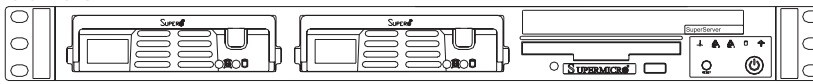
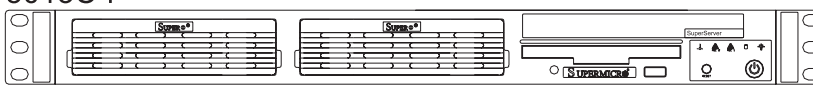
SUPERMICRO®

SUPERSERVER 5013C-T
SUPERSERVER 5013C-i

5013C-T



5013C-i



USER'S MANUAL

Revision 1.1b

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Printed in the United States of America

Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5013C-T/5013C-i. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 5013C-T/5013C-i is a high-end single processor 1U rackmount server based on the SC811T-250/SC811i-250 1U rackmount server chassis and the Super P4SCE motherboard. The P4SCE supports single Intel® Pentium® 4 processors of up to 3.40 GHz with a 2 MB integrated Advanced Transfer Cache and hyper-threading technology and single Intel® Celeron® processors of up to 2.40 GHz with a 128KB integrated Advanced Transfer Cache in 478-pin microPGA sockets.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super P4SCE motherboard and the SC811 chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 5013C-T/5013C-i 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 SuperServer 5013C-T/5013C-i.

Chapter 5: Advanced Motherboard Setup

Chapter 5 provides detailed information on the P4SCE motherboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the motherboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC811 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring Serial ATA 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 and Messages

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Chapter 1
Introduction

1-1 Overview

The Supermicro SuperServer 5013C-T/5013C-i is a high-end single processor, 1U rackmount server with state-of-the-art features. The 5013C-T/5013C-i is comprised of two main subsystems: the SC811T-250/SC811i-250 1U rackmount chassis and the P4SCE motherboard. Please refer to our web site for information on operating systems that have been certified for use with the 5013C-T/5013C-i (www.supermicro.com).

In addition to the mainboard and chassis, various hardware components may have been included with the 5013C-T/5013C-i, as listed below.

- One CPU heatsink (SNK-P0002)
- One CPU retention module (SKT-0115)
- One (1) 3.5" floppy drive (FPD-PNSC-02)
- One (1) slim CD-ROM drive (CDM-TEAC-24(B))
- Two (2) 10-cm blower fans (FAN-0038)
- Serial ATA (SATA) Accessories (5013C-T only):
  One (1) internal SATA backplane (CSE-SATA-810)
  Two (2) SATA cables (CBL-0061)
  One (1) SATA LED cable (CBL-0056)
  Two (2) SATA drive carriers (CSE-PT10 (B))
- One (1) 5V 32-bit, 33 MHz PCI slot riser card (CSE-RR32-1U)
- Rackmount hardware with screws (CSE-PT8):
  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
- SuperServer 5013C-T/5013C-i User's Manual

Note: "B" indicates black.

1-2 Motherboard Features

At the heart of the SuperServer 5013C-T/5013C-i lies the P4SCE, a single processor motherboard designed to provide maximum performance. Below are the main features of the P4SCE.

Chipset Overview

The P4SCE is based on Intel's E7210 chipset. See Figure 1-1 for a block diagram of the chipset. The E7210 chipset is made up of two main components:

The Memory Controller Hub (MCH)

The I/O Controller Hub (ICH5R)

Memory Controller Hub (MCH)

The MCH includes the host (CPU) interface, memory interface, ICH5R interface, CSA interface and AGP interface. It contains advanced power management logic and supports dual-channel (interleaved) DDR memory, providing bandwidth of up to 6.4 GB/s using DDR-400 SDRAM. The AGP interface supports 8x data transfers and operates at a peak bandwidth of 2.1 GB/s. The CSA (Communications Streaming Architecture) interface connects the MCH to a Gigabit Ethernet controller.

I/O Controller Hub (ICH5R)

The ICH5R I/O controller hub integrates an Ultra ATA 100 controller, two Serial ATA host controllers, one EHCI host controller and and four UHCI host controllers to support up to eight external USB 2.0 ports. The ICH5R also integrates an LPC interface controller, a flash BIOS interface controller, a PCI interface controller, an AC '97 digital controller, an integrated LAN controller, an ASF controller and a hub interface for communication with the MCH. The ICH5R provides data buffering and interface arbitration to offer efficient communication between system interfaces operate and to provide high bandwidth for peak performance. The ICH5R supports Serial ATA with Intel® RAID Technology.

Processors

The P4SCE supports single Intel® Pentium® 4 processors of up to 3.40 GHz with a 2 MB integrated Advanced Transfer Cache and hyper-threading technology and single Intel® Celeron® processors of up to 2.40 GHz with a 128KB integrated Advanced Transfer Cache in 478-pin microPGA sockets. Please refer to the support section of our web site for a complete listing of supported processors (http://www.supermicro.com/support/).

Memory

The P4SCE has four (4) 184-pin DIMM sockets that can support up to 4 GB of ECC or non-ECC unbuffered DDR-400/333/266 SDRAM modules. Low-profile memory modules are required for use in the 1U form factor of the 5013C-T/5013C-i. Module sizes of 256 MB, 512 MB and 1 GB may be used to populate the DIMM slots. All memory modules must be the same size and speed.

Serial ATA (5013C-T)

A Serial ATA controller is incorporated into the E7210 chipset to provide a two-port Serial ATA subsystem, which is RAID 0 and RAID 1 supported. The Serial ATA drives are hot-swappable units.
Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the Serial ATA drives.

PCI Expansion Slots

The P4SCE has five 32-bit, 33 MHz PCI slots available. One riser card is included with the system for use with 32-bit PCI cards.

Ethernet Ports

The P4SCE has an onboard controller that supports two Gigabit LAN ports.

Onboard Controllers/Ports

An onboard IDE controller supports one floppy drive and up to four Ultra ATA 100 hard drives or ATAPI devices. Onboard I/O backpanel ports include one COM port, one parallel port, two USB ports, PS/2 mouse and keyboard ports and two GLAN (NIC) ports.

Other Features

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

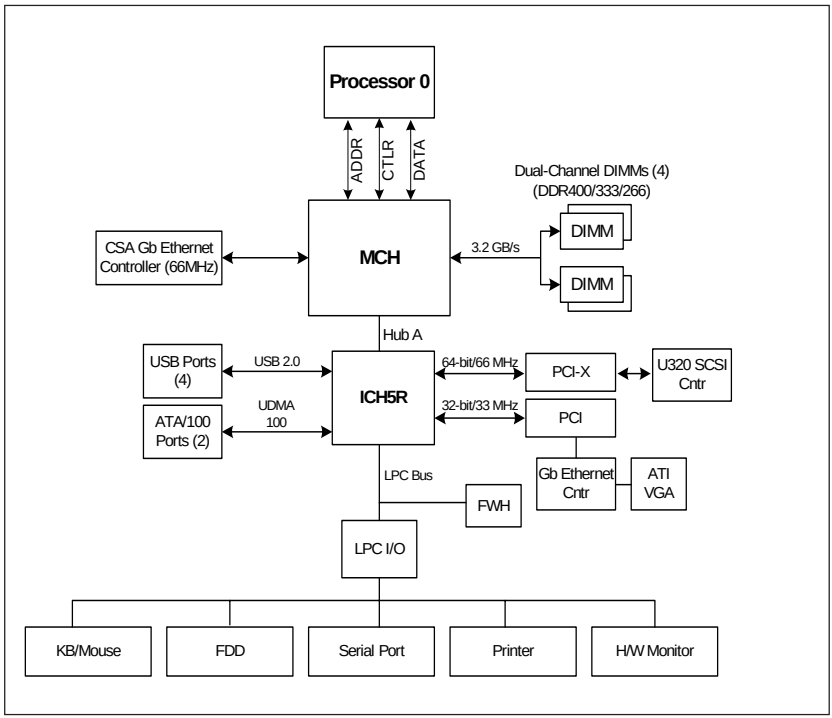


Figure 1-1. Intel E7210 Chipset: System Block Diagram

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

1-3 Server Chassis Features

The SuperServer 5013C-T/5013C-i is a 1U rackmount server platform designed with some of today's most state-of-the-art features. The following is a general outline of the main features of the SC811 chassis. (The 5013C-T uses the SC811T-250 modification and the 5013C-i uses the SC811i-250 modification of the same SC811 chassis.)

System Power

When configured as a SuperServer 5013C-T/5013C-i, the SC811 chassis includes a single 250W power supply.

Serial ATA Subsystem (5013C-T)

For the 5013C-T, the SC811T chassis was designed to support two Serial ATA hard drives. The Serial ATA drives are hot-swappable units. ATA/100 IDE drives are also supported.

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

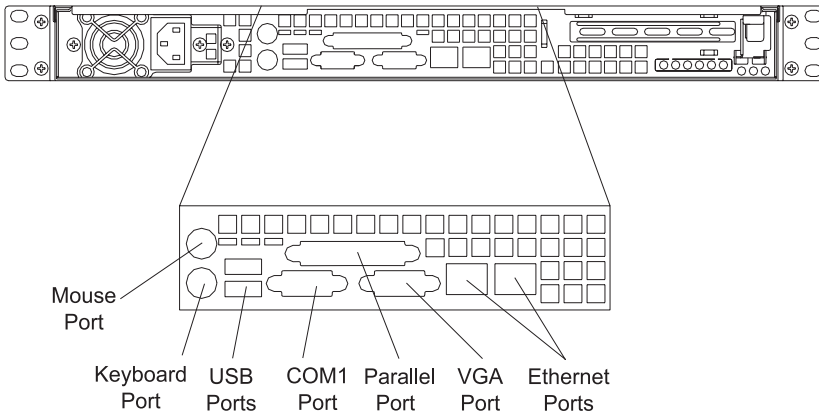
Control Panel

The SC811's control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat conditions. The control panel also includes a main power button and a system reset button.

Rear I/O Panel

The SC811 is a 1U rackmount chassis. Its I/O panel provides one motherboard expansion slot, one COM port (another is internal), two USB ports, PS/2 mouse and keyboard ports, a graphics port and two Gb Ethernet ports. (See Figure 1-2.)

Figure 1-2. Rear I/O Panel



Cooling System

The SC811 chassis has an innovative cooling design that features two 10-cm blower system cooling fans. The blower fans plug into a chassis fan header on the motherboard and operate at full rpm continuously.

1-4 Contacting Supermicro

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Notes

Chapter 2
Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 5013C-T/5013C-i up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. This quick setup assumes that your 5013C-T/5013C-i system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the SuperServer 5013C-T/5013C-i

You should inspect the box the SuperServer 5013C-T/5013C-i was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the SuperServer 5013C-T/5013C-i. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the SuperServer 5013C-T/5013C-i 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 minimal amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

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

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a 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 power supply units and hot plug Serial ATA drives to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

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

Reduced Airflow

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

Mechanical Loading

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

Circuit Overloading

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

Reliable Ground

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

2-4 Installing the 5013C-T/5013C-i into a Rack

This section provides information on installing the SuperServer 5013C-T/5013C-i into a rack unit. 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. The following is a guideline for installing the unit into a rack with the rack rails provided with the system. You should also refer to the installation instructions that came with the rack unit you are using.

Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies with the SuperServer 5013C-T/5013C-i. Each of these assemblies consist of two sections: an inner fixed chassis rail that secures to the unit (A) and an outer fixed rack rail that secures directly to the rack itself (B). A sliding rail guide sandwiched between the two should remain attached to the fixed rack rail (see Figure 2-1). The A and B rails must be detached from each other to install.

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

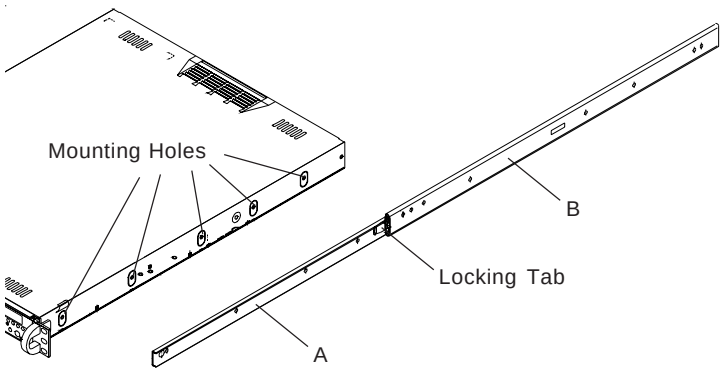


Figure 2-1. Identifying the Sections of the Rack Rails

Installing the Chassis Rails

Position the fixed chassis rail sections you just removed along the side of the chassis making sure the five screw holes line up. Note that these two rails are left/right specific. Screw the rail securely to the side of the chassis (see Figure 2-2). Repeat this procedure for the other rail on the other side of the chassis. You will also need to attach the rail brackets when installing into a telco rack.

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

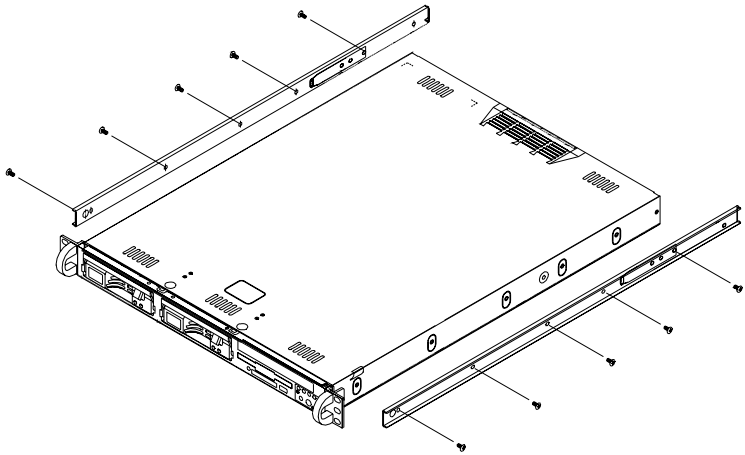


Figure 2-2. Installing Chassis Rails

Installing the Rack Rails

Determine where you want to place the SuperServer 5013C-T/5013C-i in the rack (see Rack and Server Precautions in Section 2-3). Position the fixed rack rail/sliding rail guide assemblies at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack. Screw the assembly securely to the rack using the brackets provided. Attach the

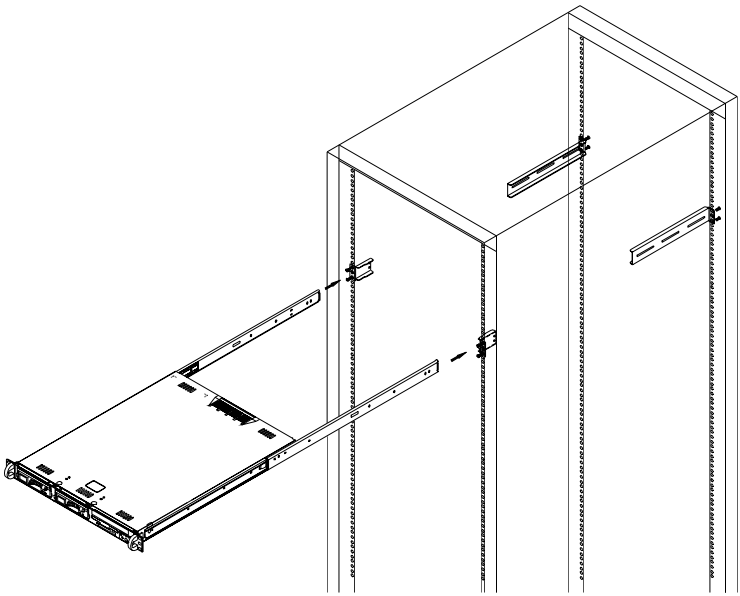
other assembly to the other side of the rack, making sure that both are at the exact same height and with the rail guides facing inward.

Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. 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 2-3.

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.

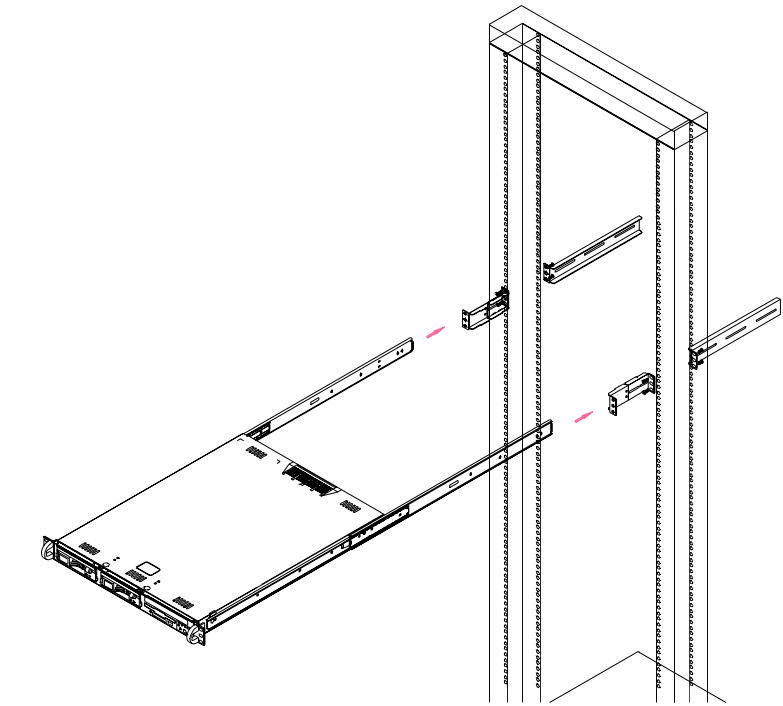
Figure 2-3. Installing the Server into a Rack



Installing the Server into a Telco Rack

If you are installing the SuperServer 5013C-T/5013C-i into a Telco type rack, follow the directions given on the previous pages for rack installation. The only difference in the installation procedure will be the positioning of the rack brackets to the rack. They should be spaced apart just enough to accomodate the width of the telco rack.

