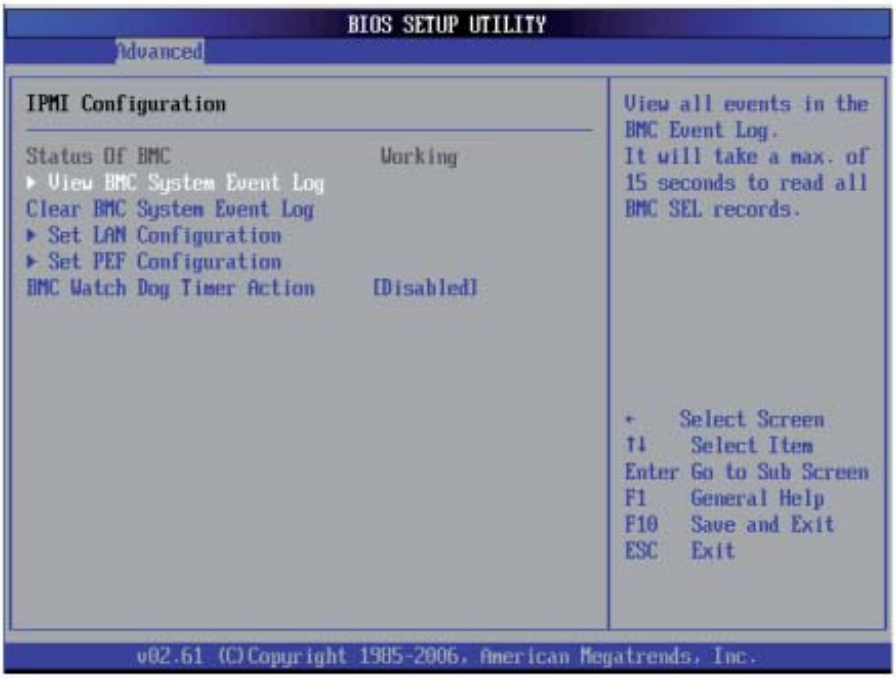
This feature is used to enable system to function without a keyboard, monitor or mouse attached The options are Enabled and **Disabled**.

High Performance Event Timer

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**.

▶IPMI Configuration

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.

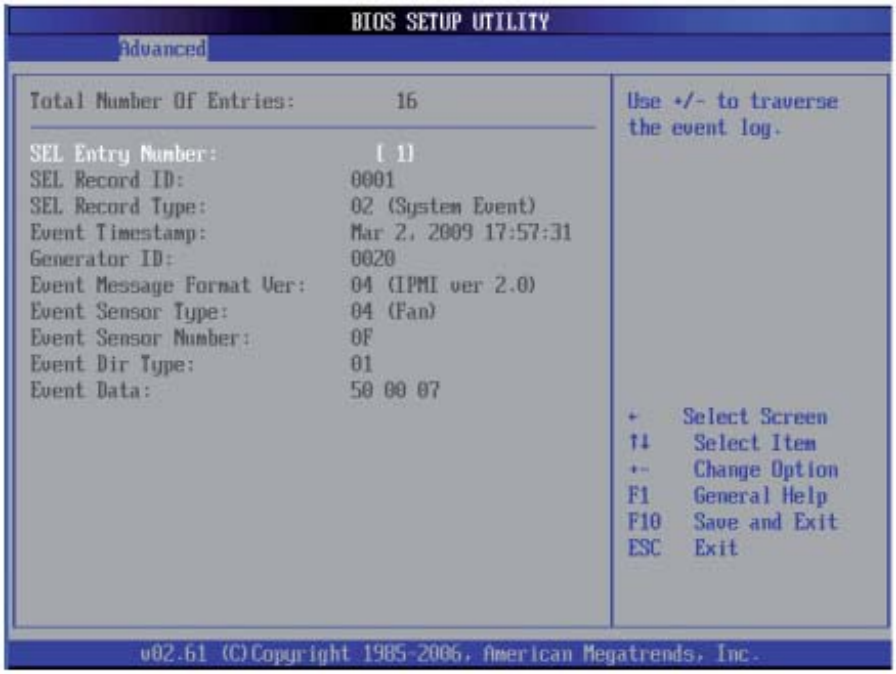


Status of BMC

Baseboard Management Controller (BMC) manages the interface between system management software and platform hardware. This is an informational feature which returns the status code of the BMC micro controller.

▶View BMC System Event Log

This feature displays the BMC System Event Log (SEL). It shows the total number of entries of BMC System Events. To view an event, select an Entry Number and pressing <Enter> to display the information as shown in the screen..



- Total Number of Entries
- SEL Entry Number
- SEL Record ID
- SEL Record Type
- Timestamp, Generator ID
- Event Message Format User
- Event Sensor Type
- Event Sensor Number,
- Event Dir Type
- Event Data.

Clear BMC System Event Log

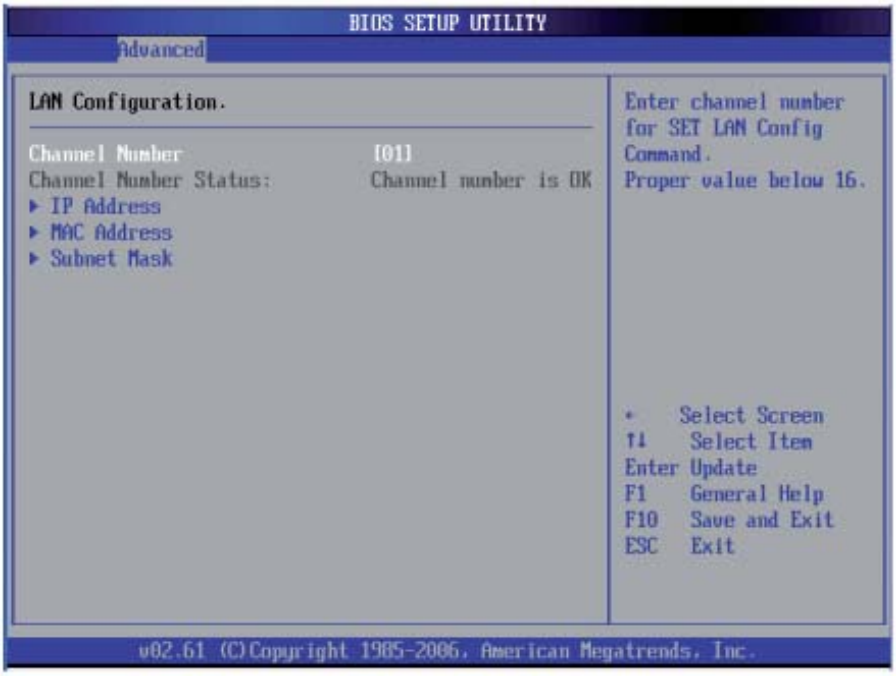
Clear BMC System Log

Select OK and press the <Enter> key to clear the BMC system log. Select to keep the BMC System log. The options are **OK** and Cancel..

Caution: Any cleared information is unrecoverable. Make absolutely sure that you no longer need any data stored in the log before clearing the BMC Event Log.

▶Set LAN Configuration

Set this feature to configure the IPMI LAN adapter with a network address as shown in the following graphics..

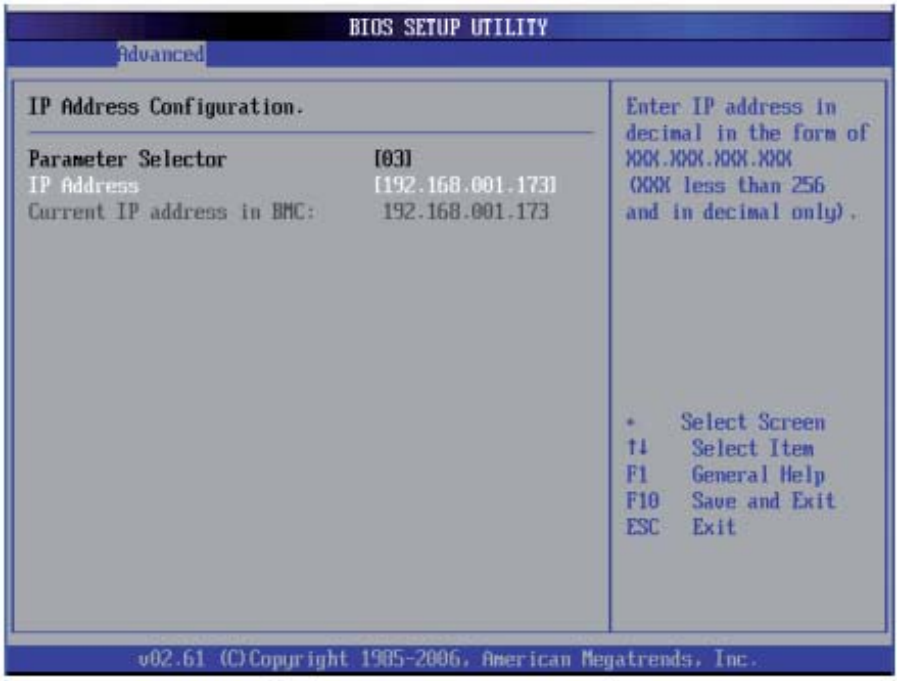


Channel Number - Enter the channel number for the SET LAN Config command. This is initially set to **[1]**. Press "+" or "-" on your keyboard to change the Channel Number.

Channel Number Status - This feature returns the channel status for the Channel Number selected above: "Channel Number is OK" or "Wrong Channel Number".

▶IP Address Configuration

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 as shown in the screen below..



Parameter Selector

Use this feature to select the parameter of your IP Address configuration. IP Address

Current IP Address in BMC

This item displays the current IP address used for your IPMI connection..

▶MAC Address Configuration

Parameter Selector

Use this feature to select the parameter of your Mac Address configuration.

Mac Address

The BIOS will automatically enter the Mac address of this machine; however it may be over-ridden. 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).

Current Mac Address in BMC

This item displays the current Mac address used for your IPMI connection.

▶Subnet Mask Configuration

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..

Parameter Selector

Use this feature to select the parameter of your Subnet Masks configuration.

Subnet Mask

This item displays the current subnet mask setting for your IPMI connection.

▶Set PEF Configuration

Set PEF Configuration

Set this feature to configure the Platform Event Filter (PEF). PEF interprets BMC events and performs actions based on pre-determined settings or 'traps' under IPMI 1.5 specifications. For example, powering the system down or sending an alert when a triggering event is detected.

The following will appear if PEF Support is set to Enabled. The default is **Disabled**.

PEF Action Global Control - These are the different actions based on BMC events. The options are **Alert**, Power Down, Reset System, Power Cycle, OEM Action, Diagnostic Interface.

Alert Startup Delay - This feature inserts a delay during startup for PEF alerts. The options are Enabled and ***Disabled***.

PEF Alert Startup Delay - This sets the pre-determined time to delay PEF alerts after system power-ups and resets. Refer to Table 24.6 of the IPMI 1.5 Specification for more information at www.intel.com. The options are **No Delay**, 30 sec, 60 sec, 1.5 min, 2.0 min.

Startup Delay - This feature enables or disables startup delay. The options are Enabled and **Disabled**.