Figure 2-4. Installing the Server into a Telco Rack



2-5 Checking the Motherboard Setup

After you install the 5013C-T/5013C-i in the rack, you will need to open the unit to make sure the motherboard is properly installed and all the connections have been made.

1. Accessing the inside of the 5013C-T/5013C-i (Figure 2-5)

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Check the CPU (processor)

You should have one processor already installed into the system board. Each processor should have its own heatsink attached. See Chapter 5 for instructions on processor installation.

3. Check the system memory

Your 5013C-T/5013C-i 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.

4. Installing add-on cards

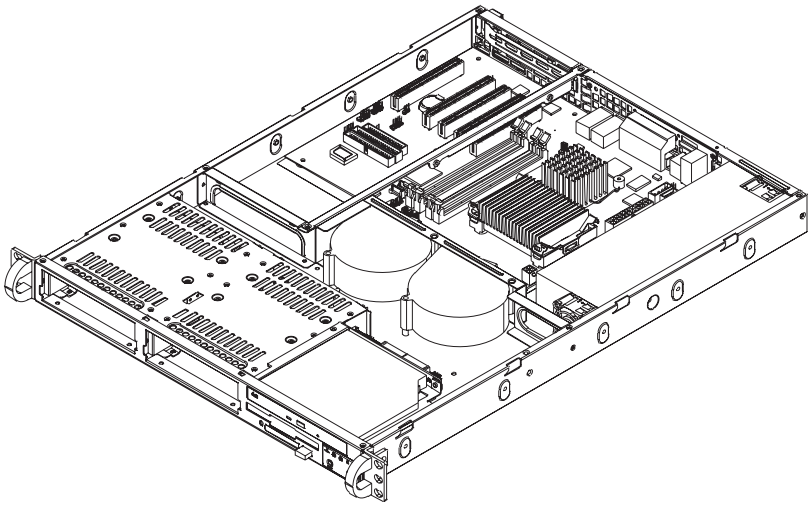
If desired, you can install an add-on card to the system. See Chapter 5 for details on installing a PCI add-on card.

5. Check all cable connections and airflow

Make sure all power and data cables are properly connected and not blocking the airflow. See Chapter 5 for details on cable connections. Also, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.

Note: Make sure that the air seals are properly installed.

Figure 2-5.
Accessing the Inside of the SuperServer 5013C-T/5013C-i
(with drives removed)



2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the Serial ATA drives and Serial ATA backplane (5013C-T only) have been properly installed and all essential connections have been made.

1. Accessing the drive bays

All drives can be accessed from the front of the server. For servicing the CD-ROM and floppy drives, you will need to remove the top chassis cover. The Serial ATA disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. Installing a CD-ROM and floppy disk drives

Refer to Chapter 6 if you need to reinstall a CD-ROM and/or floppy disk drive to the system.

3. Check the Serial ATA disk drives (5013C-T)

Depending upon your system's configuration, your system may have one or two Serial ATA drives already installed. If you need to install Serial ATA drives, please refer to the appropriate section in Chapter 6.

4. Check the airflow

Airflow is provided by two 10-cm input fans. The system component layout was carefully designed to promote sufficient airflow through the small 1U rackmount space. Also 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.

5. Supplying power to the system

The last thing you must do is to provide input power to the system. Plug the power cord from the power supply unit into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS).

Chapter 3
System Interface

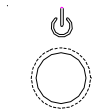
3-1 Overview

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

3-2 Control Panel Buttons

There are two push-button buttons located on the front of the chassis. These are (in order from left to right) a reset button and a power on/off button.

- **RESET:** The reset switch reboots the system.



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

3-3 Control Panel LEDs

The control panel located on the front of the SC811 chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

- **OVERHEAT:** Indicates an overheat condition in the chassis. This may be caused by cables obstructing the airflow in the system, or the ambient room temperature being too warm. You should also check to make sure that the chassis cover is installed and that all fans are present and operating normally. Finally, check the air seals for damage. The air seals are located under the blower fan and beneath the frame cross section that separates the drive bay area from the motherboard area of the chassis.

NIC2

- **NIC2:** Indicates network activity on GLAN2 when flashing .

NIC1

- **NIC1:** Indicates network activity on GLAN1 when flashing.

- **HDD:** Channel activity for all HDDs. This light indicates CD-ROM and HDD (SATA drive activity on the 5013C-T) activity when flashing.

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

3-4 Serial ATA Drive Carrier LED (5013C-T)

Each Serial ATA drive carrier has a green LED. When illuminated, this green LED (on the front of the Serial ATA drive carrier) indicates drive activity. A connection to the Serial ATA backplane enables this LED to blink on and off when that particular drive is being accessed.

Notes

Chapter 4
System Safety

4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 5013C-T/5013C-i 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 motherboard, memory modules and floppy drives. 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.

- Motherboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites. 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. See Figure 4-1.

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

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SuperServer 5013C-T/5013C-i clean and free of clutter.

- The SuperServer 5013C-T/5013C-i weighs approximately 34 lbs (~15.5 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

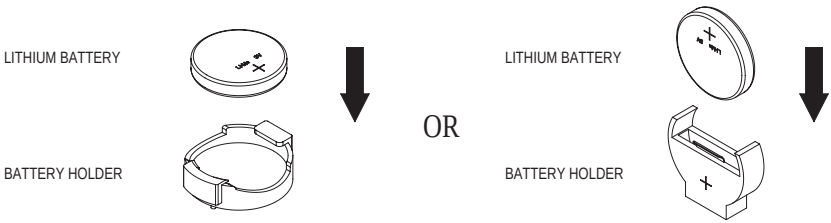
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient 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 motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 5013C-T/5013C-i is operating to assure proper cooling. Out of warranty damage to the 5013C-T/5013C-i system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Chapter 5
Advanced Motherboard Setup

This chapter covers the steps required to install the P4SCE motherboard into the SC811 chassis, connect the data and power cables and install add-on cards. All motherboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the motherboard to better cool and protect the system.

5-1 Handling the P4SCE Motherboard

Electric-static 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 P4SCE motherboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

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

Unpacking

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

5-2 Motherboard Installation

This section explains the first step of physically mounting the P4SCE into the SC811 chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the motherboard, follow the procedure in reverse order.

1. Accessing the inside of the 5013C-T/5013C-i (see Figure 2-5)

Two release buttons are located on the top cover of the chassis. Depressing both of these buttons while pushing the cover away from you until it stops. You can then 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.)

2. Check compatibility of motherboard ports and I/O shield:

The P4SCE requires a chassis big enough to support a 12" x 9.5" motherboard, such as Supermicro's SC811 1U rackmount. Make sure that the I/O ports on the motherboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. Mounting the motherboard onto the motherboard tray:

Carefully mount the motherboard to the motherboard tray by aligning the board holes with the raised metal standoffs that are visible on the bottom of the chassis. Insert screws into all the mounting holes on your motherboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the motherboard ground to provide a continuous ground for the system.

5-3 Connecting Cables

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

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables should be connected. (See the layout on page 5-9 for connector locations.)

- IDE Device Cables (J2, 5013C-i only)
- CD-ROM Drive Cable (J5)
- Floppy Drive Cable (J7)
- Serial ATA Device Cables (J3 and J4, 5013C-T only)
- Serial ATA LED cable (J37, 5013C-T only)
- Control Panel Cable (JF1)

Connecting Power Cables

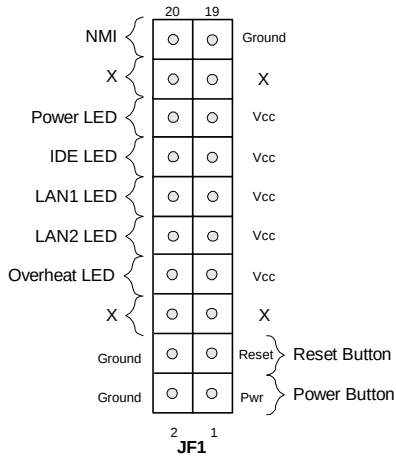
The P4SCE has a 24-pin primary power supply connector ("ATX Power") at J20 for connection to the ATX power supply. See Chapter 5 for power connector pin definitions.

Connecting the Control Panel

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

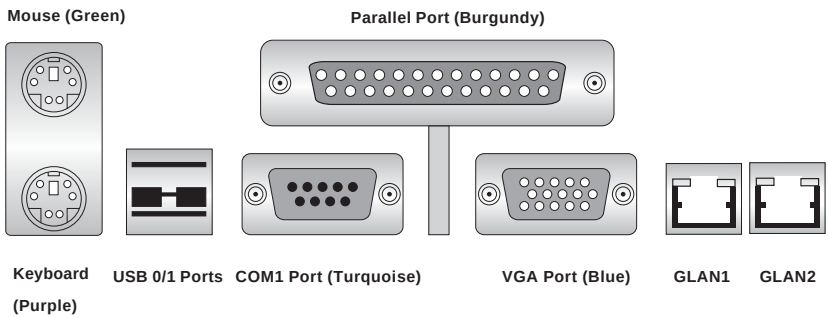
All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Chapter 5 for details.

Figure 5-1. Control Panel Header Pins



5-4 I/O Ports

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



Note: The COM2 port is a header on the motherboard, located near the ATX power connector.

5-5 Installing Processors

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

Processor Support

The P4SCE has a single 478-pin microPGA socket, which supports Intel Pentium 4 and Intel Celeron processors.

1. Lift the lever on the CPU socket.

2. Install the CPU in the socket. Make sure that Pin 1 of the CPU is seated on Pin 1 of the socket (both corners are marked with a triangle).

3. Press the lever down until you hear it *click* into the locked position.

4. Place the heatsink on top of the CPU aligning its holes with those on the retention mechanism. Screw in two diagonal screws (ie. the #1 and #2 screws) until just snug, then do the same with the remaining two screws. Finish by fully tightening all four screws (see Figure 5-4 on next page).

Figure 5-3. 478-pin Socket: Empty and with Processor Installed

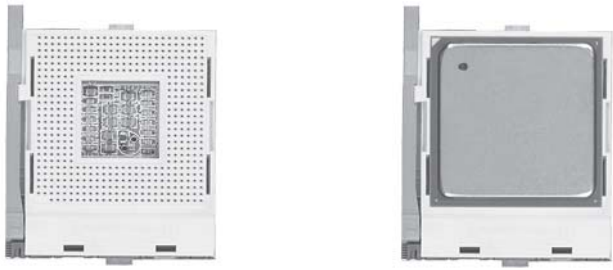
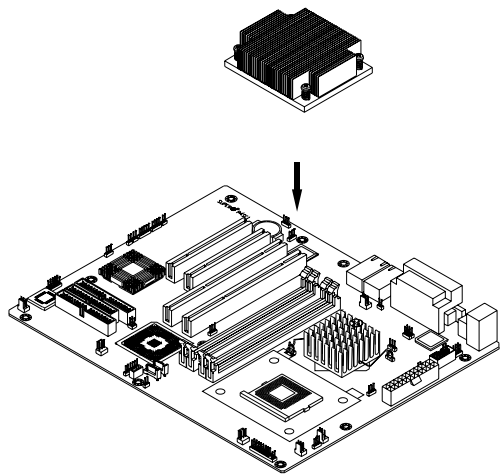


Figure 5-4. Heatsink Installation



5-6 Installing Memory

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

1. Memory support

The P4SCE supports dual-channel, ECC or non-ECC unbuffered DDR-400/333/266 SDRAM. Populating DIMM0A and DIMM1A and/or DIMM0B and DIMM1B with the same size/same type of memory modules will result in dual channel (two-way interleaved) operation, which is faster than single channel operation.

2. Installing memory modules

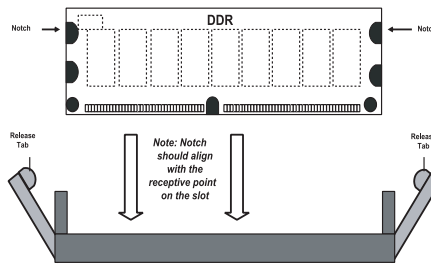
Insert each memory module vertically. Pay attention to the notch along the bottom of the module to prevent inserting it incorrectly. Gently press down on the DIMM module until it snaps into place in the slot (see Figure 5-5).

Memory Speeds

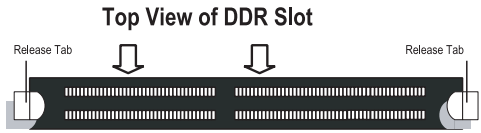
Host Clock (MHz)	FSB (MHz)	DRAM Data (MT/s)	Shown during POST
100	400	266	DDR266
		333	DDR266
		400	DDR266
133	533	266	DDR266
		333	DDR333
		400	DDR333
200	800	266	DDR266
		333	DDR320*
		400	DDR400

* The BIOS displays DDR320 due to a chipset limitation.

Figure 5-5. DIMM Installation



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notch.
To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.

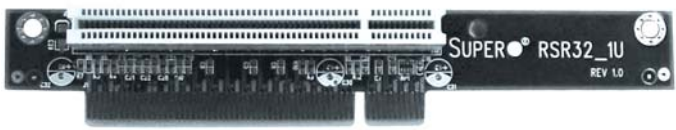


5-7 Adding PCI Cards

1. 32-bit PCI slot

The P4SCE has six 32-bit, 33 MHz 5V PCI slots. A riser card designed specifically for use in the 811 1U rackmount chassis is included with your system. This riser card allows an installed PCI card to sit at a 90 degree angle so it can fit inside the chassis. This riser card accommodates 32-bit, 33 MHz 5V PCI cards (see Figure 5-6).

Figure 5-6. 32-bit, 33 MHz 5V Riser Card



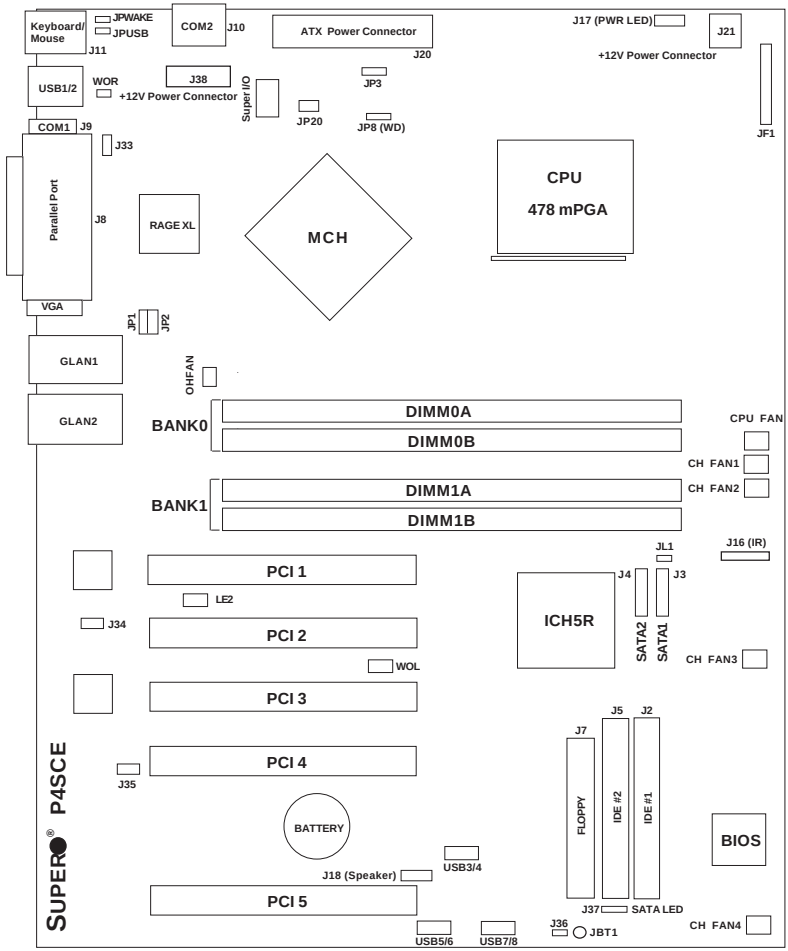
2. PCI card installation

Before installing a PCI add-on card, locate the PCI riser card mentioned in Step 1. Begin by depressing the release latch to remove the shield for the PCI slot. Next, fully seat the PCI card into the riser card and screw it into the metal retention rail. Then, insert the riser card into the PCI slot on the motherboard, pushing down with your thumbs evenly on both sides of the card. Finish by securing the card with the release latch. The PCI slot shield protects the motherboard and its components from EMI and promotes proper ventilation, so make sure the shield covers the PCI slot if no add-on card is to be installed.