PEF Startup Delay - This sets the pre-determined time to delay PEF after system power-ups and resets. Refer to Table 24.6 of the IPMI 1.5 Specification for more information at www.intel.com. The options are **No Delay**, 30 sec, 60 sec, 1.5 min, 2.0 min.

Event Message for PEF Action - This enables of disables Event Messages for PEF action. Refer to Table 24.6 of the IPMI 1.5 Specification for more information at www.intel.com. The options are **Disabled** and Enabled.

▶BMC Watch Dog Timer Action

Allows the BMC to reset or power down the system if the operating system hangs or crashes. The options are **Disabled**, Reset System, Power Down, Power Cycle.

BMC Watch Dog TimeOut [Min:Sec]

This option appears if BMC Watch Dog Timer Action (above) is enabled. This is a timed delay in minutes or seconds, before a system power down or reset after an operating system failure is detected. The options are **[5 Min]**, [1 Min], [30 Sec], and [10 Sec].

▶DMI Event Log

View Event Log

Use this option to view the System Event Log.

Mark all events as read

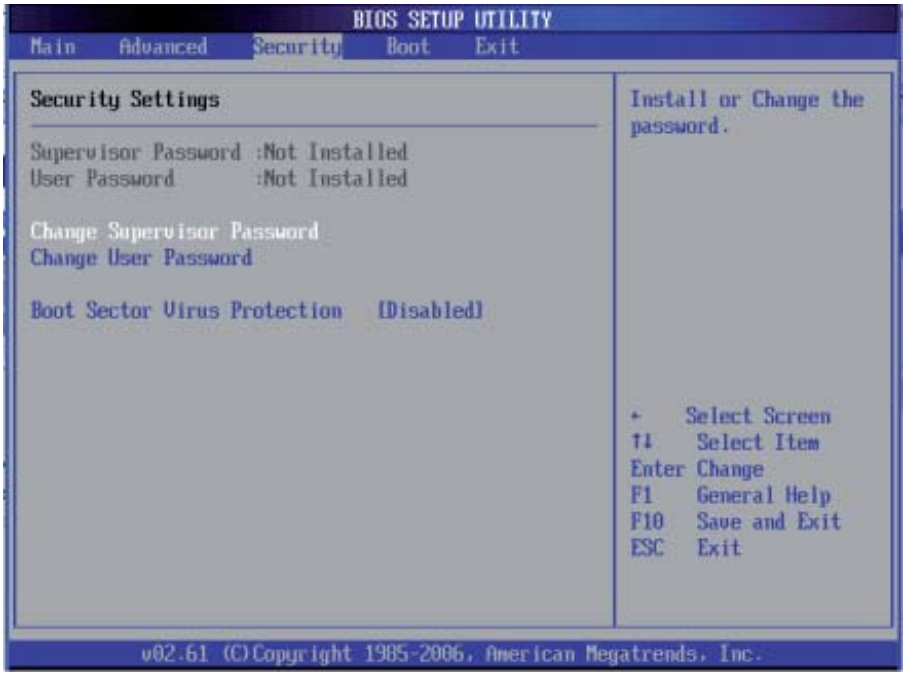
This option marks all events as read. The options are OK and **Cancel**.

Clear event log

This option clears the Event Log memory of all messages. The options are OK and **Cancel**.

7-4 Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.



Supervisor Password

This item indicates if a Supervisor password has been entered for the system. "Not Installed" means a Supervisor password has not been used.

User Password

This item indicates if a user password has been entered for the system. "Not Installed" means that a user password has not been used.

Change Supervisor Password

Select this feature and press <Enter> to access the submenu, and then type in a new Supervisor Password.

User Access Level (Available when Supervisor Password is set as above)

Available options are Full Access: grants full User read and write access to the

Setup Utility, View Only: allows access to the Setup Utility but the fields cannot be changed, Limited: allows only limited fields to be changed such as Date and Time, No Access: prevents User access to the Setup Utility.

Change User Password

Select this feature and press <Enter> to access the submenu , and then type in a new User Password.

Clear User Password (Available only when User Password has been set)

This item allows you to clear a user password after it has been entered.

Password Check

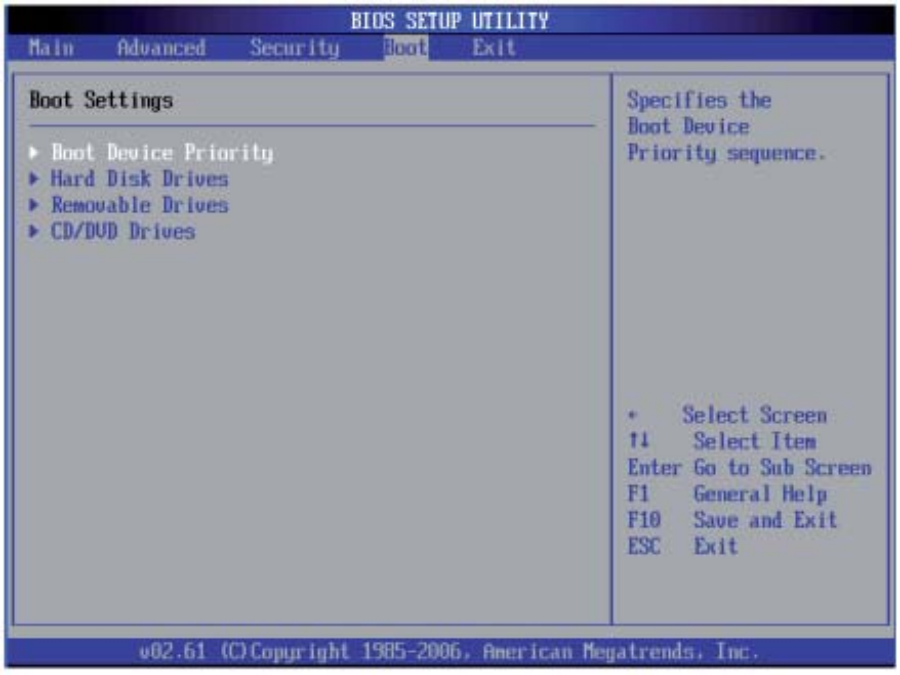
This item allows you to check a password after it has been entered. The options are **Setup** and Always.

Boot Sector Virus Protection

When Enabled, the AMI BOIS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

7-5 Boot Configuration

Use this feature to configure boot settings..



▶Boot Device Priority

This feature allows the user to specify the sequence of priority for the Boot Device.

The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

• 1st Boot Device - [USB: XXXXXXXXX]

• 2nd Boot Device - [CD/DVD: XXXXXXXXX]

▶Hard Disk Drives

This feature allows the user to specify the boot sequence from all available hard disk drives. The settings are Disabled and a list of all hard disk drives that have been detected (i.e., 1st Drive, 2nd Drive, 3rd Drive, etc).

• 1st Drive - [SATA: XXXXXXXXX]

▶Removable Drives

This feature allows the user to specify the boot sequence from available Removable Drives. The settings are 1st boot device, 2nd boot device, and Disabled.

• 1st Drive - [USB: XXXXXXXXX]

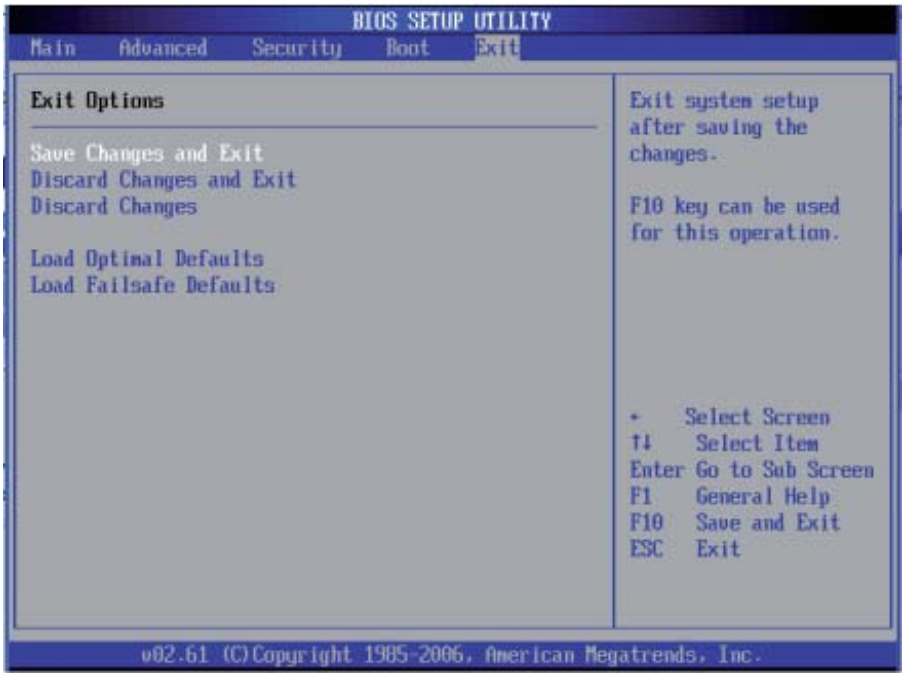
• 2nd Drive

▶CD/DVD Drives

This feature allows the user to specify the boot sequence from available CD/DVD Drives (i.e., 1st Drive, 2nd Drive, etc).

7-6 Exit Options

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



Save Changes and Exit

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>.

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>.

Discard Changes

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

Load Optimal Defaults

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

Load Fail-Safe Defaults

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not for maximum performance.

Notes

Appendix A. BIOS Error Beep Codes

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

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

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

A-1 BIOS Error Beep Codes

BIOS Error Beep 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
8 beeps	Display memory read/write error	Video adapter missing or with faulty memory
1 continuous beep (with the front panel OH LED on)	System Overheat	1 continuous beep with the front panel OH LED on

Notes

Appendix B. Intel HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure Intel's IOH-36D SATA RAID before you install the Windows Operating System and other software drivers.

Important Notes to the User

- If you do not wish to configure onboard SATA RAID functions, please go directly to Section B-3 and Appendix C for OS and other software installation instructions.

- This chapter describes RAID Configuration Instructions for the Intel IOH-36D RAID controller designed for the Windows OS.

B-1 Introduction to Serial ATA and Parallel ATA

To configure the SATA RAID functions, you must first use the Intel IOH-36D SATA RAID Utility program to configure the RAID Level that you desire before installing the Windows XP/2000/2003 operating system and other software drivers. (The necessary drivers are all included on the CD that came packaged with your motherboard.) Note that the current version of the IOH-36D SATA RAID Utility can only support Windows XP/2000/2003 Operating Systems.

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link, which supports transfer rates up to 3.0 Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis than Parallel ATA. In addition, the cables used in PATA are limited to a length of 40cm, while Serial ATA cables can be up to one meter in length. Overall, SATA provides better functionality than PATA.

Introduction to the Intel IOH-36D Serial RAID

Located in the South Bridge of the 5520 chipset, the I/O Controller Hub (IOH-36D) provides the I/O subsystem with access to the rest of the system. It supports an 1-channel UltraATA/100 Bus Master IDE controller (PATA) and six Serial ATA (SATA) ports. The IOH-36D supports the following PATA and SATA device configurations: Legacy mode and Native mode.

The Intel HostRAID Configurations

The following RAID levels are supported:

RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections of two hard drives. Data transfer rate is doubled over using a single disk.

RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

RAID 10 (Striping & Mirroring): RAID 0 and 1 schemes are combined (without parity information) to get the benefits of both.

RAID 5: both data and parity information are striped and mirrored across three or more hard drives.

The Intel Matrix Storage

The Intel Matrix Storage, supported by the IOH-36D, allows the user to create RAID 0, RAID 1, RAID 10 and RAID 5 sets by using only six identical hard disk drives. The Intel Matrix Storage Technology creates two partitions on each hard disk drive and generate a virtual RAID 0, RAID 1, RAID 10 and RAID 5 sets. It also allows you the change the HDD partition size without any data.

Configuring BIOS Settings for SATA RAID Functions (Native Mode)

1. Press the <Del> key during system bootup to enter the BIOS Setup Utility. Note: If it is the first time powering on the system, we recommend you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Main" section in BIOS.

4. Scroll down to "SATA Controller Mode" and press the <Enter> key to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Go to "Exit". Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

7. Once you've exited the BIOS Utility, the system will re-boot.

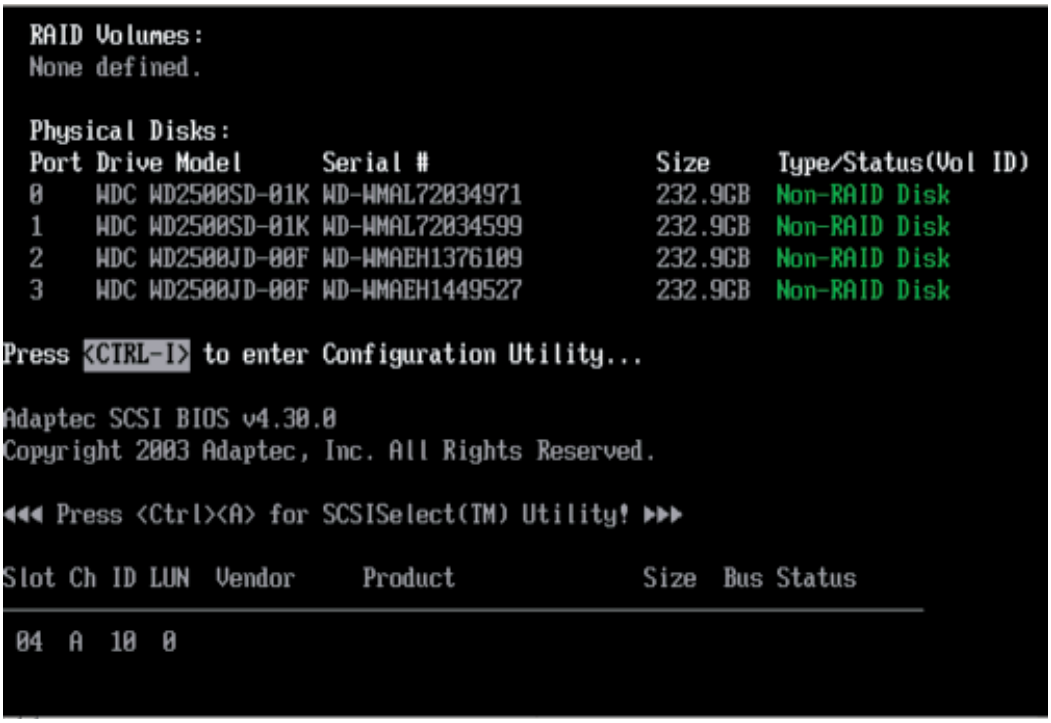
8. During the system boot-up, press the <Ctrl> and <I> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <I> for the* Intel *RAID Configuration Utility*.

Note: The Intel RAID Configuration Utility is only available for systems with two or more drives installed. The Intel RAID Utility screen will not display in systems with one drive installed. Due to each serverboard controlling two of the four SATA

Using the Intel IOH-36D SATA RAID Utility Program

Creating, Deleting and Resetting RAID Volumes:

a. After the system exits from the BIOS Setup Utility, the system will automatically reboot. The following screen appears after Power-On Self Test.

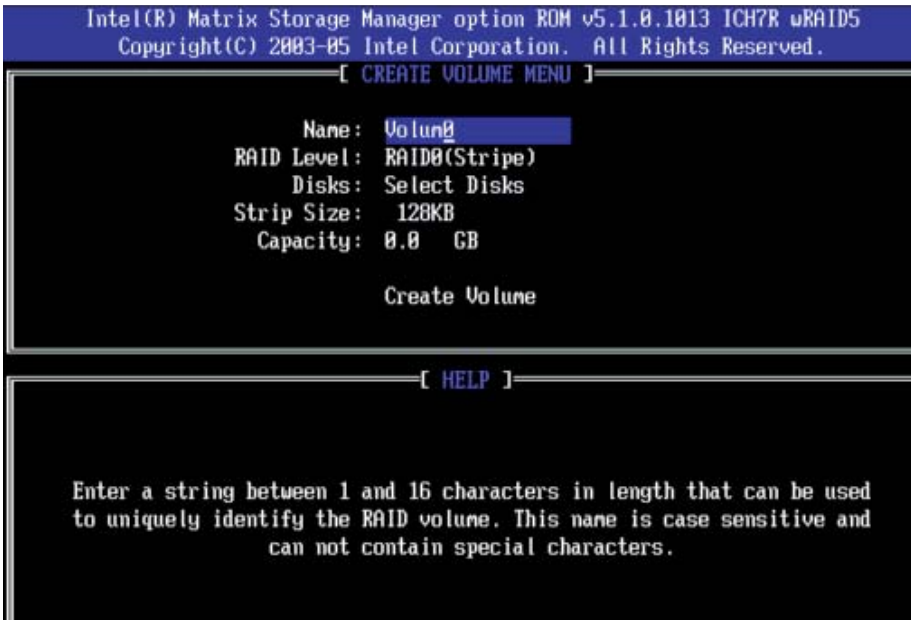


b. When you see the above screen, press the <Ctrl> and the <I> keys simultaneously to have the main menu of the SATA RAID Utility appear:

Note: All graphics and screen shots shown in the manual are for reference only. The screen shots shown in the manual do not imply Supermicro's endorsement or non-endorsement on any 3rd party's product. Your screens may or may not look exactly the same as the graphics shown in this manual.

Creating a RAID 0 Volume

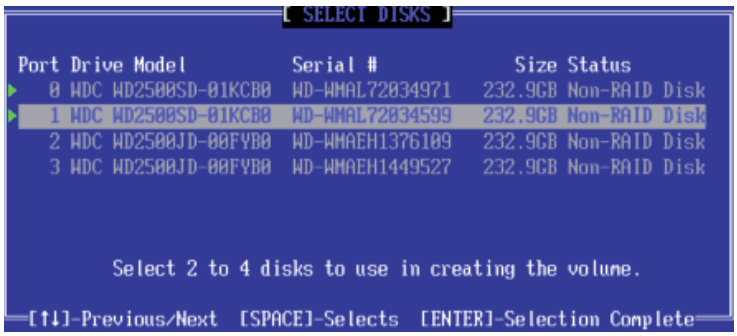
a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



b. Specify a name for the **RAID 0** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)

c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 0 (Stripe)** and hit <Enter>.

d. When the Disks item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen displays (see note on page B-3) :



e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.

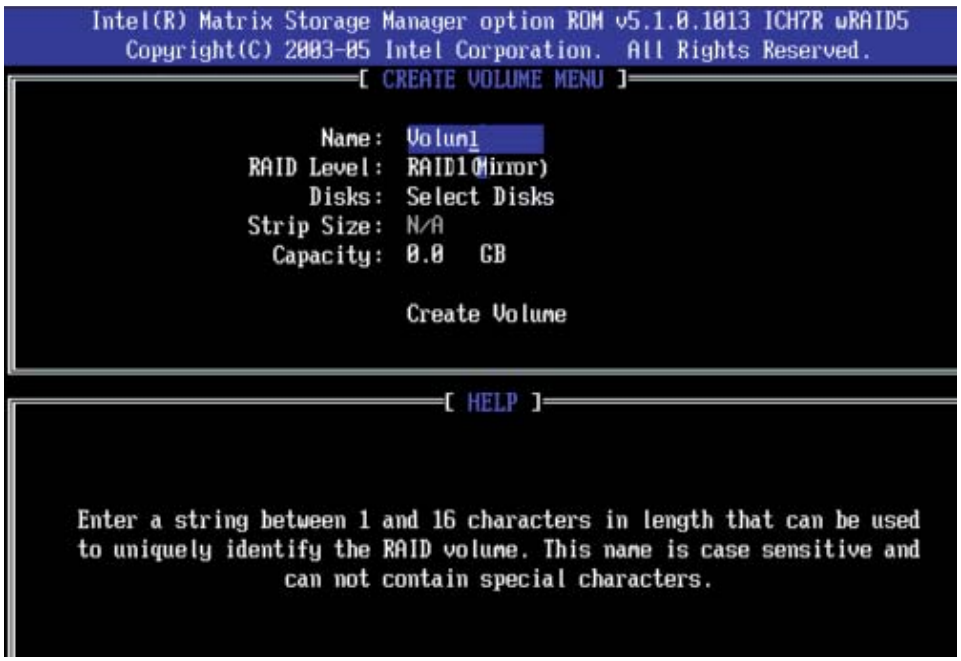
f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 0 array, and hit <Enter>. (Note: For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)

g. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

h. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 1 Volume

a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



b. Specify a name for the **RAID 1** set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)

c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select **RAID 1 (Mirror)** and hit <Enter>.

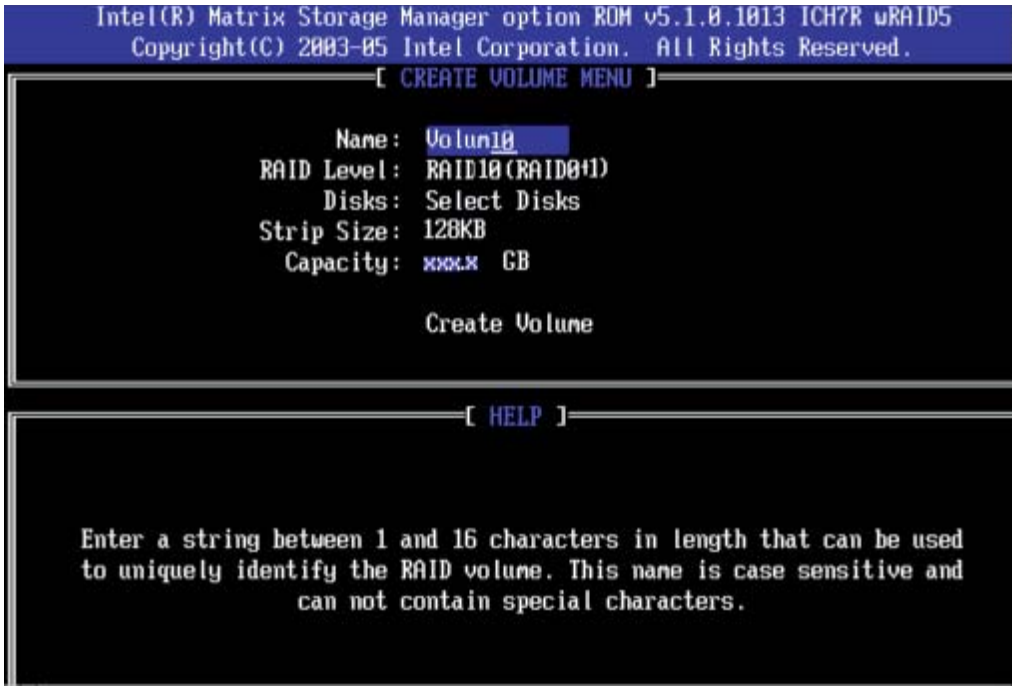
d. When the Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.

e. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

f. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 10 (RAID 1+ RAID 0)

a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



b. Specify a name for the **RAID 10** set and press <Enter>.

c. When RAID Level item is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 10 (RAID1 + RAID0)** and hit <Enter>.

d. When the Stripe Size is highlighted, use the <Up Arrow>, <Down Arrow> keys to select the stripe size from 4 KB to 128 KB for your RAID 10 and hit <Enter>. The default setting is 64 KB. (Note: For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size.)