5-8 Motherboard Details

Figure 5-7. P4SCE Layout

(not drawn to scale)



Jumpers not indicated are for test purposes only.

P4SCE Quick Reference

Jumpers	Description	Default Setting
J18	Speaker	Pins 3-4 (Internal)
J33	VGA Enable/Disable	Pins 1-2 (Enabled)
J34/J35	GLAN1/2	Pins 1-2 (Enabled)
J36	Keylock Enable/Disable	Open (Disabled)
JBT1	CMOS Clear	See Section 5-9
JP1, JP2	CPU Clock Speed	Pins 1-2 (Auto)
JP3	OH Fan Force On	Closed (On)
JP8	Watch Dog Reset/NMI	Pins 1-2 (WD Reset)
JP20	Power Force On	Open (Disabled)
JPUSB	USB1/2 Wake Up	Pins 1-2 (Disabled)
JPWAKE	Keyboard Wake-up	Pins 1-2 (Disabled)

Connector	Description
COM1/COM2	COM Port 1/Port2
DIMM0A/0B/1A/1B	Memory (DIMM) Slots (1 through 4)
Fan 1/2/4	Fan Headers
GLAN1/GLAN2	Gigabit LAN (Ethernet Ports)
J2, J5	IDE Ports (J2: IDE1, J5:IDE2)
J3/J4	Serial ATA 1/Serial ATA 2 Connectors
J7	Floppy Disk Drive Connector
J8	Parallel Printer Port
J9, J10	COM1 (J9), COM2 (J10)
J11	Keyboard/Mouse Connector
J16	Infrared Connector
J17	Power LED
J20	ATX Power Connector
J21	12V Power Connector
J38	4-Pin Power Connector
JF1	Front Control Panel
JL1	Chassis Intrusion Header
LE2	Standby Power LED
OH FAN	Overheat Fan
USB 1/2	Universal Serial Ports 1/2
USB 3/4/5/6/7/8	Universal Serial Port Headers
WOL	Wake-On-LAN
WOR	Wake-On-Ring

5-9 Connector Definitions

Power Supply Connectors

The primary power supply connector on the P4SCE meets the SSI (Superset ATX) 24-pin specification. Refer to the table on the right for the pin definitions of the ATX 24-pin power connector. You must also connect the 4-pin J21 power connector to your power supply. Refer to the table below right for the J24 (12V) connector. If J21 is not accessible, another 12V power connector (J38) is available, which is located nect to the COM2 port.

Important: you must use connect either J21 or J38 to your power supply to meet the ATX safety requirements.

ATX Power Supply 24-pin Connector Pin Definitions

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

+12V 4-pin PWR Connector (J21)

Required Connection

Pins #	Definition
1 & 2	Ground
3 & 4	+12 V

+12V 4-pin PWR Connector (J38)

Additional Connection

Pins #	Definition
1	+12V
2 & 3	Ground
4	NC

IR Connector

The infrared connector is located on J16. See the table on the right for pin definitions. See the Technical Support section of our web page for information on the infrared devices you can connect to the system.

Infrared Pin Definitions (J16)

Pin Number	Definition
1	+5V
2	CIRRX
3	IRRX
4	Ground
5	IRTX
6	NC

PW_ON Connector

The PW_ON connector is located on pins 1 and 2 of JF1. This header should be connected to the chassis power button, which you may also configure to put the system into suspend mode (see the Power Button Mode setting in BIOS). To turn off the power when the suspend mode is enabled, depress the power button for at least 4 seconds. See the table on the right for pin definitions.

PW_ON Pin Definitions (JF1)

Pin Number	Definition
1	PW_ON
2	+3V

Reset Connector

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

Reset Pin Definitions (JF1)

Pin Number	Definition
3	Reset
4	Ground

Overheat LED (OH)

Connect an LED to the OH connection on pins 7 and 8 of JF1 to provide advanced warning of chassis overheating. Refer to the table on the right for pin definitions.

Overheat (OH) LED Pin Definitions (JF1)

Pin Number	Definition
7	Vcc
8	GND

GLAN1/GLAN2 LED

The GLAN1 and GLAN2 LED connections for the Ethernet ports are located on pins 9 and 10 (GLAN2) and 11 and 12 (GLAN1) of JF2. Attach LAN LED cables to display network activity. See the table on the right for pin definitions.

GLAN1/GLAN2 LED Pin Definitions (JF1)

Pin Number	Definition
9,10	Vcc
11,12	GND

IDE LED

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

Hard Drive Activity LED Pin Definitions (JF1)

Pin Number	Definition
13	+5V
14	HD Activity

Power_LED Connector

The Power LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

PWR_LED Pin Definitions (JF1)

Pin Number	Definition
15	Vcc
16	Control

Serial Ports

Two serial ports are included on the motherboard: COM1 is a port located beside the mouse/keyboard ports and COM2 is a header located on the motherboard near the J20 power connector. See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1, COM2)

Pin Number	Definition	Pin Number	Definition
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Note: Pin 10 is included on the header but not on the port. NC indicates no connection.

Fan Headers

There are six fans on the P4SCE, which are designated CPU Fan, Chassis Fan 1, Chassis Fan 2, Chassis Fan 3, Chassis Fan 4 and Overheat Fan. (Chassis Fan 3 and Chassis Fan 4 are not monitored by BIOS.) Connect the fan on your CPU heatsink to the CPU Fan header. See the table on the right for pin definitions.

Fan Header Pin Definitions (CPU, Chassis and Overheat)

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

Caution: These fan headers are DC power.

Chassis Intrusion

The Chassis Intrusion header is designated JL1. See the board layout in Chapter 1 for the location of JL1 and the table on the right for pin definitions.

Chassis Intrusion Pin Definitions (JL1)

Pin Number	Definition
1	Intrusion Input
2	Ground

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J11. The mouse port is above the keyboard port. See the table on the right for pin definitions.

PS/2 Keyboard and Mouse Port Pin Definitions (J11)

Pin Number	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Universal Serial Bus (USB)

There are two Universal Serial Bus ports located on the I/O panel and an additional six USB headers are located on the motherboard. These headers, labeled USB3 through USB8, can be used to provide front side chassis access (cables not included). See the tables on the right for pin definitions.

USB1/2 Pin Definitions

Pin#	Definition
1	+5V
2	P0-
3	P0+
4	Ground

USB3/4/5/6/7/8 Pin Definitions

Pin Number	Definition	Pin Number	Definition
1	+5V	2	+5V
3	PO-	4	PO-
5	PO+	6	PO+
7	Ground	8	Ground
		10	Ground

Wake-On-LAN

The Wake-On-LAN header is designated WOL on the motherboard. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-On-LAN connector and cable to use this feature.)

Wake-On-LAN Pin Definitions (WOL)

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

Wake-On-Ring

The Wake-On-Ring header is designated WOR. This function allows your computer to receive and be "awakened" by an incoming call when in the suspend state. See the table on the right for pin definitions. You must also have a WOR card and cable to use this feature.

Wake-On-Ring Pin Definitions (WOR)

Pin Number	Definition
1	Ground
2	Wake-up

SATA LED

The SATA LED header is located on J37. This header is used to display all SATA activities. See the table on the right for pin definitions.

SATA LED Pin Definitions (J37)

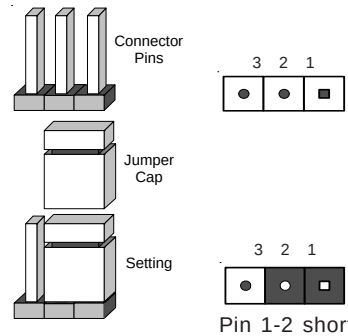
Pin Number	Definition
1	SATA1
2	SATA2
3	NC
4	NC
5	NC

5-10 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.

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



CMOS Clear

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

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

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

Front Side Bus Speed

JP1 and JP2 are used to set the system (front side) bus speed for the processors. It is best to keep these jumpers set to Auto. This jumper is used together with the CPU Clock setting in BIOS. See the table on the right for jumper settings.

Front Side Bus Speed (JP1, JP2)

JP1	JP2	FSB Speed
Pins 1-2	Pins 1-2	Auto
Pins 2-3	Pins 2-3	100 MHz (x4)
NC	Pins 2-3	133 MHz (x4)
NC	NC	Reserved
Pins 2-3	NC	200 MHz (x4)

Note: NC stands for "No Connection".

USB Wake-Up

Use JPUSB to enable or disable USB Wake-Up, which allows you to wakeup the system by de-pressing a key on the keyboard or by clicking the mouse when either is connected to the USB1 or USB2 port. Enable the jumper to allow the system to be woken up from an S1 or S3 state in Windows OS. See the table on the right for jumper settings. This feature works with the USB1 and USB2 ports only.

USB Wake-Up
Jumper Settings
(JPUSB)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

Watch Dog Enable/Disable

JP8 enables controls the Watch Dog function, a system monitor that takes action when a software application freezes the system. Pins 1-2 will have WD reset the system if a program freezes. Pins 2-3 will generate a non-maskable interrupt for the program that has frozen. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Watch Dog
Jumper Settings (JP8)

Jumper Position	Definition
Pins 1-2	WD to Reset
Pins 2-3	WD to NMI
Open	Disabled

Note: when Watch Dog is enabled, the user must write their own application software to disable the Watch Dog Timer.

Speaker Jumper

The speaker jumper is located on J18 and allows you to choose between using the internal or external speakers. For the internal speaker, jump pins 3 and 4. To use an external speaker, place the speaker cable's header on all four pins See the table on the right.

Speaker
Jumper Settings (J18)

Pins	Definition
1 through 4	External Spkr
3 and 4	Internal Spkr

Keyboard Wake-Up

The JPWAKE jumper is used to allow the system to be woken up by depressing a key on the keyboard from an S1 or S3 state in Windows OS. See the table on the right for jumper settings. Your power supply must meet ATX specification 2.01 or higher and supply 720 mA of standby power to use this feature.

Keyboard Wake-Up Jumper Settings (JPWAKE)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

GLAN1 Enable/Disable

Change the setting of jumper J34 to enable or disable the onboard GLAN1 or NIC (Network Interface Card) on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

GLAN1 (NIC) Enable/Disable Jumper Settings (J34)

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

GLAN2 Enable/Disable

Change the setting of jumper J35 to enable or disable the onboard GLAN2 or NIC on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

GLAN2 (NIC) Enable/Disable Jumper Settings (J35)

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

Keylock Enable/Disable

The Keylock header is located at J36. Close the jumper to enable the Keylock function and leave the jumper open (off) to disable it. The default setting is open. See the table on the right for jumper settings.

Keylock Enable/Disable Jumper Settings (J36)

Jumper Position	Definition
On	Enabled
Off	Disabled

5-11 Parallel Port, Floppy and Hard Drive Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.
- The 80-wire ATA100/66 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Parallel Port Connector

The parallel port is located on J8. See the table on the right for pin definitions.

Parallel (Printer) Port Pin Definitions (J8)

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Floppy Connector

The floppy connector is located on J7. See the table on the right for pin definitions.

Floppy Connector Pin Definitions (J7)

Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

IDE Connectors

There are no jumpers to configure the onboard IDE interfaces J2 and J5. See the table on the right for pin definitions. You must use the ATA100/66 cable included with your system to benefit from the ATA100/66 technology.

IDE Connector Pin Definitions (J2, J5)

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

Chapter 6
Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC811T-250/SC811i-250 (5013C-T/5013C-i) chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required

The only tool you will need to install components and perform maintainance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electric Static 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 motherboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

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

Figure 6-1. Chassis Front View (5013C-i shown)

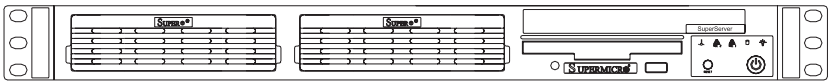
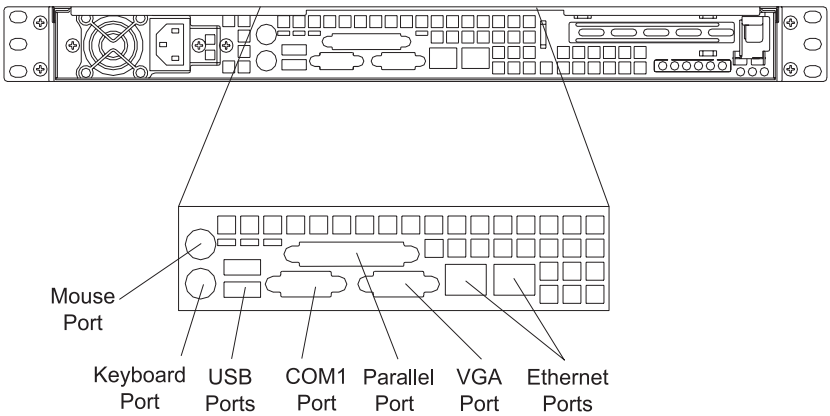


Figure 6-2. Chassis Rear View



6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the motherboard to provide you with system control buttons and status indicators. These wires have been bundled together in a ribbon cable to simplify the connection. Connect the cable from JF1 on the motherboard to JP4 on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both JF1 and JP4. Pull all excess

cabling out of the airflow path. The LEDs inform you of system status. See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

6-3 System Fans

Two 10-cm blower fans provide the cooling for the SuperServer 5013C-T/ 5013C-i. The chassis includes air seals under the blower fans and at the chassis cross section, which separates the drive bay area from the motherboard area of the chassis to promote better airflow. It is highly important that the air seal is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis.

System Fan Failure

The blower fans run at a full 100% rpm. If a fan fails, you will need to have it replaced with the same type. Contact your vendor or Supermicro for information on replacement fans.

6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

Serial ATA 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 Serial ATA drives. Proceed to the next step for instructions.

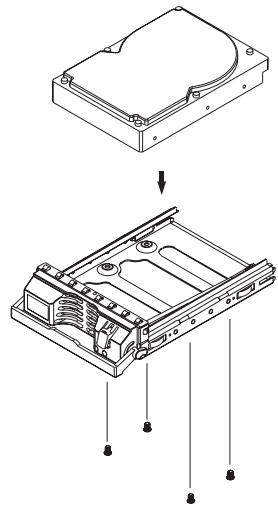
CD-ROM/Floppy Disk Drives: For installing/removing a CD-ROM or floppy disk drive, you will need to gain access to the inside of the 5013C-T/5013C-i by removing the top cover of the chassis. Proceed to the "CD-ROM and Floppy Drive Installation" section later in this chapter for instructions.
Note: Only a "slim" CD-ROM drive will fit into the 5013C-T/5013C-i.

Serial ATA Drive Installation (5013C-T)

1. Mounting a Serial ATA drive in a drive carrier

The Serial ATA drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the Serial ATA drive bays. For this reason, even empty carriers without Serial ATA drives installed must remain in the chassis. To add a new Serial ATA drive, install a drive into the carrier with the printed circuit board side toward the carrier so that the mounting holes align with those in the carrier. Secure the drive to the carrier with four screws, as shown in Figure 6-3.

Figure 6-3. Mounting a Drive in a Carrier



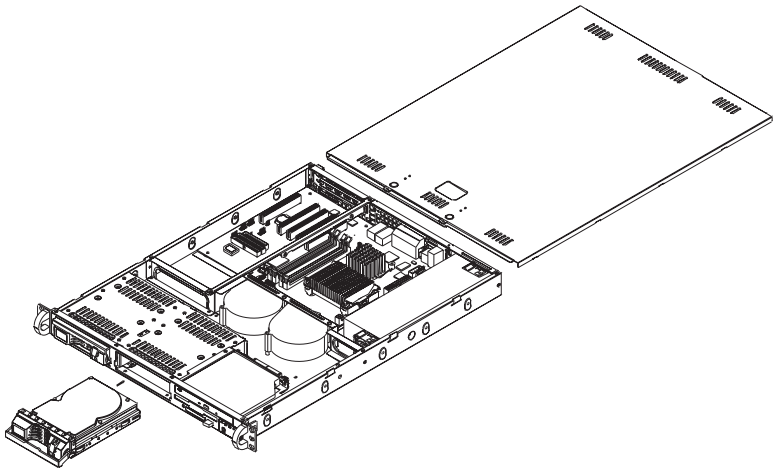
Use caution when working around the Serial ATA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

<u>Important:</u> Regardless of how many Serial ATA hard drives are installed, both drive carriers must remain in the drive bays to maintain proper airflow.