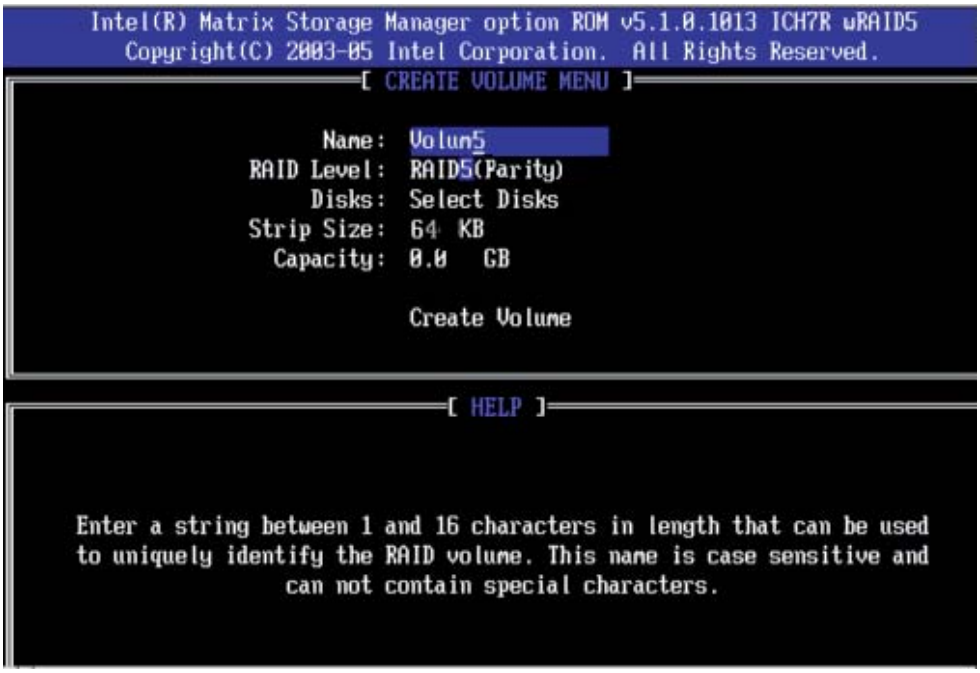
e. When the RAID Volume Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.

f. Press <Enter> when the Create Volume item is highlighted. A warning message displays.

g. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 5 Set (Parity)

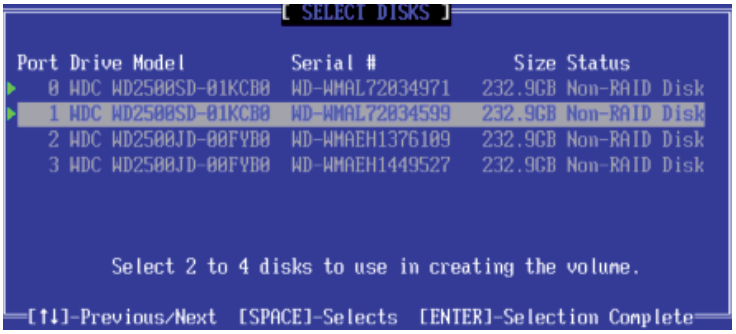
a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



b. Specify a name for the **RAID 5** set and press <Enter>.

c. When the Raid Level is highlighted, use the <Up Arrow>, <Down Arrow> keys to select **RAID 5 (Parity)** and hit <Enter>.

d. When the Disk item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen displays (see note on page B-3):



e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.

f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 5 array, and hit <Enter>. (Note: For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)

g. Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.

h Press Enter when the Create Volume item is highlighted. A warning message displays.

i. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Deleting a RAID Volume

Warning: Make sure you back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

a. From the main menu, select item2-Delete RAID Volume, and press <Enter>.

b. Use the <Up Arrow>, <Down Arrow> keys to select the RAID set you want to delete and press <Del>. A warning message displays.

c. When asked "Are you sure you want to delete this volume (Y/N), press "Y" to delete the RAID volume, or type "N" to go back to the Delete Volume menu.

Resetting to Non-RAID and Resetting a RAID HDD

Warning: Be cautious when you reset a RAID volume HDD to non-RAID or Resetting a RAID HDD. Resetting a RAID volume HDD or Resetting a RAID HDD will reformat the HDD and delete the internal RAID structure on the drive.

a. From the main menu, select item3-Reset Disks to Non- RAID, and press <Enter>. The following screen will appear:

b. Use the <Up Arrow>, <Down Arrow> keys to highlight the RAID set drive to reset and press <Space> to select.

c. Press <Enter> to reset the RAID set drive. A Warning message displays.

d. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Exiting the Intel Matrix Storage Manager Utility

a. From the main menu, select item4-Exit, and press <Enter>. A warning message will appear.

b. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Appendix C. Adaptec HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure the Adaptec Embedded Serial ATA RAID before you install the Windows operating system. The necessary drivers are all included on the bootable CDs that came packaged with your motherboard. Note: The following section provides information on the Adaptec SATA RAID Driver based on the Intel Enterprise South Bridge 2 (IOH-36D) controller.

C-1 Adaptec Embedded SATA Controller

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface. It uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link which supports SATA Transfer rates up to 3.0 Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis than PATA. In addition, the cables used in PATA can only extend to 40cm long, while SATA cables can extend up to one meter. Overall, SATA provides better functionality than PATA.

Introduction to the Intel IOH-36D I/O Controller Hub

Located in the South Bridge of the Intel 5520 Chipset, the IOH-36D I/O controller Hub provides the I/O subsystem with access to the rest of the system. It supports 1-channel Ultra ATA/100 Bus Master IDE controller (PATA) and one Adaptec SATA Host Controller, which support up to six SATA drives, up to two RAID volumes and up to four drives in RAID configurations. (See the table below for details.)

*** Adaptec's SATA HostRAID Controller Firmware supports:**	
Drives supported	Six
Number of RAID Volumes supported	Two
Total Drives in RAID Configurations	Four
Examples of Valid RAID Configurations:	
Two drives of RAID 1 + two drives of RAID 0	
Two drives of RAID 1 + two drives of RAID 1	
Three drives of RAID 0	
Four drives of RAID 0	
Examples of Invalid RAID Configurations:	
Three drives of RAID 0 + two drives of RAID 1	
(***Note**: this table is applicable to Adaptec's HostRAID Controller Firmware only.)	

Configuring SATA RAID

1. Press the <Del> key during system bootup to enter the BIOS Setup Utility.

Note: If it is the first time powering on the system, we recommend you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Main" section in BIOS.

4. Scroll down to "SATA Control Mode" and press the <Enter> key to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Scroll down to "ICH RAID Codebase" and select "Adaptec". Then press <Enter>. (For ICH RAID Codebase: Change the setting from Intel to Adaptec.)

7. Go to "Exit". Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

8. Once you've exited the BIOS Utility, the system will re-boot.

9. During the system boot-up, press the <Ctrl> and <A> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: Press <Ctrl> <A> for Intel RAID Configuration Utility.

Adaptec SATA with HostRAID

The Adaptec Embedded Serial ATA RAID Controller adds SATA/RAID functionality and performance enhancements to a motherboard. RAID striping (RAID 0) allows data to be written across multiple drives, greatly improving hard disk I/O performance. RAID mirroring (RAID 1) allows data to be simultaneously written to two drives, improving data security even if a single hard disk fails. A Stripe of Mirrors (RAID 10) provides multiple RAID 1 mirrors and a RAID 0 stripe, maximizing data security and system efficiency. By incorporating the Adaptec Embedded Serial ATA into the motherboard design, bullx R422-E1/R422-INF-E1 serverboard offers the user the benefits of SATARAID without the high costs associated with hardware RAID applications.

Using the Adaptec RAID Configuration Utility (ARC)

The Adaptec RAID Configuration Utility, an embedded BIOS Utility, includes the following:

Array Configuration Utility: Use this utility to create, configure and manage arrays.

Disk Utilities: Use this option to format or verify disks.

To run the Adaptec RAID Configuration Utility, you will need to do the following:

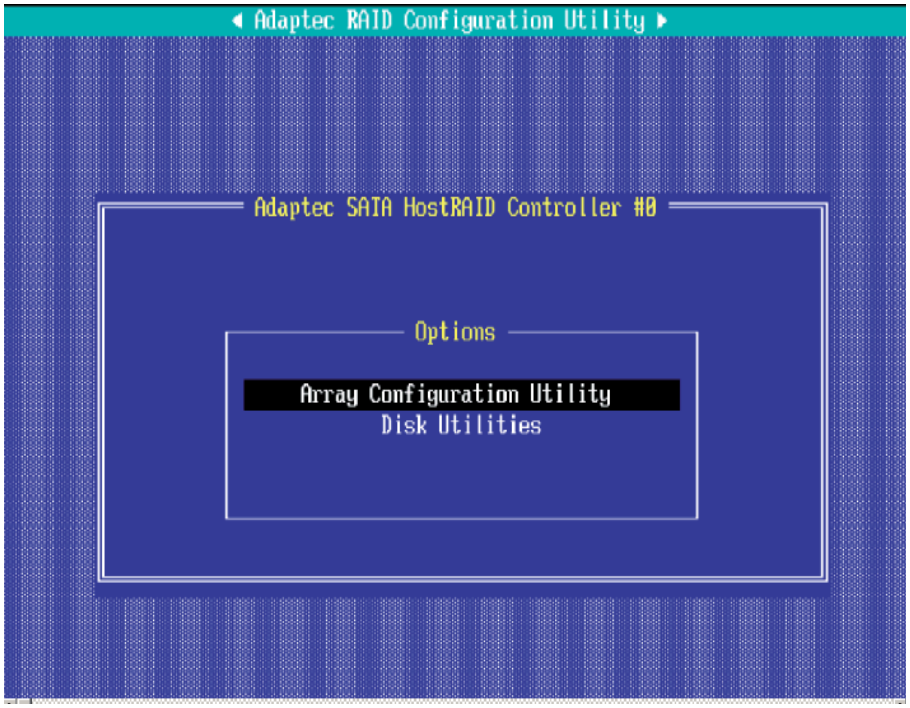
1. Enable RAID functions in the system BIOS (refer to Chapter 4 for System BIOS Configurations).