2. Installing/removing hot-swap Serial ATA drives

Two Serial ATA drive bays are located in the front of the chassis, making them easily accessible for installation and removal. These drives are hot-swappable, meaning they can be installed and removed without powering down the system. To remove, first push the release button located beside the drive LEDs, then swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-4).

Figure 6-4. Removing/Installing Serial ATA Drives



Important: Regardless of how many Serial ATA drives are installed, both drive carriers must remain in the drive bays to maintain proper airflow.

Serial ATA Power Cables

Serial ATA power cables should be routed so that they do not block the airflow through the chassis. See the motherboard layout diagram for the location of the cable connections.

Serial ATA Backplane

The Serial ATA drives plug into a backplane that provides power, drive ID and bus termination. A RAID controller can be used with the backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the Serial ATA drives. The backplane is already preconfigured, so there are no jumpers or switches present on it.

CD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the CD-ROM and floppy drive bays. The CD-ROM drive must have a "slim" profile to fit into the 5013C-T/5013C-i.

First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server. You must power down the system before installing or removing a CD-ROM or floppy drive.

Drives mount on rails and should "click" into place to be correctly and fully installed in their bays.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

IDE Drive Installation (5013C-i only)

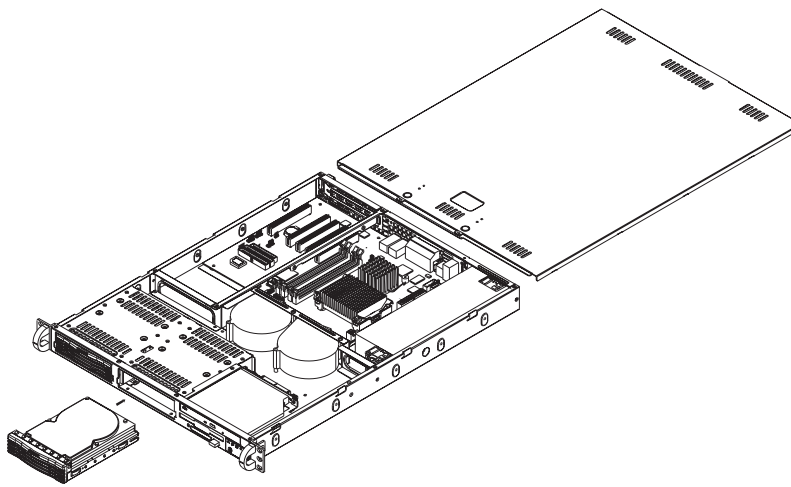
1. Mounting an IDE drive in a drive carrier

Like SATA drives, IDE drives are also mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow. For this reason, even empty carriers without IDE drives installed must remain in the chassis. To add a new IDE drive, install a drive into the carrier with the printed circuit board side toward the carrier so that the mounting holes align with those in the carrier. Secure the drive to the carrier with the four screws (see Figure 6-5).

2. Installing/removing IDE drives

The two IDE drive bays are located in the front of the chassis, making them easily accessible for installation and removal. The IDE drives are not hot-swap units, meaning system power must be turned off before installing and/or removing them. To install or remove a drive, first power down the system and then remove the top cover of the chassis. Unscrew the retention screw at the top center of the drive, then push the drive carrier out from the back until you can grasp and pull it out through the front of the chassis (see Figure 6-5). Reverse this procedure when installing a drive carrier, making sure you screw in the retention screw. Replace the top cover when finished.

Figure 6-5. Removing/Installing IDE Drives



6-5 Power Supply

The SuperServer 5013C-T/5013C-i has a single 250 watt power supply. This power supply has the capability of operating at 100 or 240 input volts. Depress the main power button 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 Supermicro (PWS-021 - see contact infomation in Chapter 1).

Replacing the Power Supply

1. Accessing the inside of the SuperServer 5013C-T/5013C-i

To replace a power supply, you must first remove the top chassis cover. To do so, first release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and push it away from you. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. Removing the power supply

First unplug the power cord from the system. To remove the failed power unit, remove the two screws on the back of the power supply, which secure it to the chassis. You can then lift the unit straight out of the chassis. (The power cord should have already been removed.)

3. Installing a new power supply

Replace the failed unit with another unit of the same wattage. It is highly recommended to replace it with the exact same power supply. Carefully insert the new unit into position in the chassis and secure it with the two screws at the rear of the unit. Before reconnecting the power cord, make sure the power switch on the power supply is in the off position. Then reconnect the power cord, replace the chassis top cover and push the unit back into the rack. Finish by turning the power switch on the power supply on, and then depress the power button on the front of the system.

Chapter 7
BIOS

7-1 Introduction

This chapter describes the AwardBIOS for the P4SCE. The Award ROM BIOS is stored in a Flash chip and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our web site for any changes to BIOS that are not reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The AwardBIOS Flash chip stores the system parameters, such as amount of memory, type of disk drives and video displays, etc. CMOS requires very little power. When the computer is turned off, a back-up battery provides power to the BIOS Flash chip, enabling it to retain the system parameters. Each time the computer is powered-on, the computer is then configured with the values stored in the BIOS ROM by the system BIOS, which gains control when the computer is powered on.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the 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 POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 4-3 gives detailed descriptions of each parameter setting in the Setup utility.

7-2 Running Setup

**Optimal default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the Main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

When you first power on the computer, the AwardBIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Del> immediately after turning the system on, or
2. When the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Del> key to activate the Main Setup Menu.

Press DEL to enter SETUP

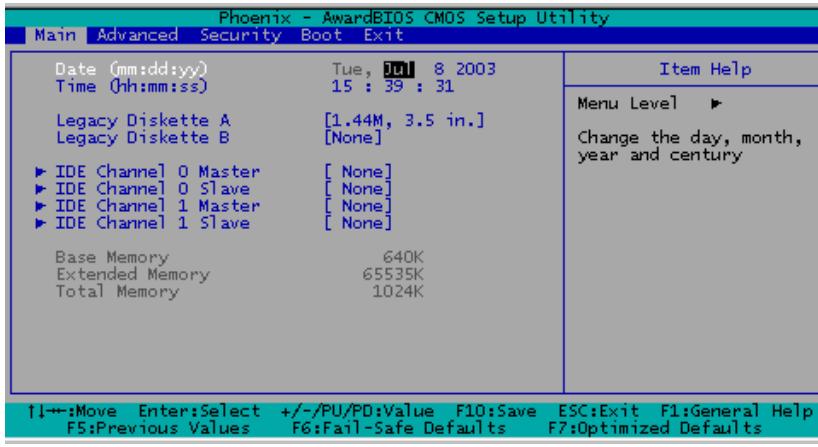
7-3 Main BIOS Setup

All Main Setup options are described in this section. The Main BIOS Setup screen is displayed below.

Use the <Up> <Down> arrow keys or the <Tab> key to move among the different settings in the above menu.

Press the <Esc> key to exit the CMOS Setup Menu and use the <Left> <Right> arrow keys to enter the other categories of BIOS settings. The next section is described in detail to illustrate how to navigate through the menus.

Main BIOS Setup Menu



Date/Time

Set the system date and time. Key in the correct information in the "mm", "dd" and "yy" fields. Press the "Enter" key to save the data.

Legacy Diskette A

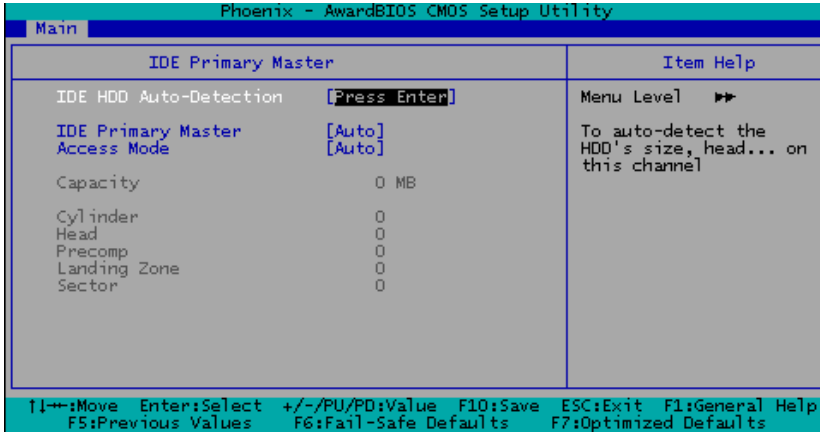
This setting allows the user to set the type of floppy disk drive installed as diskette A. The options are None, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, **1.44/1.25MB**, 3.5 in and 2.88MB 3.5 in.

Legacy Diskette B

This setting allows the user to set the type of floppy disk drive installed as diskette B. The options are **None**, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, 1.44/1.25MB, 3.5 in and 2.88MB 3.5 in.

▶IDE Channel 0 Master/Slave, IDE Channel 1 Master/Slave

These settings allow the user to set the parameters of the IDE Channel 0 Master/ Slave and IDE Channel 1 Master/Slave slots. Hit <Enter> to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are:



IDE HDD Auto-Detection

This option allows the user to determine the manner in which the AwardBIOS sets the settings for the IDE Primary Master Device. The options are "None", "**Auto**" and "Manual."

IDE Primary Master

Press the <Auto> key to activate the 'IDE HDD Auto-Detection" function, which will allow BIOS to automatically detect the status of the IDE HDD installed in the system, such as the size, the number of cylinders, the configurations of items such as Head, Precomp, Landing Zone and Sector. The options are "None", "**Auto**", and "Manual."

Access Mode

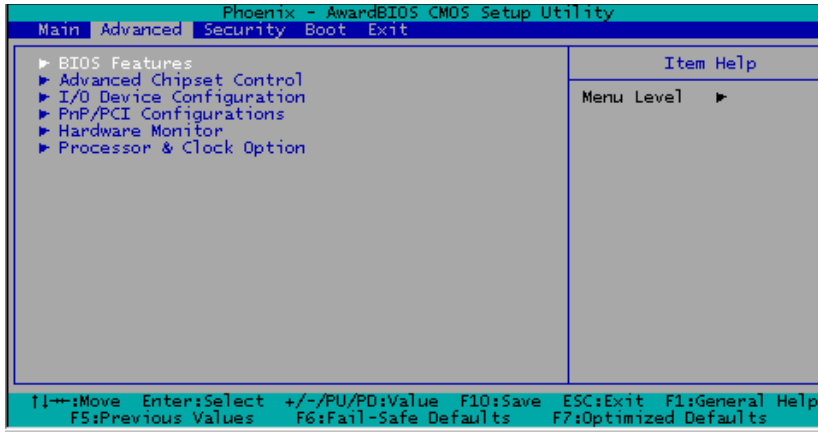
This item determines the location through which the AwardBIOS accesses the IDE Primary Master Device. The settings are "CHS", "LBA", "Large", and "**Auto**".

Base Memory/Extended Memory/Total Memory

These are displays that inform you how much of each type of memory is recognized as being present in the system.

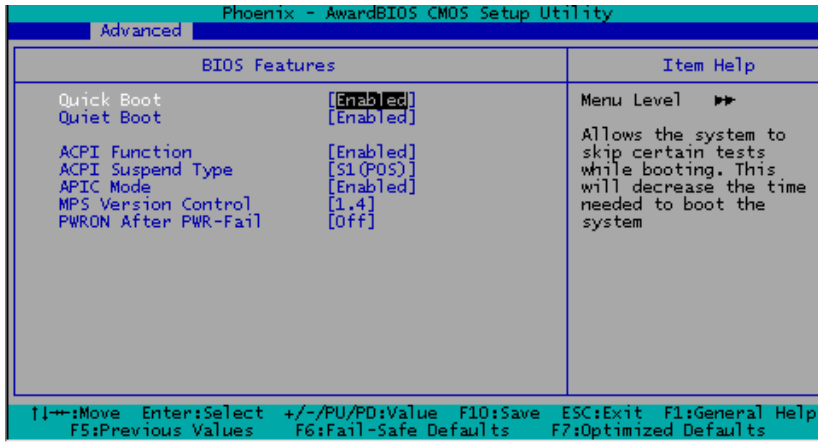
7-4 Advanced BIOS Setup

Choose Advanced BIOS Setup from the Award BIOS main menu with the Left/ Right arrow keys. You should see the following display. Select one of the items in the left frame of the screen to go to the sub screen for that item. Advanced BIOS Setup options are displayed by highlighting the option using the arrow keys. All Advanced BIOS Setup options are described in this section.



7-4.1 Advanced BIOS Features

When the item of Advanced BIOS Features is highlighted, press the <Enter> key to activate the screen below:



Quick Boot

If enabled, this feature allows the system to skip certain tests while booting. This will decrease the time needed to boot the system. The settings are "**Enabled**" and "Disabled".

Quiet Boot

This feature allows the user to activate the function of "Quiet Boot". "**Enabled**" and "Disabled".

ACPI Function

Select "Enabled" to activate the function of BIOS Support for Advanced Configuration and Power Interface features. The settings are "**Enabled**" or "Disabled".

ACPI Suspend Type

If enabled, the option allows the user to determine the ACPI Suspend type. The options are **S1(POS)**, S3(STR), S1&S3.

APIC Mode

This setting allows you to **Enable** or Disable APIC. APIC is used to assign interrupt signals to a specific processor on multi-processor system and provides IRQs beyond the conventional 16 under Windows 2000 or XP. It has no effect on single processor systems.

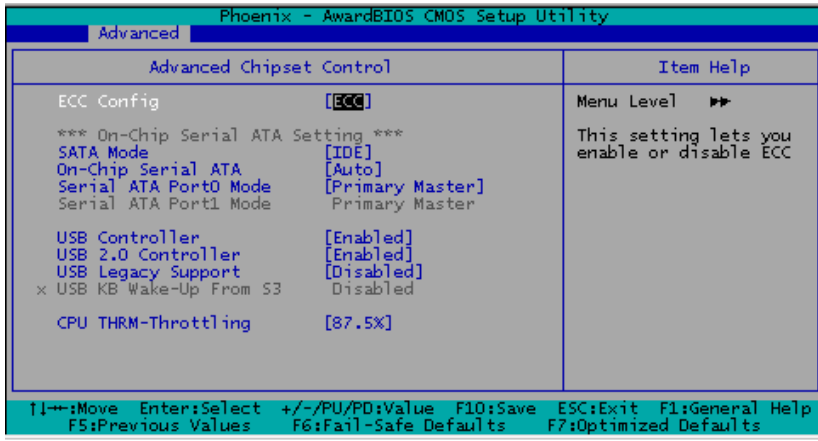
MPS Version Control

This setting allows you to state the MPS version for your operating system. Options are "1.1" and "**1.4**".

PWRON After PWR-Fail

This setting allows the user to specify how the system will respond when power is reapplied after the system has gone down due to a power failure. The options are "**Off**", "On" and "Former-Sts".

7-4.2 Advanced Chipset Control



ECC Configuration

This setting allows you to enable or disable ECC (Error Correction and Checking). The options are **ECC** and Non-ECC.

SATA Mode

This setting allows you to set the SATA Mode RAID via BIOS. The options are **RAID** and IDE.

On-Chip Serial ATA

This setting allows you to configure the On-Chip SATA. Select "Disabled" to disable the SATA controller. If "Auto" is selected, BIOS will automatically configure the SATA controller settings. Select "Combined Mode" to combine the functionality of Parallel ATA (PATA) and SATA (with a maximum of two IDE drives available for each channel). If "Enhanced Mode" is selected, both SATA and PATA are supported (with a maximum of 6 IDE drives available). If "SATA Only" is selected, SATA will operate in Legacy Mode. The options are Disabled, **Auto,** Combined Mode, Enhanced Mode and SATA only.

Serial ATA Port0/1 mode

This setting allows you to configure Serial ATA Port0/1 modes.The options are **Primary Master**, Primary Slave, Secondary Master, Secondary Slave, SATA0 Master and SATA1 Master.

USB Controller

This setting allows you to enable or disable the USB Controller. The options are **Enabled**, and Disabled.

USB 2.0 Controller

This setting allows you to enable or disable USB 2.0 (EHCI) Controller. The options are **Enabled**, and Disabled.

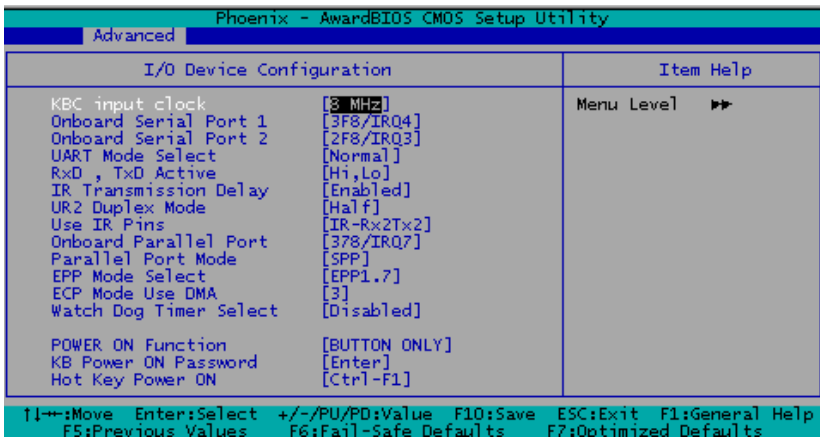
USB Legacy Support

This setting allows you to enable or disable the functions of USB, Keyboard/Mouse under POST and DOS. The options are **Disabled**, and Enabled.