2. Press the <Ctrl> and <A> keys simultaneously when prompted to do so during system boot. (Refer to the previous page for detailed instructions.)

Using the Array Configuration Utility (ACU)

When you press <Ctrl> and <A> keys simultaneously at the prompt during system bootup, the main menu will appear.

Note: To select an option, use the arrow keys to highlight the item and then press the <Enter> key to select it. To return to the previous menu, press the <ESC> key. Press the <Insert> key to select a drive. When a drive is highlighted (selected), press the <Delete> key to de-select it.



Managing Arrays

Select this option to view array properties, and configure array settings.

To select this option, using the arrow keys and the <enter> key, select "Managing Arrays" from the main menu as shown above.

Configuring Disk Drives

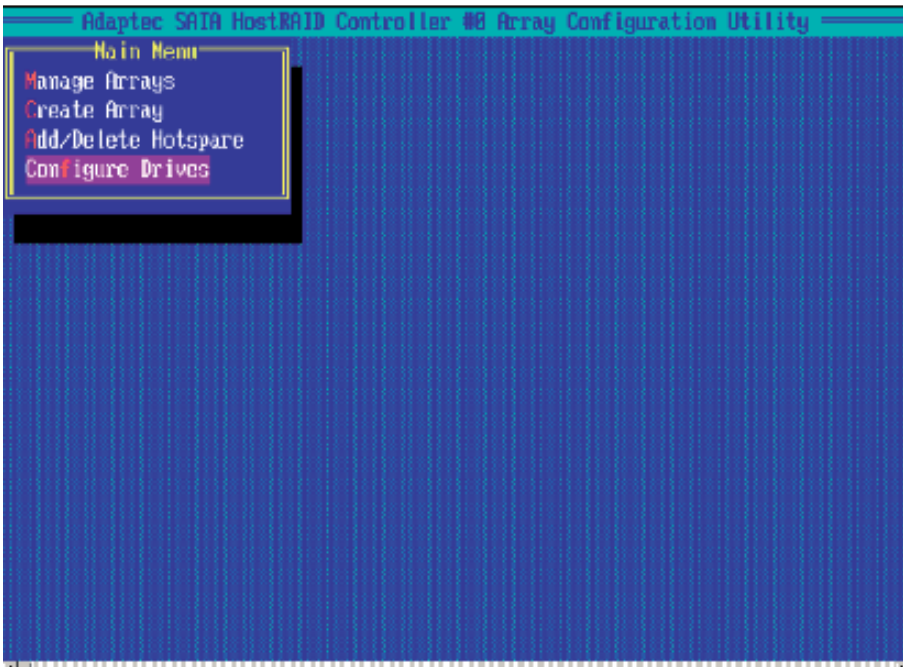
You may need to configure a disk drive before you can use it.

Caution: Configuring a disk may overwrite the partition table on the disk and may make any data on the disk inaccessible. If the drive is used in an array, you may not be able to use the array again.

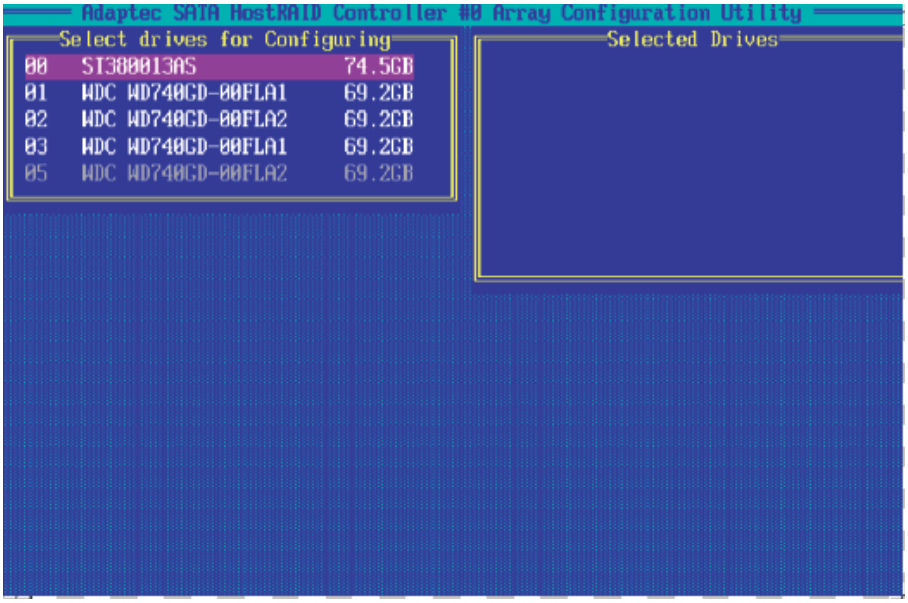
Do not configure a disk that is part of a boot array. To determine which disks are associated with a particular array, please refer to Viewing Array Properties.

To configure a disk drive:

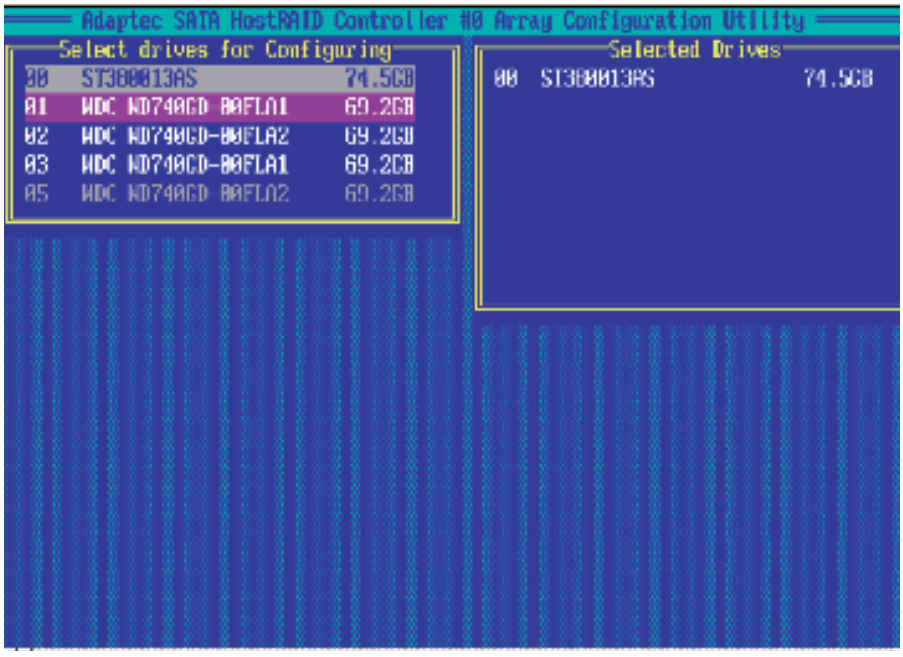
1. From the main menu (shown on Page C-4), select Configure Drives and hit <Enter> (as shown below.)



2. From the "Select Drives for Configuring" List (shown below,) select the drives you want to configure and press <Insert>.

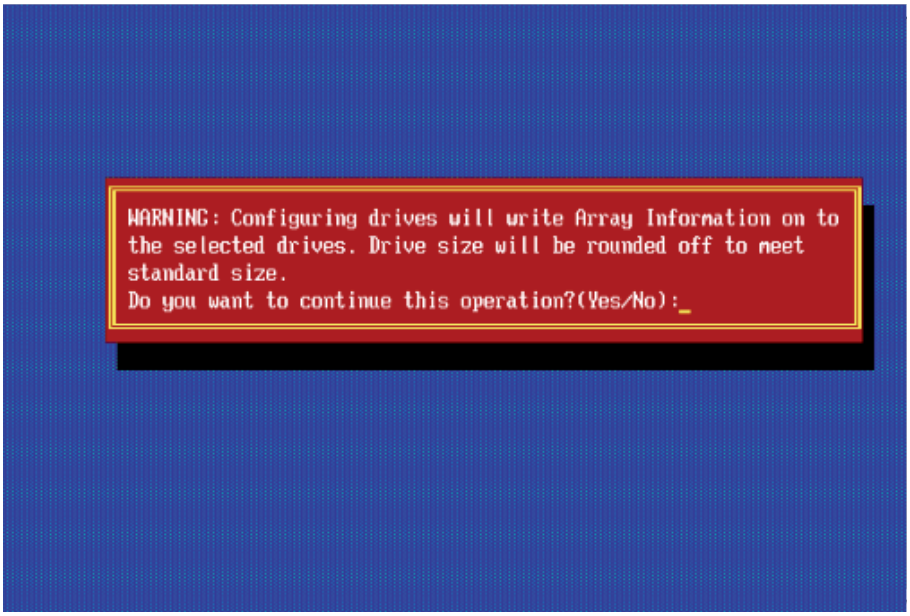


3. The drive you've selected will appear in the "Selected Drives Dialog Box" on the right (as shown below.) Repeat the same steps until all drives that you want to configure appear in the selected drives box.



4. Once both drives display in the selected drive box, press <Enter>.

5. Read the warning message as shown in the screen below.



6. Make sure that you have selected the correct disk drives to configure. If correct, type Y to continue.

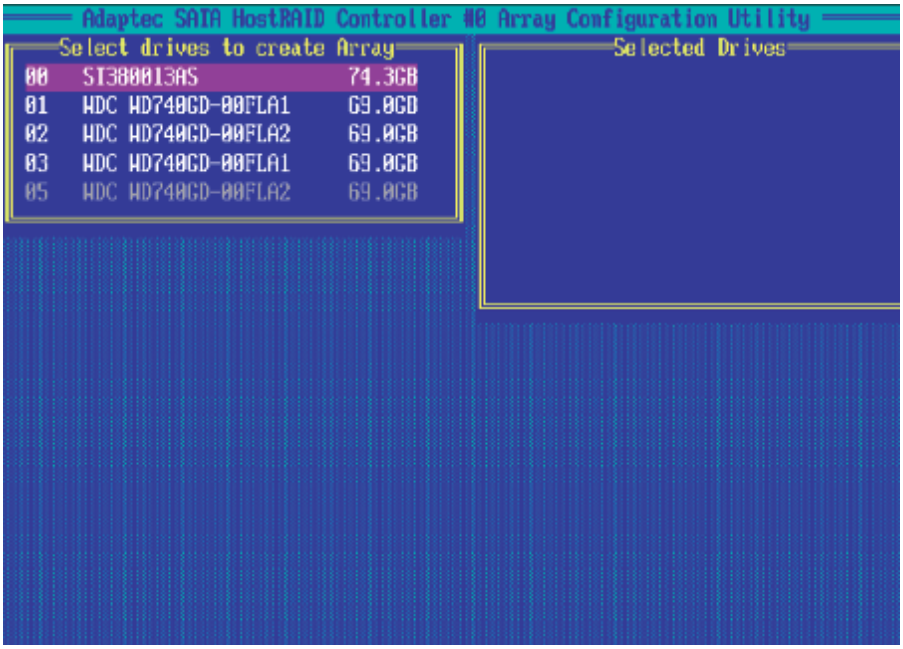
Creating Arrays

Before you create arrays, make sure that the disks for the array are connected and installed in your system. Note that disks with no usable space, or disks that are un-initialized or not formatted are shown in gray and cannot be used. (**Note**: It is recommended that you configure devices before you create arrays.)

To create an array:

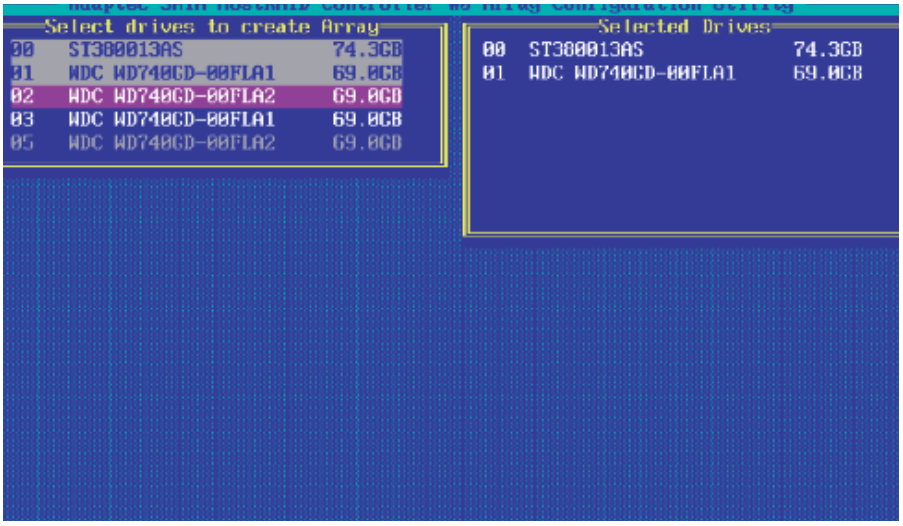
1. From the main menu (shown on page C-4), select Create Array.

2. Select the disks for the new array and press Insert (as the screen shown below). (Note: To de-select any disk, highlight the disk and press Delete.)



3. The arrays you have selected will appear on the Selected Drives dialog box on the right (as shown below.)

4 Press Enter when both disks for the new array are selected. The Array Properties menu displays.



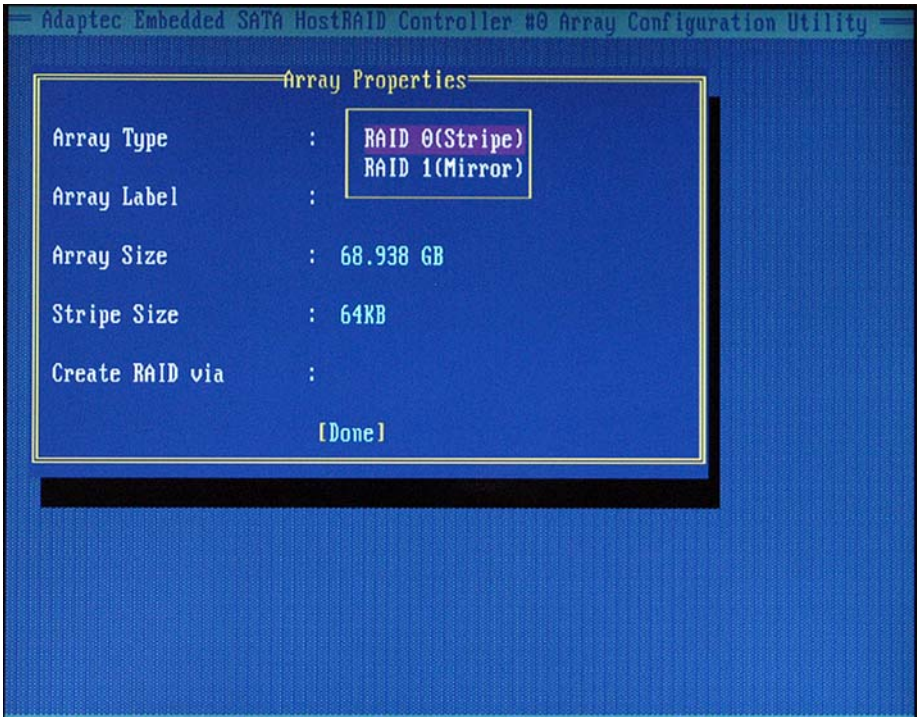
Assigning Array Properties

Once a new array is completed, you can assign properties to the array.

Caution: Once the array is created and its properties are assigned, and you cannot change the array properties using this utility.

To assign properties to the new array:

1. In the Array Properties menu (as shown in the screen below), select an array type and press Enter. Only the available array types will be displayed on the screen. (RAID 0 or RAID 1 requires two drives.)



2. Under the item "Arrays Label", type in a label and press <Enter>. (Note: The label shall not be more than 15 characters.)

3. For RAID 0, select the desired stripe size. (Note: Available stripe sizes are 16, 32, and 64 KB. 64K is default. Please do not change the default setting.)

4. The item: "Create RAID via" allows you to select between the different ways of creating methods for RAID 0 and RAID 1.

The following table gives examples of when each is appropriate.

Raid Level	Create Via	When Appropriate
RAID 0	Quick Init	Creating a RAID 0 on new drives
RAID 0	Migrate*	Creating a RAID 0 from one new drive and one drive with data you wish to preserve
RAID 1	Build*	Any time you wish to create a RAID 1, but especially if you have data on one drive that you wish to preserve
RAID 1, RAID 10	Clear	Creating a RAID 1 or RAID 10 on new drives, or when you want to ensure that the array contains no data after creation.
RAID 1, RAID 10	Quick Init	Fastest way to create a RAID 1 or RAID 10 Appropriate when using new drives

(Note: If you select Migrate for RAID 0, or Build for RAID 1, you will be asked to select the source drive. The contents of the source drive will be preserved. However, the data on the new drive will be lost.)

5. When you are finished, press <**Done>** (as the screen shown below).

Notes:

1. Before adding a new drive to an array, be sure to back up any data stored on the new drive; otherwise, all data will be lost.

2. If you stop the Build or Clear process on a RAID 1, you can restart it by pressing <Ctrl> and <R>.

3. If you've used the Quick Init option to create a RAID1, it may return some data mis-comparison when you run a consistency check at a later time. This is normal.

4. The Adaptec Host RAID allows you to use drives of different sizes in a RAID. However, you can only select a smaller drive as the source or first drive during a build operation.

5. When migrating from single volume to RAID 0, migrating from a larger drive to a smaller drive is allowed. However, the destination drive must be at least half the capacity of the source drive.

6. It is not recommended that you migrate or build an array on Windows dynamic disks (volumes) because it will result in data loss.

Warning: Do not interrupt the process when you create a RAID 0 using the Migrate option. If you do, you will not be able to restart the system, or to recover the data that was on the source drive.

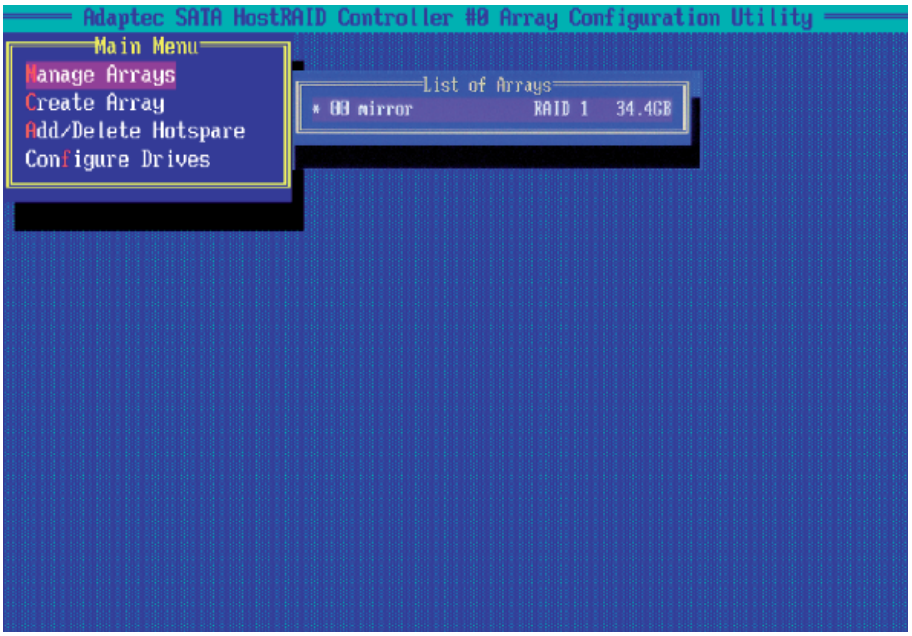
Adding a Bootable Array

To make an array bootable:

1. From the Main menu, select Manage Arrays.

2. From the List of Arrays, select the array you want to make bootable, and press <Ctrl> and <B>.

3. Enter Y to create a bootable array when the following message is displayed: "This will make all other existing bootable array non-bootable. Do you want to make this array bootable? (Yes/No):" Then, a bootable array will be created. An asterisk () will appear next to the bootable array (as shown in the picture below:)



Deleting a Bootable Array

To delete a bootable array:

1. From the Main menu, select Manage Arrays.

2. From the List of Arrays, select the bootable array you want to delete, and press <Ctrl> and <B>. Note: a bootable array is the array marked with an asterisk (as shown in the picture above.)

3. When the following message is displayed: "The array is already marked bootable. Do you want to make this array as not bootable? (Yes/No)," Enter Y to delete a bootable array. The bootable array will be deleted and the asterisk will disappear.

Note: Do not use the delete key to delete the bootable array.

Adding/Deleting Hotspares

To add a Hotspare:

(**Note**: In order to rebuild a RAID (RAID 0 or RAID 1), you would need to add a new HDD as a hotspare.)

1. From the main menu (shown on Page C-4), select Add/Delete Hotspares.

2. Use the up and down arrow keys to highlight and select the disk you want to designate as a hotspare, and press <Insert>, and then, press <Enter>.

3. Press Yes when the following prompt is displayed:

"Do you want to create spare?" (Yes/No?)

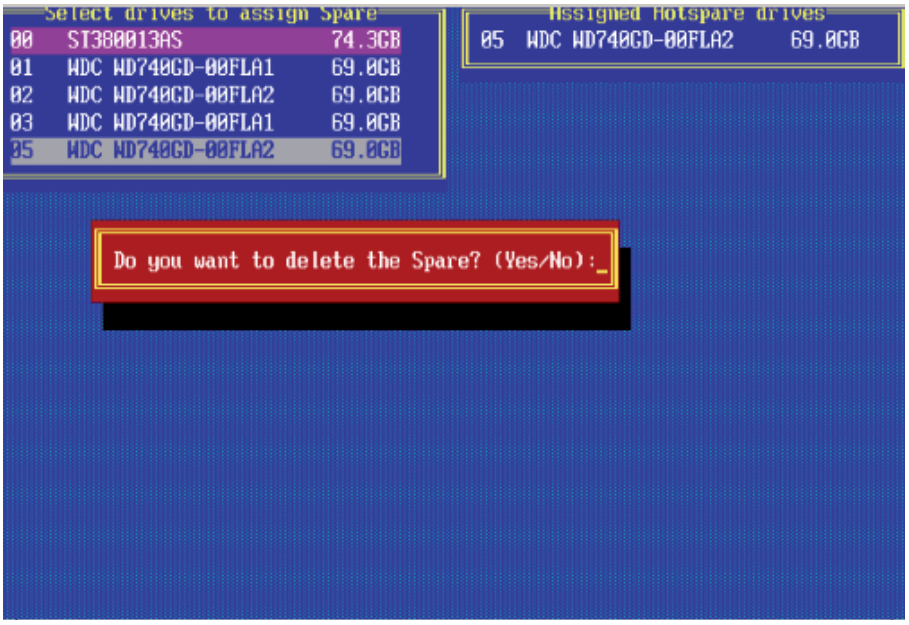
The spare you have selected will appear in the Selected drives Menu.