CPU THRM-Throttling

THRM throttling is used to lower power consumption and reduce the heat generated by the CPU. The options for this setting are "**87.5%**", "75%", "62.5%", "50%", "37.5%", "25%' and "12.5%'.

7-4.3 I/O Device Configuration



Keyboard Input Clock

This setting allows to you set the speed of the keyboard. The options are 6 MHz, **8 MHz,** 12 MHz, and 16 MHz.

Onboard Serial Port1/Onboard Serial Port2

This setting allows the user to set the address and the corresponding IRQ for the Serial Port1 and Serial Port 2. The options are "Disabled" , "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", and "Auto". The default setting for Serial Port1 is "**3F8/IRQ4**" and the default for Port 2 is "**2F8/IRQ3**".

UART Mode Select

This setting allows the user to select the UART mode for the BIOS. The options are "IrDA", "ASKIR" and "**Normal**".

RxD, TxD Active

This allows the user to change the settings for the "RxD, TxD Active" function. The options are "Hi, Hi", "**Hi, Lo**", "Lo, Hi", and "Lo, Lo".

IR Transmission Delay

If "Enabled", the transmission of IR (infrared) signals will be delayed. The options are "**Enabled**" and "Disabled".

UR2 Duplex Mode

This setting sets the UR2 Duplex Mode. Options are "Full" and "**Half**".

Use IR Pins

This item sets the usage of the IR pins. The options are "RxD2, TxD2" and "**IR-Rx2Tx2**".

Onboard Parallel Port

This setting allows the user to set the address and the corresponding IRQ for the onboard parallel port. The options are "Disabled", "**378/IRQ7**", "278/IRQ5" and "3BC/IRQ7".

Parallel Port Mode

This setting sets the mode for the onboard Parallel port. The options are "**SPP**," "EPP", "ECP" "ECP+EPP" and "Normal".

EPP Mode Select

This setting allows the user to select the EPP port type. The options are "EPP 1.9" and "**EPP 1.7**".

ECP Mode Use DMA

This setting allows the user to select the DMA channel for the ECP mode (port) to use. The options are "1" and "**3**".

Watch Dog Timer Select

This setting allows you to select the setting for the Watch Dog Timer. The Options are "**Disabled**", "10 Sec", "20 Sec", "30 Sec", "40 Sec", "I min", "2 min",and "Enabled".

Power On Function

This setting allows the user to decide which method to use to power on the system. The options are "Password", "Hot Key", "Mouse Left", "Mouse Right", "Any Key", and "**Button Only**".

KB Power On Password

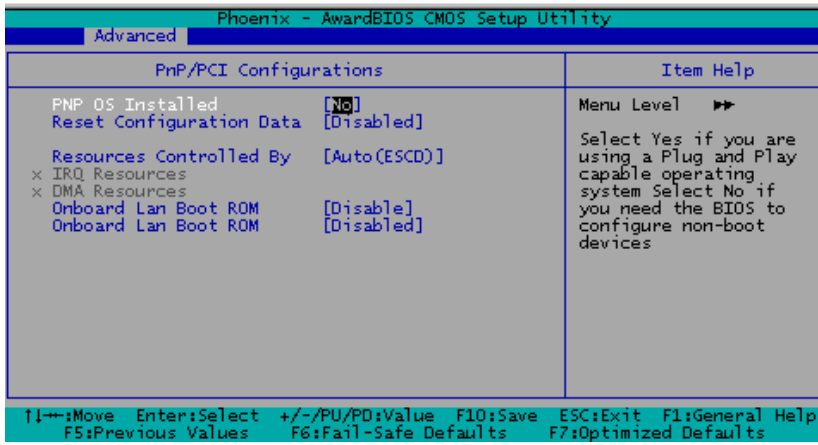
This setting allows the user to enter the Password when the system is powered on via keyboard.

Hot Key Power On

This setting allows the user to decide which hot-keys to use in order to power on the system. The options are "**Ctrl-F1**", "Ctrl-F2, Ctrl-F3", "Ctrl-F4", "Ctrl-F5", "Ctrl-F6", "Ctrl-F7", and "Ctrl-F8".

7-4.4 PnP Configuration

Choose PCI/PnP Configurations from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



PnP OS Install

Enter "Yes" if are you are using an OS that is PnP (Plug and Play) - compatible. Enter "**No**" if your OS does not support PnP.

Reset Configuration Data

Enabling this setting resets the extended system configuration data when you exit setup. Do this when you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot reboot the system. The options are "Enabled" and "**Disabled**".

Resources Controlled By

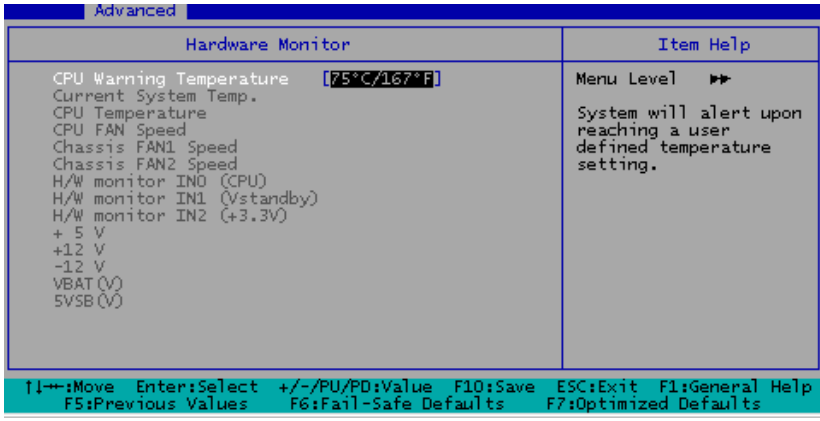
This setting allows BIOS to automatically configure all boot and Plug and Play compatible devices. If you choose Auto, you cannot select the IRQ, DMA and memory base address fields, because BIOS automatically assigns them. The options are "**Auto <ESCD>**" and "Manual".

Onboard LAN Boot ROM

Select "Enabled" to enable the Boot ROM embedded in the Onboard LAN Chip. The options are "Enabled", "LAN 1", "LAN 2" and "**Disabled**".

7-4.5 Hardware Monitors

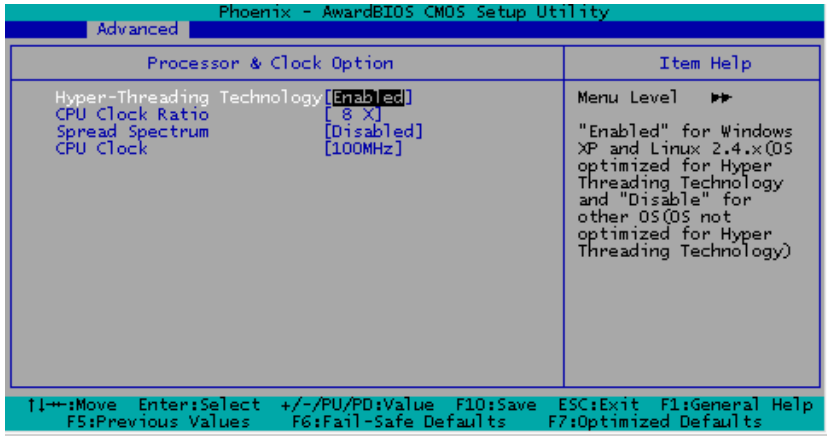
There are only three settings on this menu (below). The rest of this menu shows various temperatures and voltage levels as indicated.



CPU Warning Temperature

This allows you to set the CPU warning temperature. If the CPU temperature reaches this threshold, an alarm will activate and a warning message will be displayed onscreen. The options are "Disabled", "60°C/140°F", "65°C/149°F", "70°C/158°F", "**75°C/167°F**", "80°C/176°F" and "85°C/185°F".

7-4.6 Processor & Clock Options



Hyper-Threading Technology

Select "Enabled" to activate the hyper-threading function of the CPUs to make each CPU appear as if there were two CPUs to any programs that support it (you must have OS support also). The settings are "Disabled" and "**Enabled**."

CPU Clock Ration

Key in a number between 12x to 16x to set the clock ratio of the processor. The default setting is **16x.**

Auto Detect PCI Clk

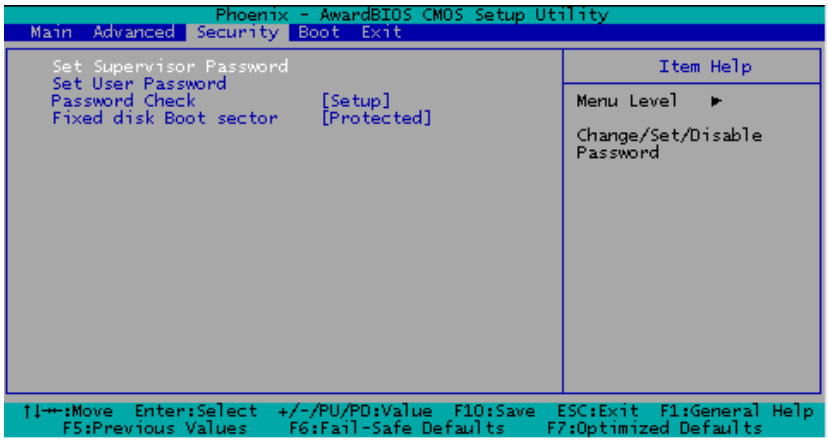
Set this option to "Enabled" to enable the BIOS to automatically detect the PCI Clock. The settings are "Disabled" and "**Enabled**."

CPU Clock

Key in a number between **200** and 233 to set the CPU clock (MHz). Supermicro does not recommend or make any guarantees with CPU overclocking.

7-5 Security

Choose Security from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



Set Supervisor Password

When the item "Set Supervisor Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the Supervisor Password in the dialogue box to set or to change the Supervisor Password.

Set User Password

When the item "Set User Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the User Password in the dialogue box to set or to change the User Password.

Password Check

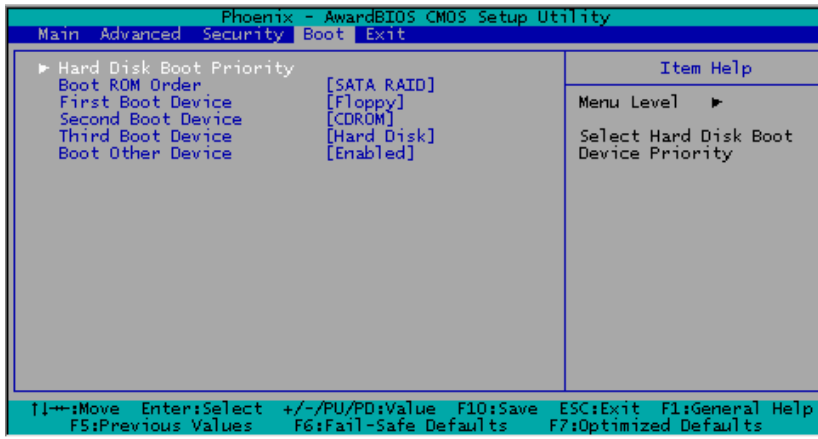
This setting allows the user to determine if the password is required every time when the system boots up or if the password is required only when you enter the CMOS setup. The options are "System" and "**Setup**".

Fixed Disk Boot Sector

This setting allows the user to configure the Fixed Disk Boot Sector. The default setting is "**Protected**".

7-6 Boot

Choose Boot from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



Hard Disk Boot Priority

This item allows the user to select the Boot Priority of Hard Disk Devices.

Boot ROM Order

This item allows the user to specify the order of ROM (Read Only Memory) the system scans first during bootup. The options are "**SATA RAID**" and "PCI Card".

First Boot Device

This item allows the user to set the first boot-up device. The options are **"Floppy"**, "LS120", "HDD", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Second Boot Device

This item allows the user to set the second boot-up device. The options are "Floppy", "LS120", "HDD", "**CDROM**", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Third Boot Device

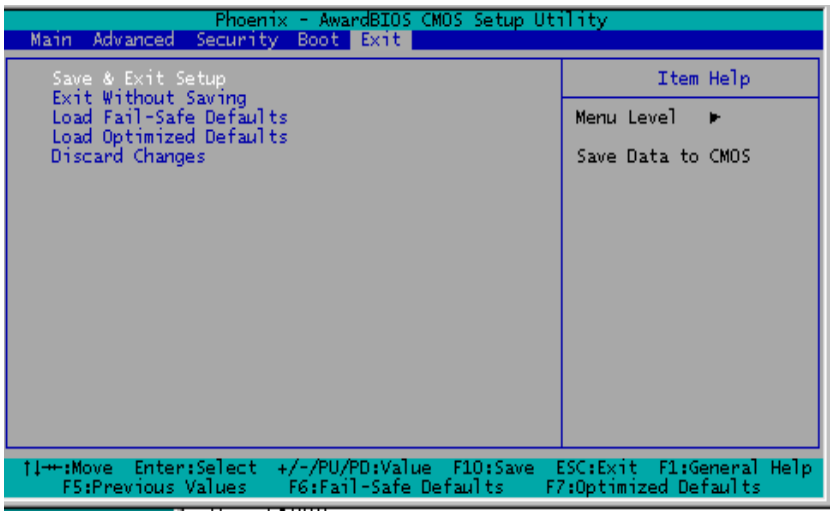
This item allows the user to set the third boot-up device. The options are "Floppy", "LS120", "**HDD**", "SCSI", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Boot Other Device

If enabled, this option enables the BIOS to load the OS from another device rather than the ones that have been specified as the first, second and third boot up devices. The settings are "**Enabled**" and "Disabled".

7-7 Exit

Choose Exit from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:



Save & Exit Setup

When the item "Save & Exit Setup" is highlighted, press <Enter> to save the changes you've made in the BIOS program (CMOS) and exit. Your system should, then, continue with the boot-up procedure.

Exit without Saving

When the item "Exit without Saving" is highlighted, press <Enter> to exit the Setup routine without saving any changes you may have made. Your system should then continue with the boot-up procedure.

Load Fail-Safe Defaults

Highlight this item and hit <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Load Optimized Defaults

Highlight this item and hit <Enter> to load the optimized settings for all items in the BIOS Setup. These settings provide you with optimal system performance.

Discard Changes

When the item "Discard Changes" is highlighted, press <Enter> to discard any changes you made to the BIOS settings and to stay in BIOS Setup. Your system should then continue with the boot-up procedure.

Notes

Appendix A

BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Beeps	Error Message
1 long beep	Memory Modules Errors
1 long beep+2 short beeps	VGA Errors

Notes

Appendix B

BIOS POST Codes

This section lists the POST (Power On Self Testing) Codes for the Award BIOS.

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	● Disable PS/2 mouse interface (optional). ● Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). ● Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.

POST (hex)	Description
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	• Program CPU internal MTRR (P6 & PII) for 0-640K memory address. • Initialize the APIC for Pentium class CPU. • Program early chipset according to CMOS setup. Example: onboard IDE controller. • Measure CPU speed. • Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved

POST (hex)	Description
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.

POST (hex)	Description
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: ◆Clear EPA or customization logo.

POST (hex)	Description
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook. 2. Recover the text font used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

Notes

Appendix C

Software Installation

C-1 Supero Doctor III

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

Install Supero Doctor III after the operating system has been installed.

Key Features

For Windows XP, NT4, 2000 and 2003 Operating Systems

Super Doctor III supports the following features:

- Web-based remote management
- Graphical Mode Console Redirection
- System Information (WMI)
- Performance Monitoring
- Remote Control
  Graceful power shutdown and reboot
  Hard power shutdown and reset without notice
- System Management
  Allows you to easily manage your entire network
- Reports
  System Information
  Health Log
  Administration
  System Management

Linux Support

The SD III Client and Supero Doctor II for Linux support the following features:*

- Applications for local management
- Pager and E-mail alerts
- SNMP support
- Health Monitoring
  CPU and system temperatures
  System voltages
  CPU and chassis fans
  Chassis intrusion
  Redundant power failure (hardware dependant)

Note: For Linux operating systems, please refer to the Supero Doctor II information posted on our website at ftp://ftp.supermicro.com/utility/Supero_Doctor_II/Linux/ .

The figures below display two of the key features of SDIII.

Figure C-1. Supero Doctor III Health Information Screen

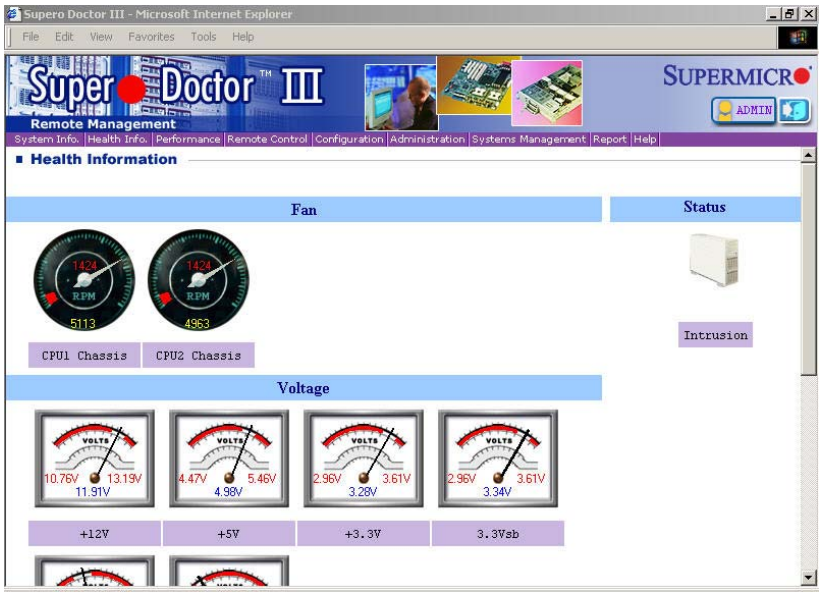


Figure C-2. Supero Doctor III Remote Power/Reset Control Screen

Note: SD III software can be downloaded from our website at ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download the SDIII User's Guide at http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf. For Linux, we recommend the use of Supero Doctor II. Please refer to our Supero Doctor II information posted at ftp://ftp.supermicro.com/utility/Supero_Doctor_II/Linux/.

C-2 Installing the Intel ICH5R SATA RAID Utility

After all hardware has been installed, you must first install the RAID level that you require in the Intel ICH5R SATA RAID Utility program before you install a Windows operating system and other software drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your motherboard. (Note: the current version of the ICH5R SATA RAID Utility can only support Windows XP/2000 Operating System.)

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 that supports SATA transfer rates of up to 150MBps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems facilitate better airflow and can be installed in smaller chassis than can PATA. In addition, PATA cables are limited to 40cm in length, while SATA cables can reach up to one meter. Overall, SATA provides better functionalities than PATA.

Introduction to Intel ICH5R Serial RAID

Located in the South Bridge of the E7210 chipset, the ICH5R (I/O Controller Hub) provides the I/O subsystem with access to the rest of the system. It supports a dual-channel Ultra ATA/100 Bus Master IDE controller (PATA) and two SATA Host controllers, which can support up to two SATA ports and up to two RAID drives. The ICH5R supports the following PATA and SATA device configurations:

ATA Operating Modes

You can select from either Legacy or Native mode.

Legacy Mode:

In this mode, system BIOS assigns the traditional 14 and 15 IRQs for HDD use. Up to four ATA devices are support by this mode.

The following three modes are supported in Legacy Mode:

*Non-Combined Mode: Parallel ATA only with a maximum of four devices.

*Non-Combined Mode: Serial ATA only with a maximum of two devices.

*Combined Mode: Both SATA and PATA devices with support for two devices each (total of four devices maximum). For IDE/SATA configurations, please refer to the table below.

Primary Master(=PM)	Yes	Yes	No	No	No	No
Primary Slave(=PS)	Yes	No	Yes	No	No	No
Secondary Master(=SM)	Yes	No	No	Yes	No	No
Secondary Slave(=SS)	Yes	No	No	No	Yes	No
SATA Port0	No	SM	SM	PM	PM	PM
SATA Port1	No	SS	SS	PS	PS	PS
*Note: (No=Not Present, Yes=Present) Also, if Logical Primary is selected, the IDE channels are no longer available.						

Native Mode:

In this mode, system BIOS will automatically search all available IRQs for HDD use. For newer operating systems that support switching to Native Mode such as Windows XP and Windows 2003, you can set SATA and PATA to Native Mode. These newer operating systems can accommodate both Legacy and Native modes and support up to six ATA devices. (To select Legacy or Native Mode, please go to the "BIOS Setup" section in System BIOS.)

Configuring BIOS settings for SATA RAID (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 the item "Load Optimized Default Settings" and press the <Enter> key. Type "Y" for "Yes" to confirm the selection, then press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Advanced" settings in the BIOS.

4. Scroll down to "Advanced Chipset Control" and press the <Enter> key to select this option.

5. Select "Manual" for the item "On Chip Serial ATA" and press the <Enter> key to select this option.

6. Select "Tertiary Master" for the item "Serial ATA Port0" and press the <Enter> key to select this option.

7. Select "Quaternary Master" for the item "Serial ATA Port1" and press the <Enter> key to select this option.

8. Select "Enabled" for the item "RAID Function" and press the <Enter> key to select this option.

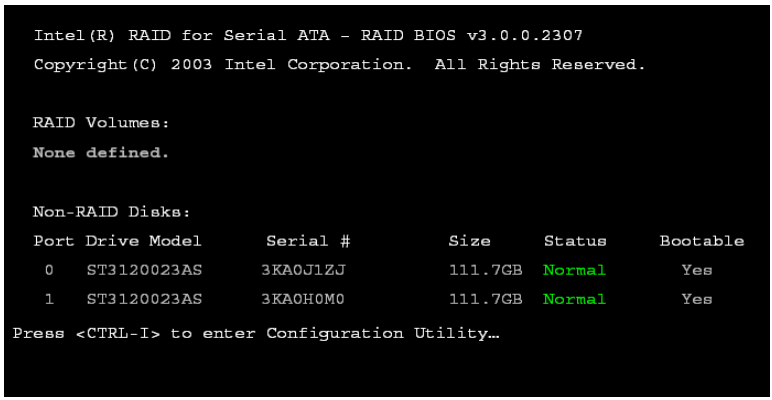
9. Tap "Esc" and scroll dwon to "Exit". Select "Save and Exit" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

10. Once you've exited the BIOS Utility, the system will reboot.

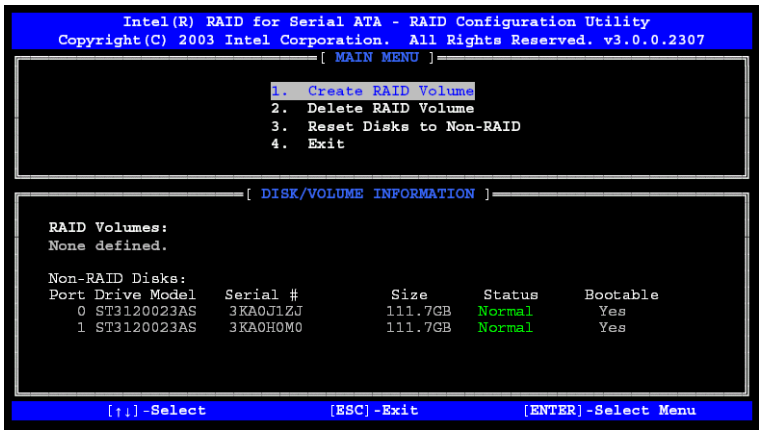
Using the Intel ICH5R SATA RAID Utility Program

1. Creating, Deleting and Reseting RAID Volumes

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

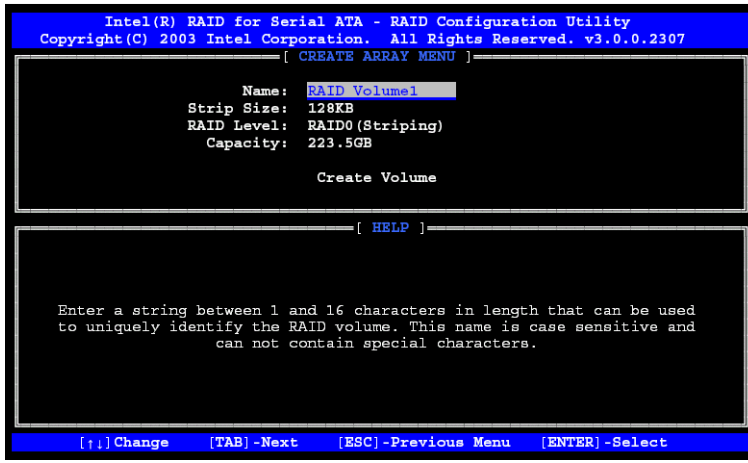


b. When you see the above screen, press the <Ctrl> and the <i> keys simultaneously to display the main menu of the SATA RAID Utility:



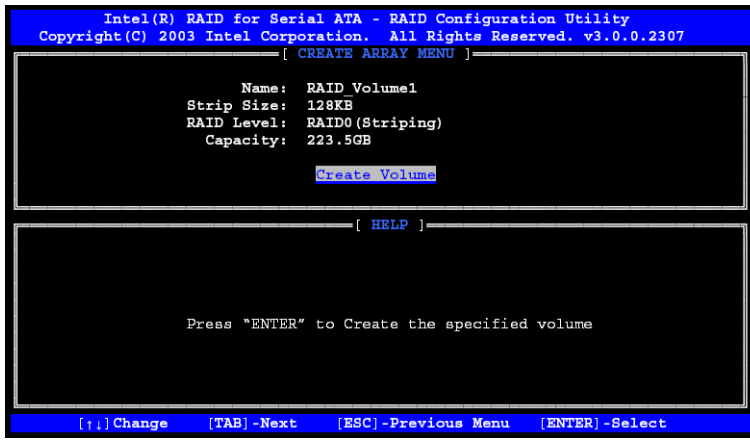
Creating RAID Volume

a. Select item #1 "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:

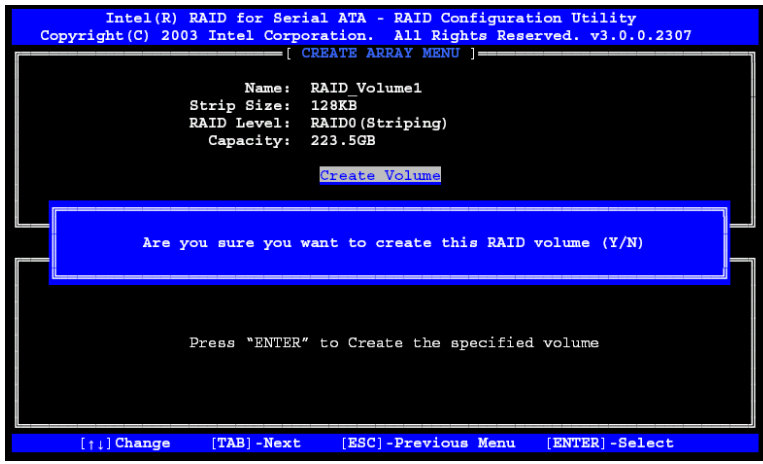


b. Specify a RAID Volume Name and press the <Tab> key or the <Enter> key to go to the next field. (Note: You can use the <Esc> key to reselect the previous menu.)

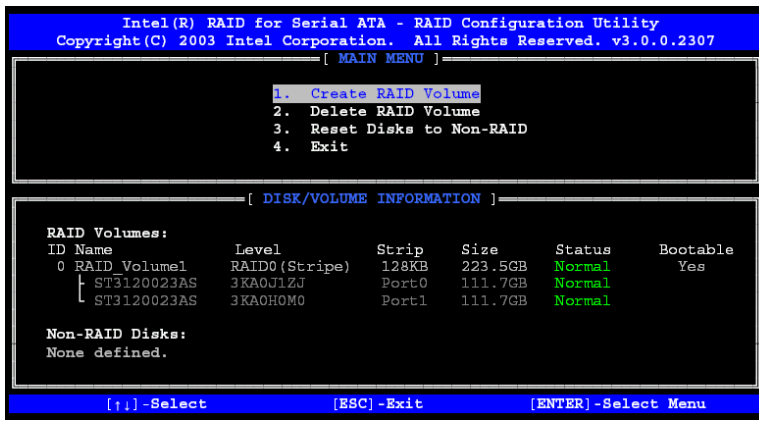
c.Use the <Tab>, <Up Arrow>, <Down Arrow> and <Enter> keys to enter the appropriate values for the items selected and to go to the next field.



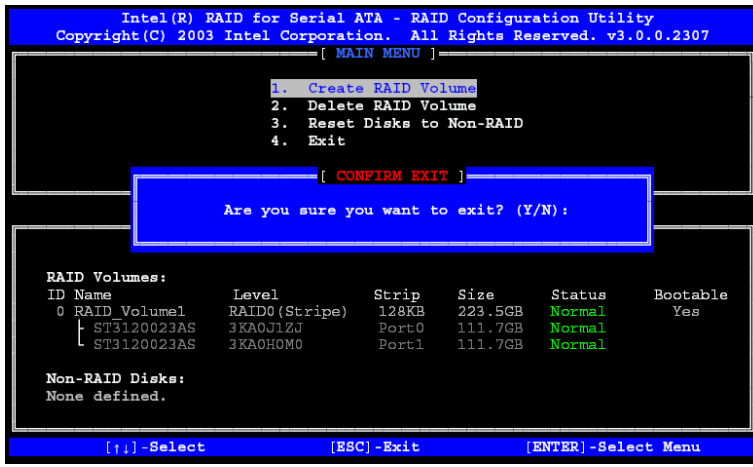
d. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to confirm the selection or type "N" to change the RAID volume. Then press the <Enter> key to enter the value and return to the main menu.



e. You will return to the main menu with DISK/VOLUME INFORMATION updated as shown in the following screen:



f. Once the above screen appears, use the <Down Arrow> key to select item #4 "Exit" and press the <Enter> key. The following screen will appear:

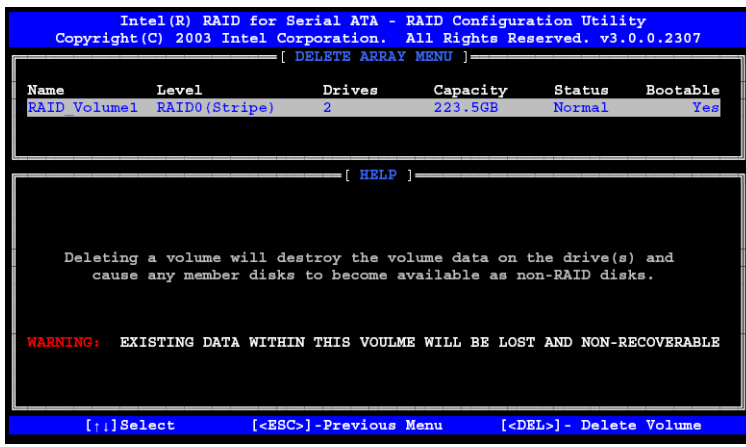


g. When asked "Are you sure you want to exit? (Y/N):", type "Y" to confirm the selections and exit the "Create RAID Volume" menu. Press the <Enter> key to return to the main menu.

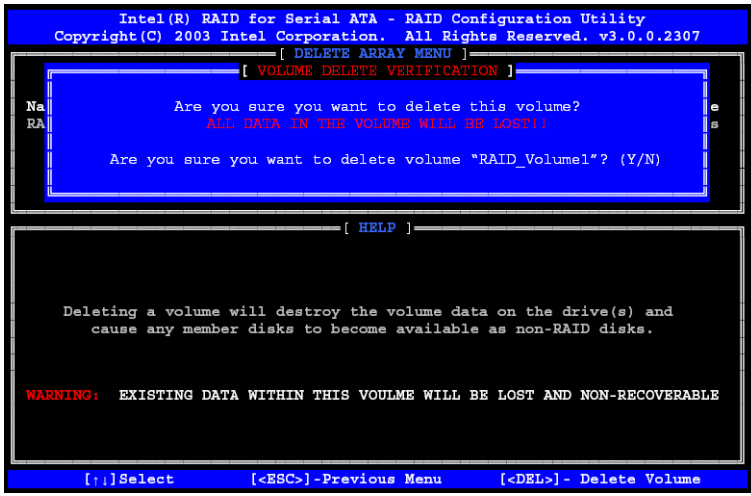
Deleting RAID Volume

a. In the main menu, use the <Down Arrow> and the <Up Arrow> keys to select item #2 "Delete RAID Volume" in the main menu.

b. With item #2 highlighted, press the <Enter> key to select the item "Delete RAID Volume". The following screen will appear:



c. Select the volume and press the <Delete> key to delete the RAID volume. The following screen will appear:

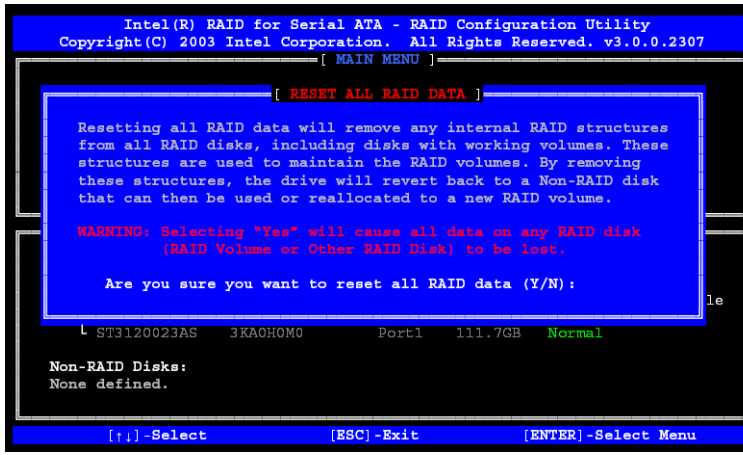


d. When asked "Are you sure you want to delete this volume?", type "Y" to confirm the deletion and press the <Enter> key to return to the main menu. (Note: the <Esc> key is used to reselect the previous menu.)