To delete a Hotspare:

1. From the main menu (shown on Page C-4), select Add/Delete Hotspares.

2. Use the up and down arrow keys to highlight and select the Hotspare you want to delete, and press <delete>, and then, press <Enter>.

3. When the following warning is displayed: "Do you want to delete the hot spare?" (Yes/No?), press Yes to delete the hotspare you have selected.



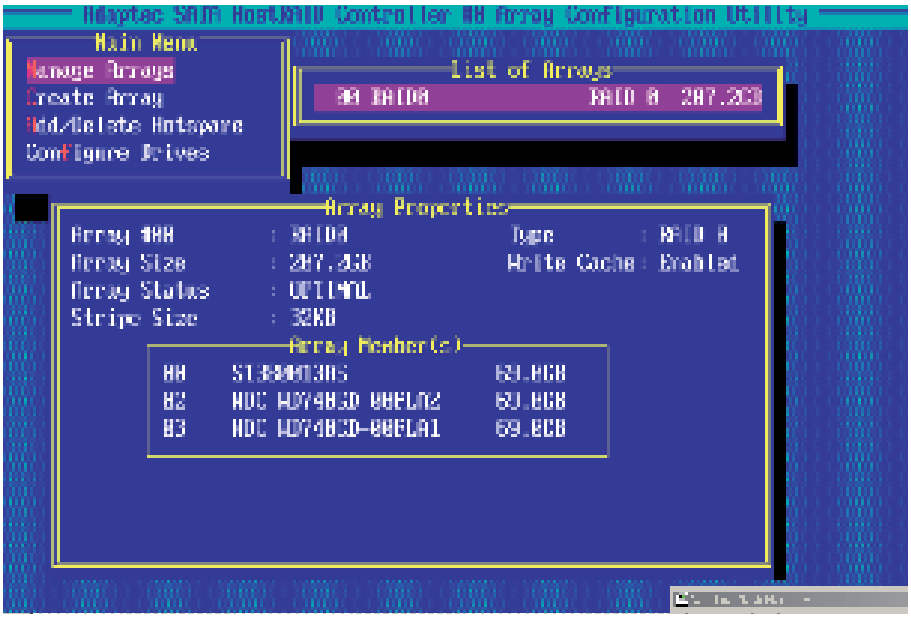
Viewing Array Properties

To view the properties of an existing array:

1. From the main menu, select Manage Arrays and hit <Enter> (as shown on the previous page.)

2. From the List of Arrays dialog box (shown below), select the array you want to view and press Enter.

The Array Properties dialog box appears (as shown below), showing detailed information on the array. The physical disks associated with the array are displayed here.



3. Press Esc to return to the previous menu.

Rebuilding Arrays

Note 1: Rebuilding applies to Fault Tolerant array (RAID 1) only.

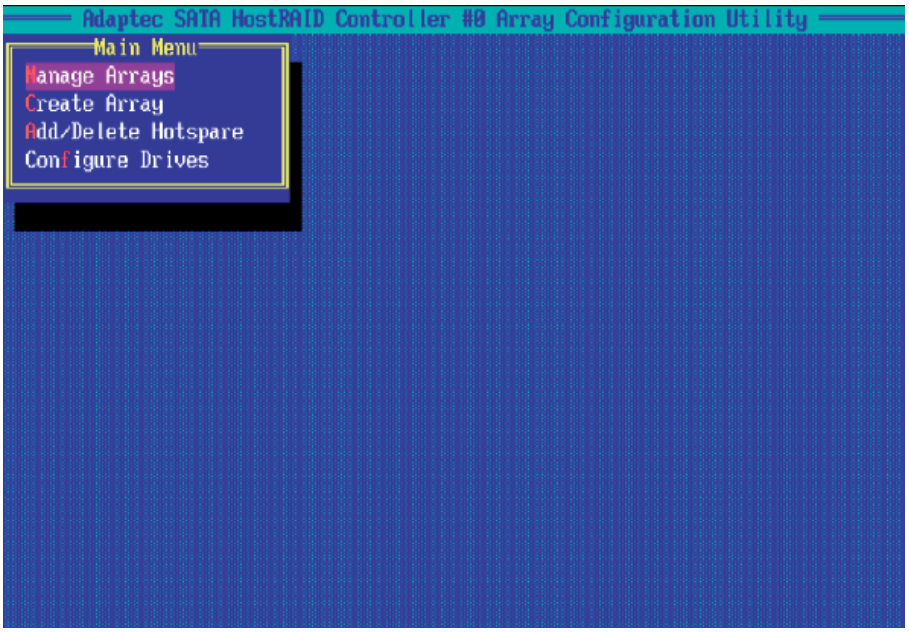
If an array Build process is interrupted or when one critical member is missing, you must perform a Rebuild to restore its functionality. For a critical array rebuild operation, the optimal drive is the source drive.

Note 2: If no spare array exists and a hard disk drive fails, you need to create a spare before you can rebuild an array.

To Rebuild an array:

1 From the Main Menu, select Manage Arrays (as shown in the screen below). From the List of Arrays, select the array you want to Rebuild.

2 Press <Ctrl> and <R> to Rebuild.



Deleting Arrays

Warning!! Back up the data on an array before you delete it to prevent data loss Deleted arrays cannot be restored.

To delete an existing array:

1. From the main menu (shown on Page C-4), select Manage Arrays.

2. Select the array you wish to delete and press <delete>.

3. In the Array Properties dialog box, select Delete and press <Enter>. The following prompt is displayed:

Warning!! Deleting the array will render array unusable. Do you want to delete the array? (Yes/No):

RAID 1 only—the following prompt is also displayed:

Deleting the partition will result in data loss! Do you also want to delete the partition? (Yes/No):

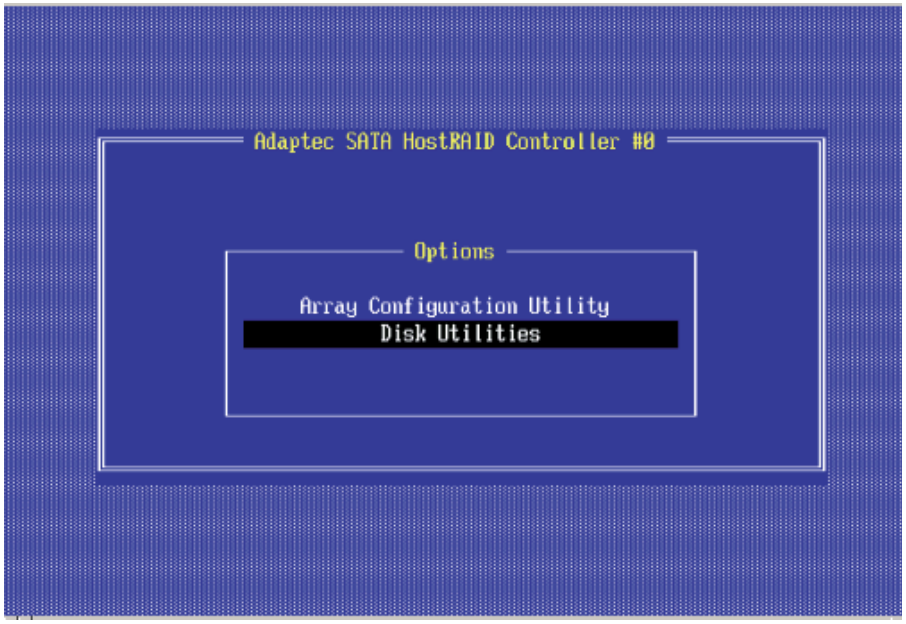
4. Press Yes to delete the array and partition or No to return to the previous menu.

5. Press Esc to return to the previous menu.

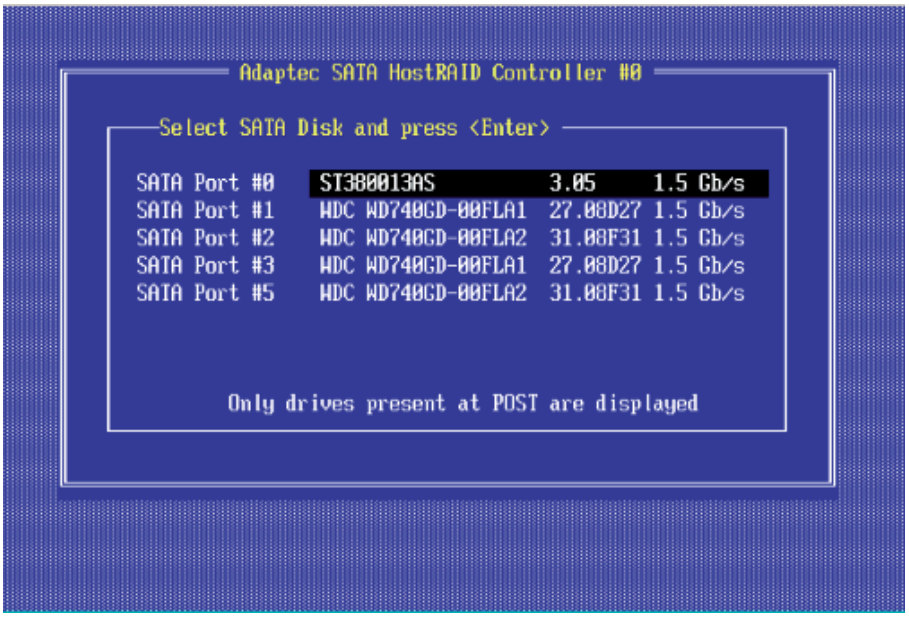
Using the Disk Utilities

The Disk Utilities enable you to format or verify the media of your Serial ATA hard disks.

To access the disk utilities:



1. From the Adaptec RAID Configuration Utility Menu, select Disk Utilities (as shown above) and press <Enter>. The following screen appears.

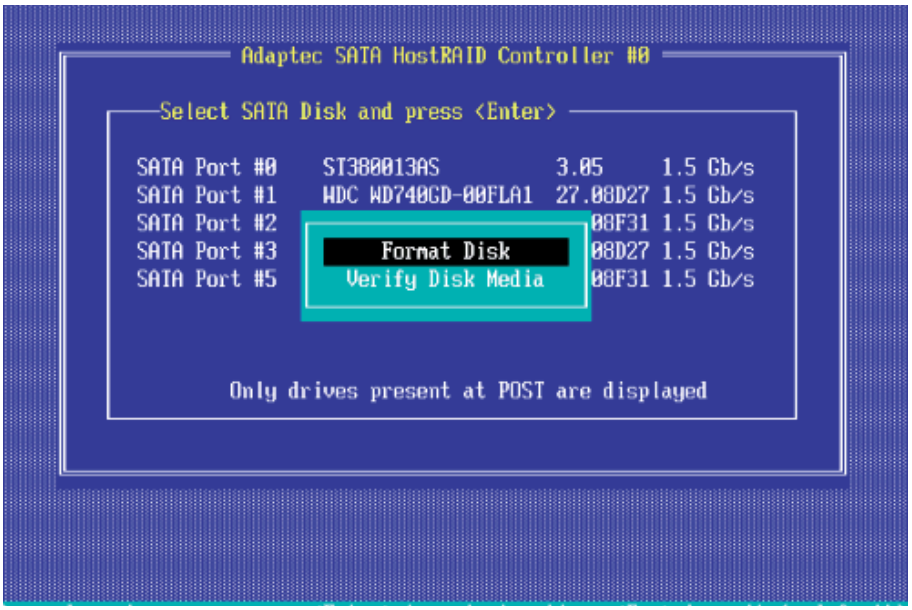


2. Select the desired disk and press <Enter>. The following screen appears:

To format a disk:

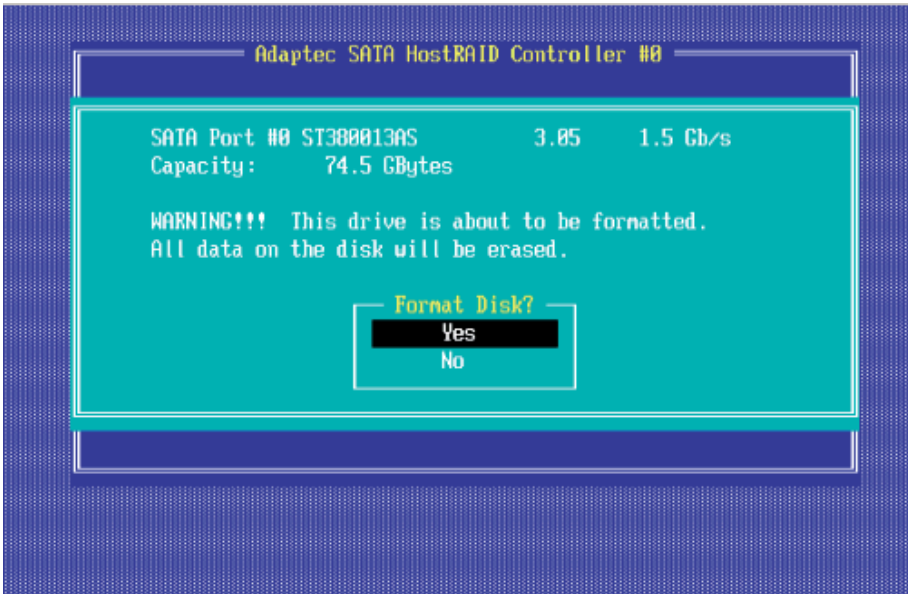
Note: The operation of Formatting Disk allows you to perform a low-level formatting of a hard drive by writing zeros to the entire disk. Serial ATA drives are low-level formatted at the factory and do not need to be low-level formatted again.

3. When the screen shown below displays, select Format Disk and press <Enter>. The following screen appears:

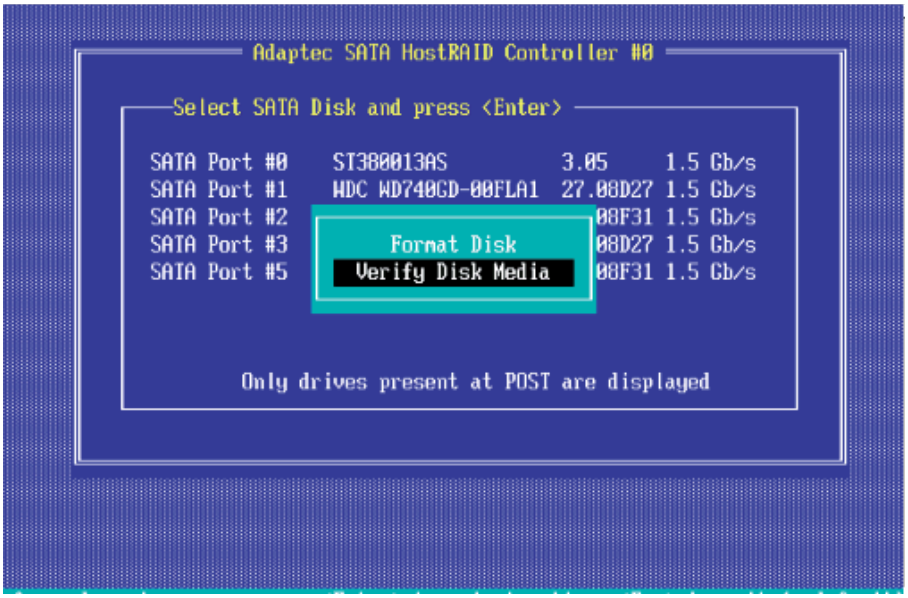


4. Read the warning message when it appears in the screen as shown below. To continue with disk formatting, select Yes and hit <Enter>. Otherwise, select No and press <Enter>.

(**Caution**: Formatting a disk destroys all data on the drive. Be sure to back up your data before formatting a disk.)

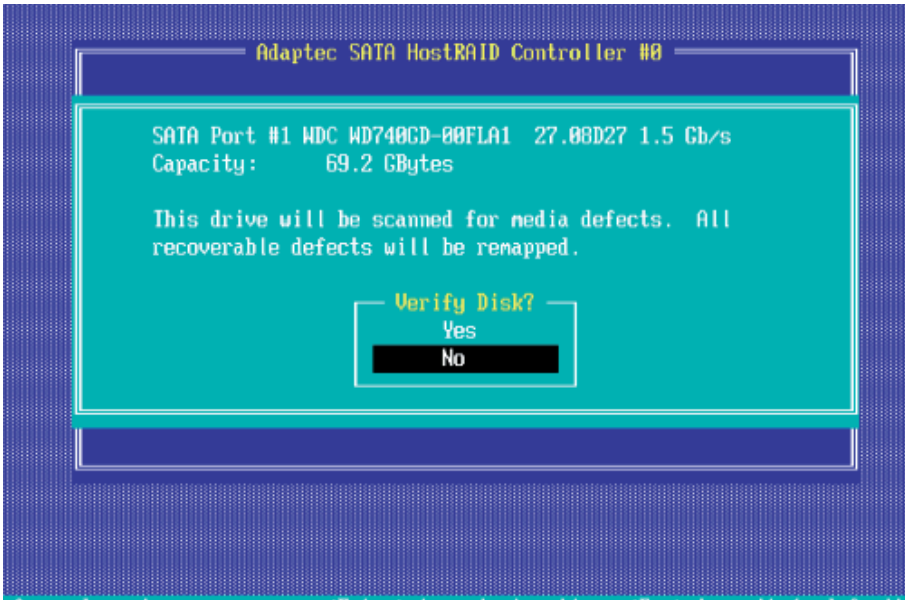


To verify disk media:



3. When the screen shown above displays, select Verify Disk Media and press <Enter>.

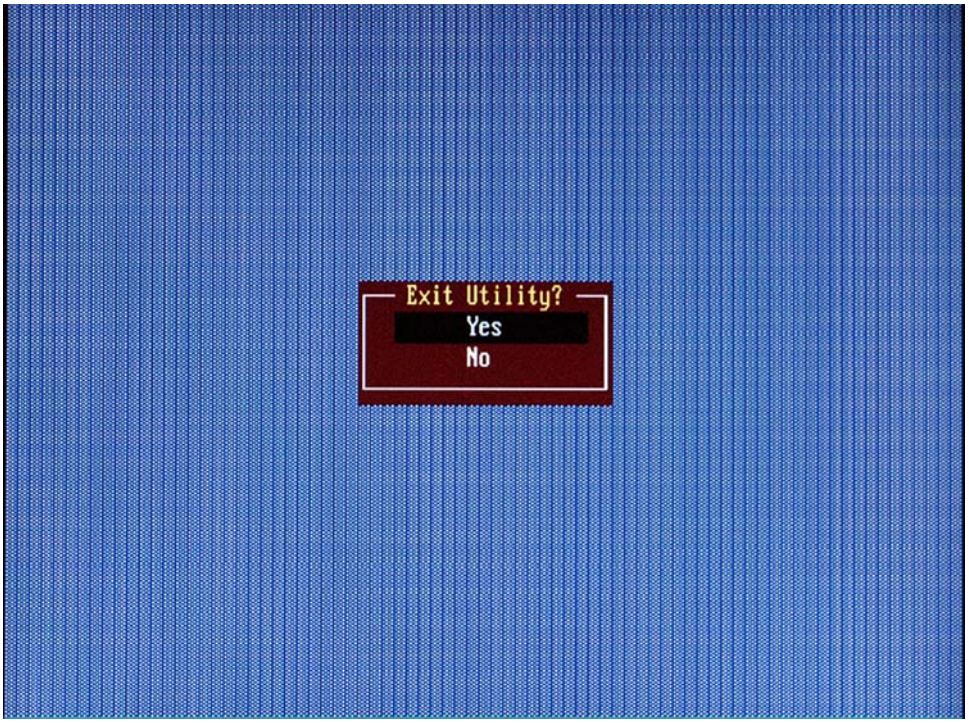
4. A message will display, indicating that the selected drive will be scanned for media defects. Select Yes and hit <Enter> to proceed with disk verifying; otherwise, select No and hit <Enter>.



To Exit Adaptec RAID Configuration Utility

1. Once you have completed RAID array configurations, press ESC to exit. The following screen will appear.

2. Press Yes to exit the Utility.



Appendix D. System Specifications

Note: unless noted specifications apply to a complete system (both server-boards).

Processors

Two Intel® 5500 Series (LGA 1366) processors, each processor supporting two full-width Intel QuickPath Interconnect (QPI) links with a total of up to 51.2 GT/s Data Transfer Rate (6.4 GT/s per direction)

Chipset

Intel 5520

BIOS

- 32 Mb AMI SPI Flash ROM,
- ACPI 1.02/2.0/3.0, Plug and Plat (PnP), and USB Keyboard support.

Memory

Twelve 240-pin DIMM sockets support up to 48 GB of DDR3 Registered ECC 1333/1066/800 MHz Memory (with maximum of 4 GB per DIMM module).

Serial ATA Controller

Intel ESB2 on-chip controller to support four 3 Gb/s Serial ATA (RAID 0, 1)

SATA Drive Bays

Four (4) hot-swap drive bays to house four (4) standard SATA drives

PCI Expansion

Two (2) low-profile PCI-Express 2.0 x16 slots (with pre-installed riser cards)

Serverboard

bullx R422-E2

bullx R422-INF-E2

Dimensions (both): 6.5 x 16.4 in (165 x 417 mm)

BULL CEDOC
357 AVENUE PATTON
B.P.20845
49008 ANGERS CEDEX 01
FRANCE

REFERENCE
86 A1 51FA 01