Reset Disks to Non-RAID

a. In the main menu, use the <Down Arrow> and the <Up Arrow> keys to select item# 3 "Reset Disks to Non-RAID" in the main menu.

b When item# 3 is highlighted, press the <Enter> key to select the item "Reset Disks to Non-RAID". The following screen will appear:



c. When asked "Are you sure you want to reset all RAID data (Y/N):", type "Y" to confirm the selection and press the <Enter> key to return to the main menu. (Press the <Esc> key to reselect the previous menu.)

2. Exiting the ICH5R SATA RAID Configuration Utility Program

a. In the main menu, use the <Down Arrow> and the <Up Arrow> keys to select item #4 "Exit" in the main menu.

b. With item# 4 "Exit" highlighted, press the <Enter> key.

c. When asked "Are you sure you want to exit? (Y/N):", type "Y" to confirm the selection, and press the <Enter> key to exit the ICH5R SATA RAID Configuration Utility Program. The system will then reboot.

C-3 Installing the Operating System and Software

New Operating System: Windows XP/2000 Installation

a. Insert the Microsoft Windows XP/2000 Setup CD in the CD Driver. The system will start booting up from the CD.

b. Press the <F6> key when the message "Press F6 if you need to install a third party SCSI or RAID driver" is displayed.

c. When the Windows XP/2000 Setup screen appears, press "S" to specify additional device(s).

d. Insert the driver diskette labeled "Intel AA RAID XP/2000 Driver for ICH5R" into Drive A and press the <Enter> key.

e. Choose Intel(R)82801ER *SATA RAID Controller* from the list indicated in the XP/2000 Setup Screen and press the <Enter> key.

f. Press the <Enter> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <Enter> key to continue with the installation.

g. From the Windows XP/2000 Setup screen, press the <Enter> key. The XP/2000 Setup will automatically load all device files and then continue the Windows XP/2000 installation.

(Note: the current version of the ICH5R SATA RAID Utility can only support the Windows XP/2000 Operating System.)

h. After the Windows XP/2000 installation is completed, the system will automatically reboot.

i. Insert the Supermicro CD that came with the system into the CD-ROM drive during the system reboot, and the following screen will appear:

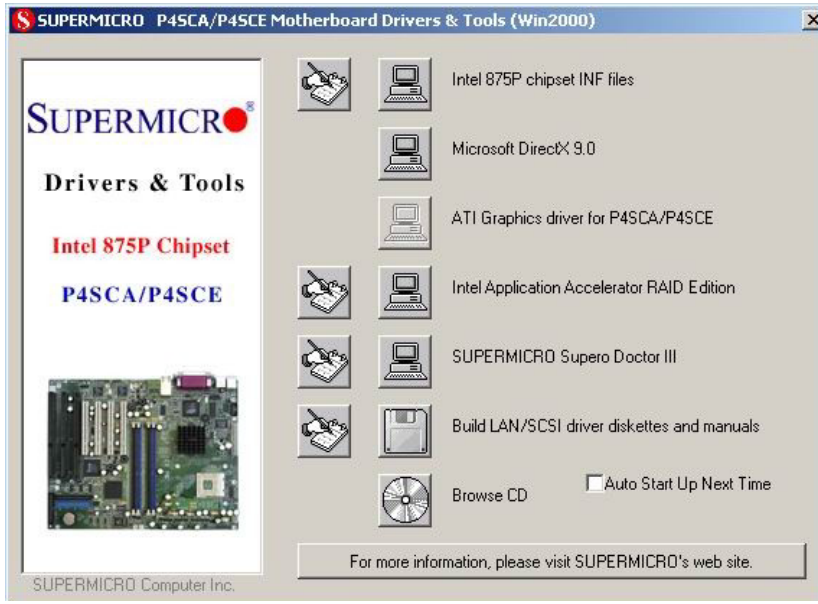
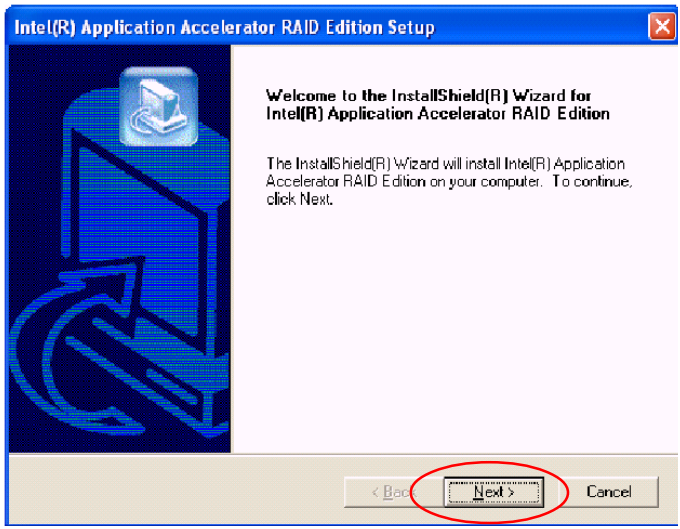


Figure C-3. Driver/Tool Installation Display Screen

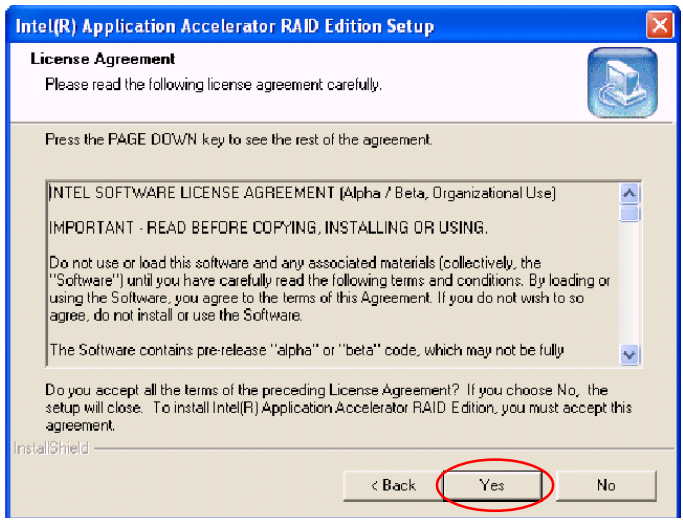
Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must reboot the system before moving on to the next item on the list.** You should install everything here except for the SUPER Doctor utility, Intel LDCM and the LAN/SCSI driver diskettes, which are optional. The bottom icon with a CD on it allows you to view the entire contents of the CD.

Installing the Intel Application Accelerator Utility

a. When the above screen appears, click on the icon marked "Application Accelerator RAID Edition", and the following screen will appear:

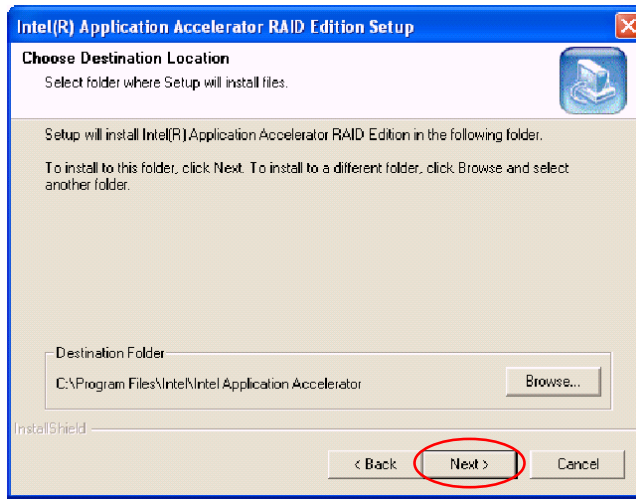


b. When the above screen appears, click on the icon marked "Next" on the screen, and the following screen will appear:

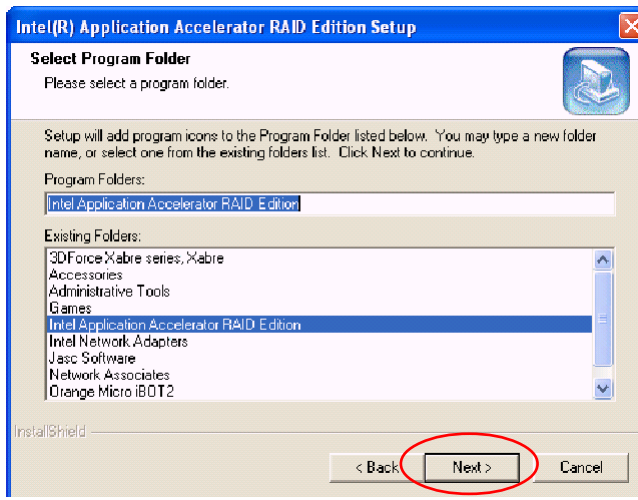


c. After reading the License Agreement, click on the icon marked "Yes" on the screen, and the screen below will appear.

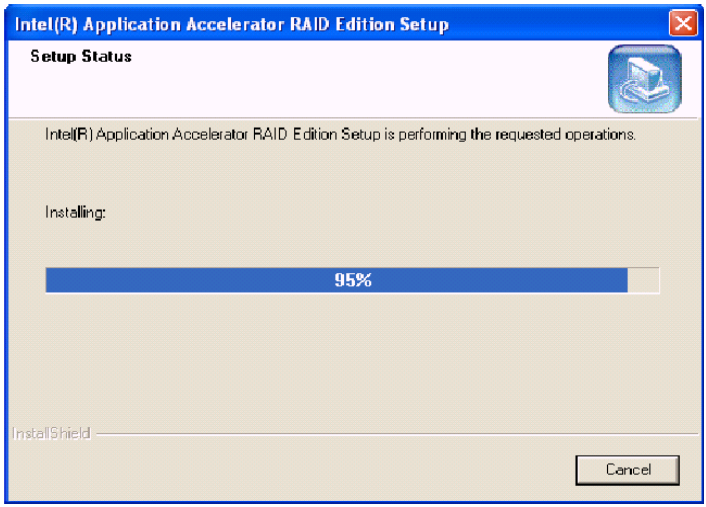
d. Specify the folder that you want the program to be installed in and then, click on the icon marked "Next" to begin the installation process.



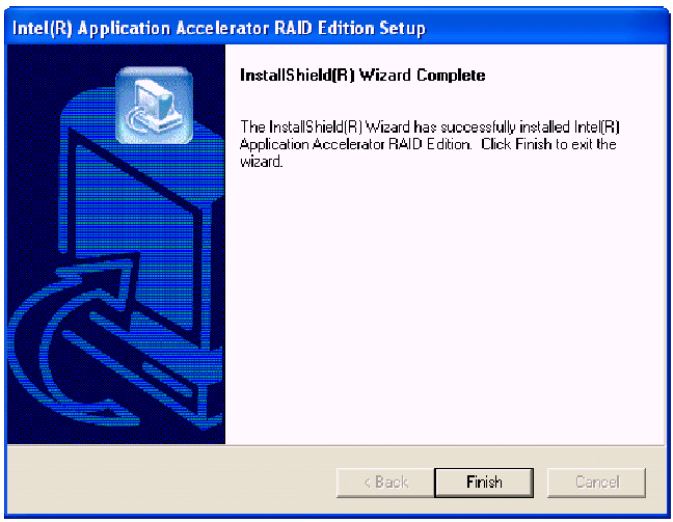
e. Specify a program folder where you want Setup to add the program as shown in the following screen and click on "Next".



f. The following screen will appear to display the status of the installation.



g. Once the Application Accelerator RAID Edition installation is completed, the following screen will appear and the system will start to reboot.



(*Note: Once the XP/2000 Operating System is installed, please read the "Readme text files" for the instructions to use the SATA RAID Utility in the Windows XP/2000 OS environment.)

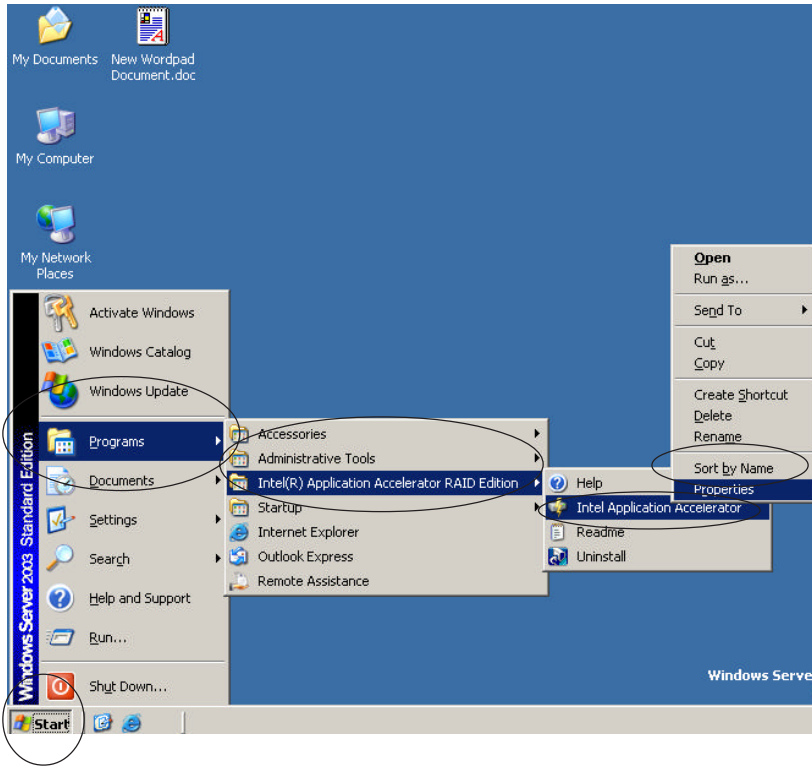
Intel Application Accelerator Utility Workaround for Windows 2003

The Windows 2003 operating system is currently not supported by the Intel Application Accelerator Software. Please follow the instructions listed below to workaround this issue.

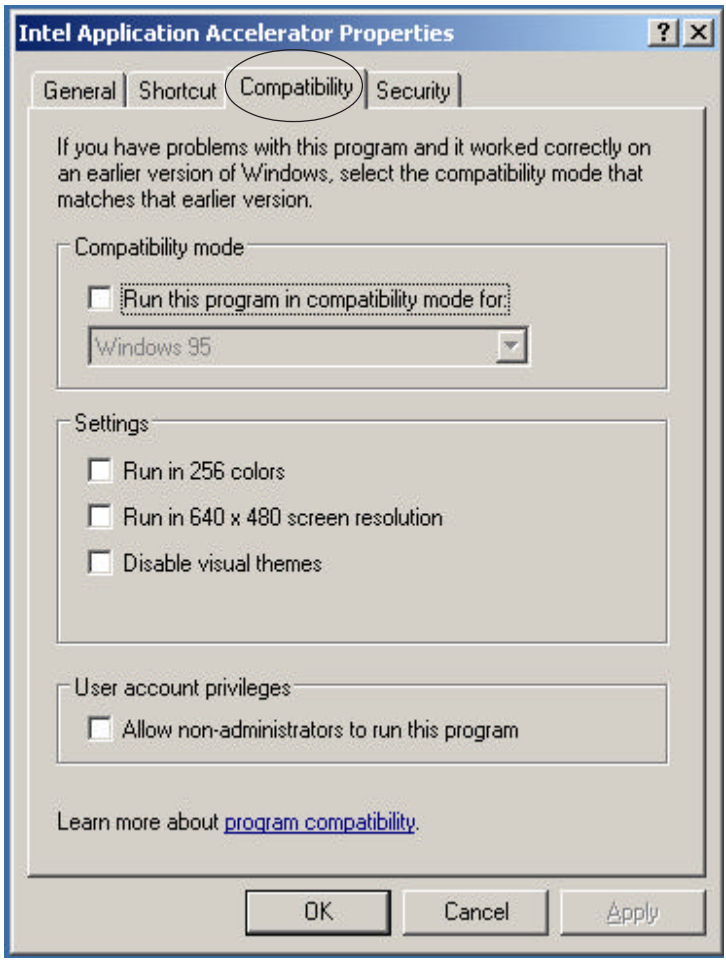
1. Click "Start" and select "Programs" from the desktop.

2. Click "Intel(R) Application Accelerator RAID Edition" and select "Intel Application Accelerator".

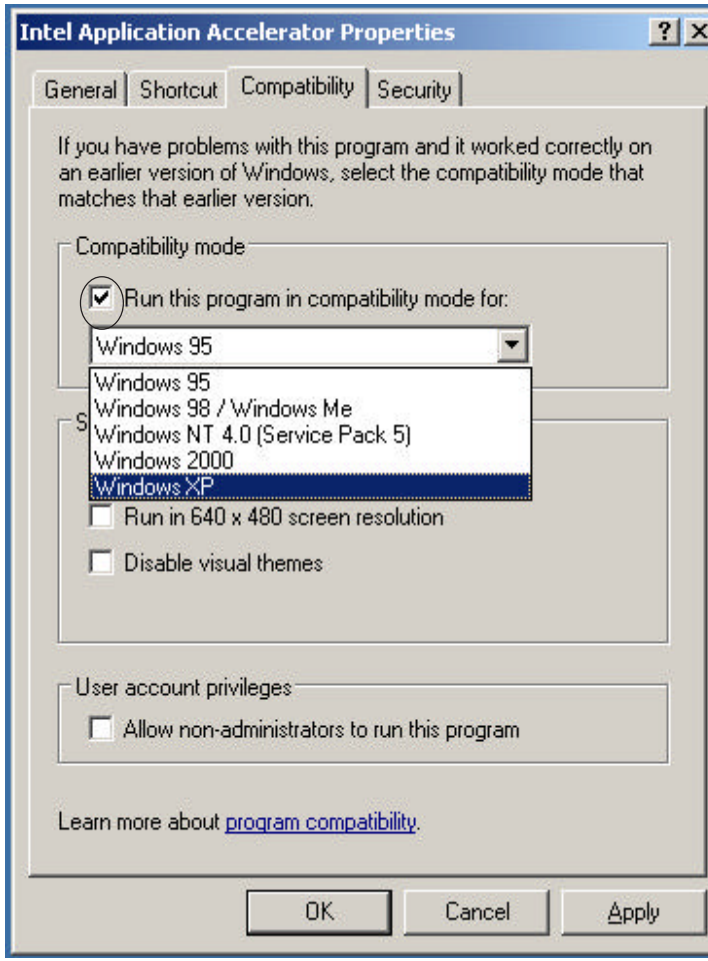
3. Right click on "Intel Application Accelerator" and select "Properties" from the popup menu as shown below:



4. Select the Compatibility Tab from the Intel Application Accelerator Properties menu as shown below:

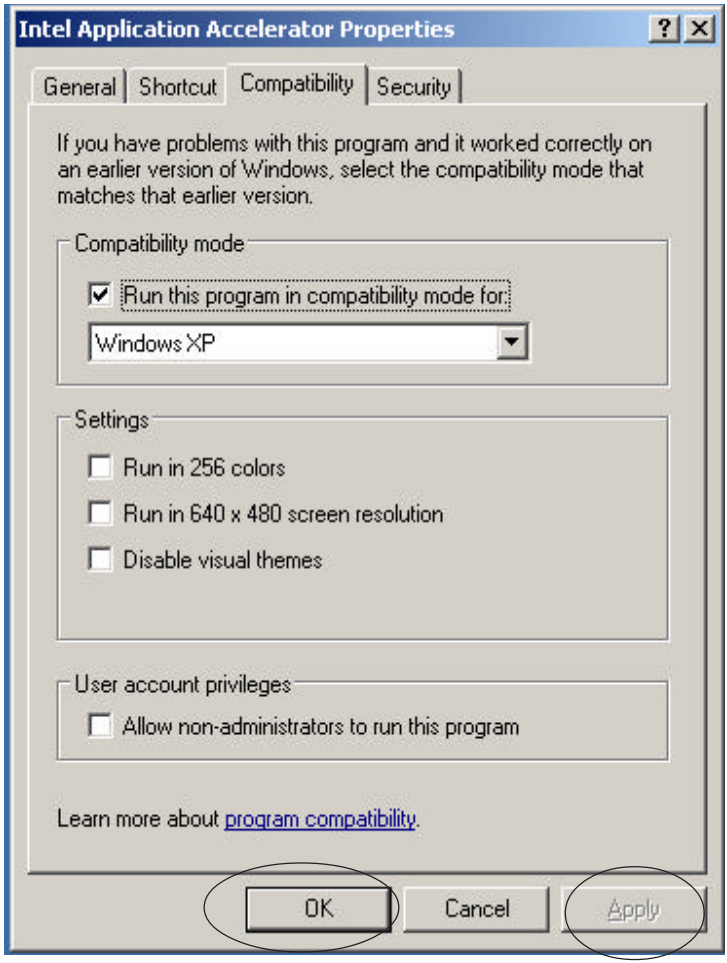


5. Select the checkbox beside the item "Run this program in compatibility mode for:" as shown below:



6. Select the correct OS type for your system from the pull-down menu.

7. Click "Apply" and "OK" to complete your selection as shown below:

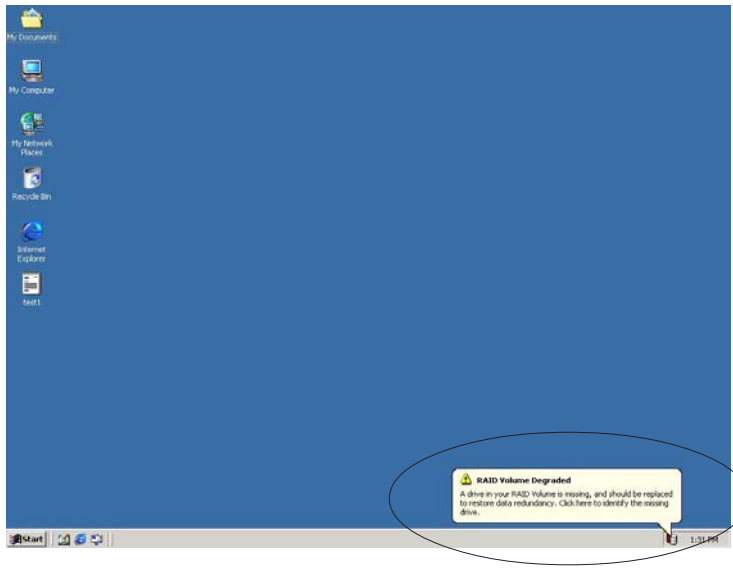


C-4 Rebuilding SATA RAID1

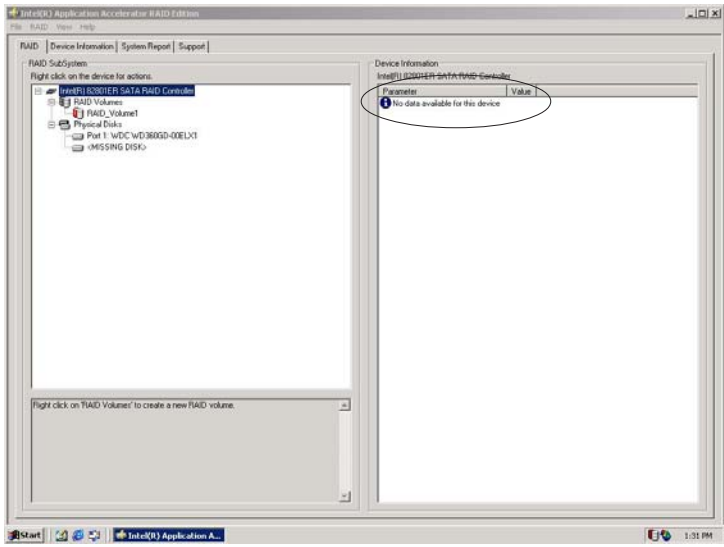
Procedures to Rebuild RAID1

If necessary, please download documentation from Intel's website at: Intel® Application Accelerator RAID Edition.

1. Once a hard drive disk has failed, a pop-up message will appear to alert you that the RAID Volume has been degraded and the following screen will appear:

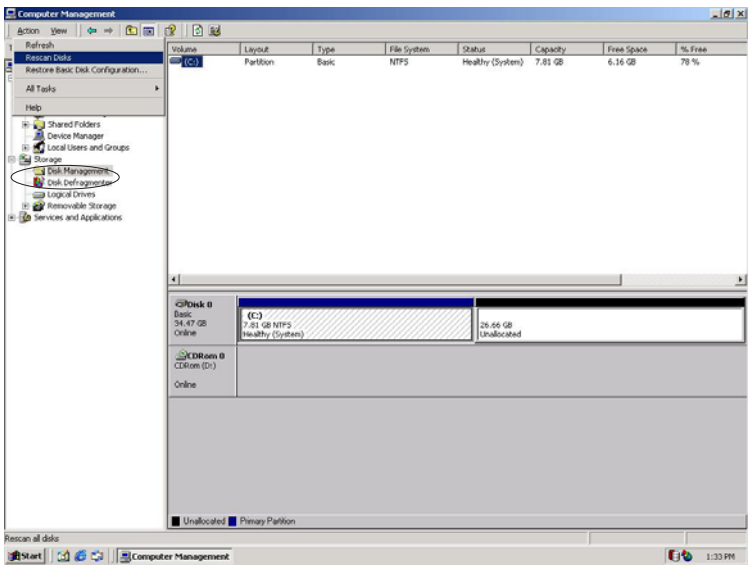


2. Double click the Intel AARE (SATARAID Controller) menu, and it will show you what is missing or not working as on the screen below:

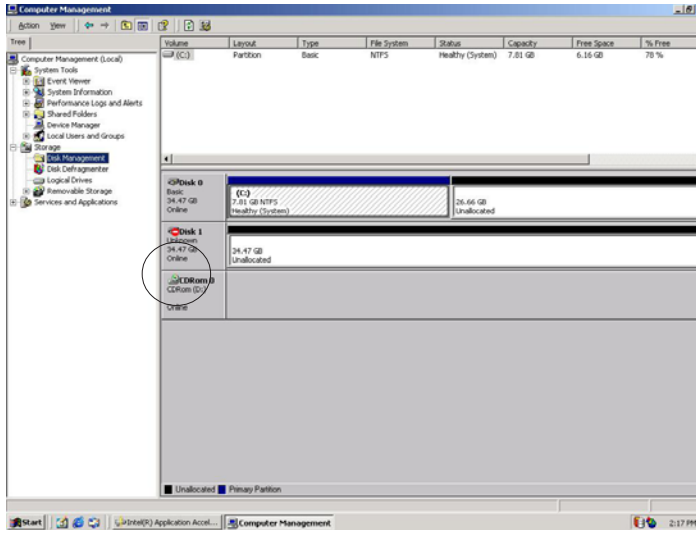


3. Unplug the bad HDD and replace it with a new one.

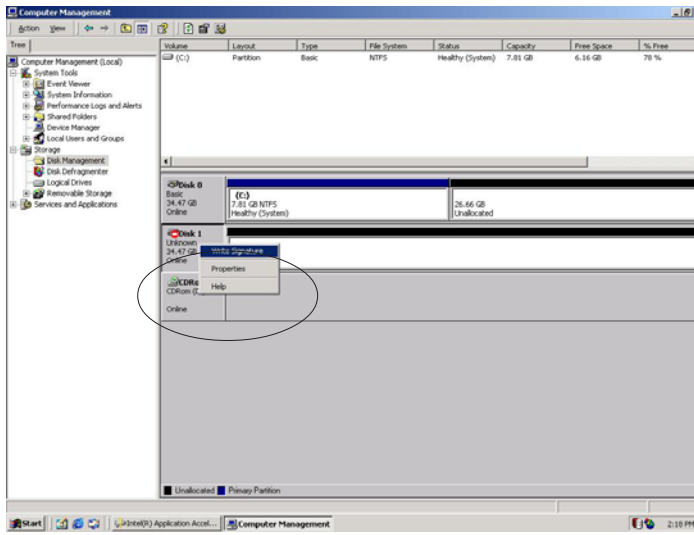
4. After you have replaced the bad HDD, go to "Disk Management" in your system. The following screen will appear:



6. Once the disk manager detects the new disk that you've installed, it will show an “Unknown” disk as indicated in the following screen:



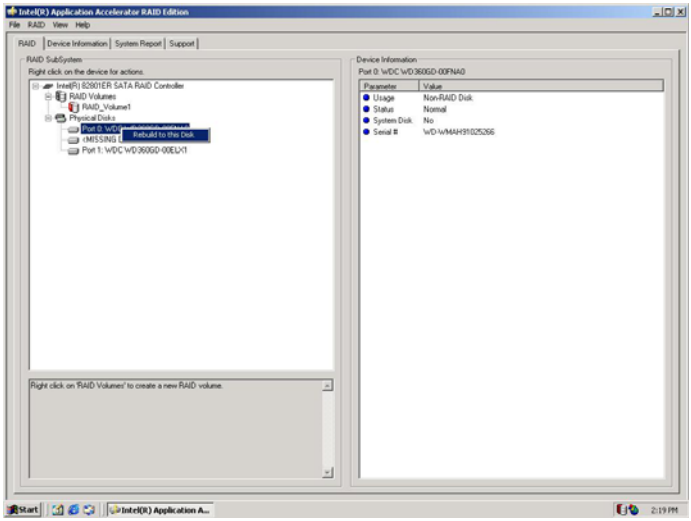
7. When the above screen appears, right click on the new disk and It will bring up a manual for the new disk. Select the item“Write Signature” to the new disk as shown below.



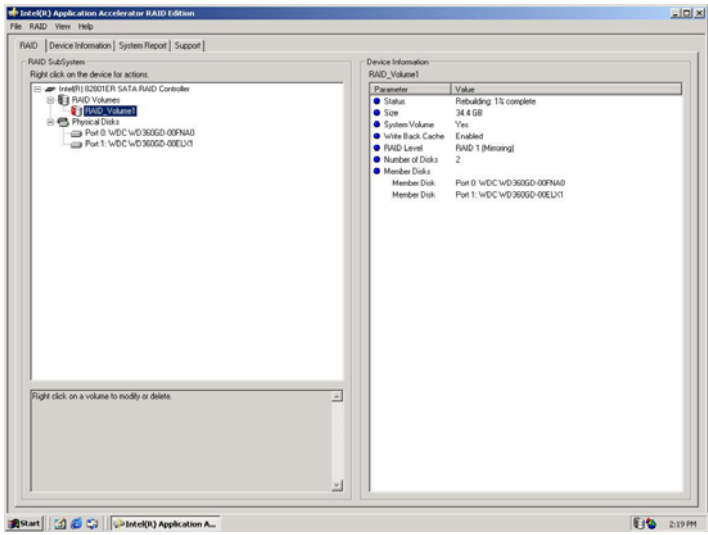
8. After you finished writing the signature to the new disk, Open the Intel AARE application again. **Note: Do not reboot the system as prompted to avoid losing data!!**

9. This time it should detect that a new disk is available.

10. Right click on the new disk and select “Rebuild to disk” as shown on the following screen:



11. Once you've made your selection, you can go to the “RAID Volume” setting to see the RAID1 rebuilding process in progress. The following screen will appear:



Appendix D
System Specifications

Processors
Single Intel® Pentium® 4 processors of up to 3.40 GHz with a 2 MB integrated Advanced Transfer Cache and hyper-threading technology or single Intel® Celeron® processors of up to 2.40 GHz with a 128KB integrated Advanced Transfer Cache in 478-pin microPGA sockets at a 800/533/400 MHz front side bus speed

Chipset
Intel E7210

Memory Capacity
Four (4) DIMM slots to support a maximum of 4 GB unbuffered, ECC/ non-ECC DDR-400/333/266 low-profile SDRAM

DIMM Sizes
256 MB / 512 MB / 1 GB 184-pin modules supported

Serial ATA Controller
ICH5R I/O controller hub incorporated into chipset

Serial ATA Backplane (5013C-T only)
SATA backplane (CSE-SATA-810) for two (2) hot-swap SATA drives

Main Drive Bays
5013C-T: Two (2) drive bays to house two (2) standard 1" 80-pin SATA drives
5013C-i: Two (2) drive bays to house two (2) 3.5 x 1" IDE disk drives

Peripheral Bays
One (1) 3.5" floppy drive
One (1) slim CD-ROM drive

PCI Expansion Slots
One (1) 32-bit 33 MHz (5V) PCI slot (bundled with a 32-bit, 33 MHz 5V riser card)

Motherboard
Model: P4SCE (ATX Form Factor)
Dimensions: 12 x 9.5 in (305 x 241 mm)

Chassis
Model: SC811T-250 (5013C-T) or SC811i-250 (5013C-i): (1U Rackmount)
Dimensions: (WxHxD) 16.7 x 1.7 x 22 in. (424 x 43 x 559 mm)

Weight
Net (Bare Bone): 28 lbs. (12.7 kg.)
Net (Gross): 34 lbs. (15.5 kg.)

System Cooling
Two (2) 10-cm ball bearing blower fans

System Input Requirements
AC Input Voltage: 100-240 VAC
Rated Input Current: 4A (115V) to 2A (230V)
Rated Input Frequency: 50 to 60 Hz

Power Supply
Rated Output Power: 250W (Model# EFA250, Part# PWS-021)
Rated Output Voltages: +3.3V (20A), +5V (25A), +12V (13A), -12V (.8A), +5Vsb (2A)

BTU Rating
1545 BTUs/hr (for rated output power of 250W)

Operating Environment
Operating Temperature: 10º to 35º C (50º to 90º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

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

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

Safety:
EN 60950/IEC 60950-Compliant
UL Listed (USA)
CUL Listed (Canada)
TUV Certified (Germany)
CE Marking (Europe)

Notes