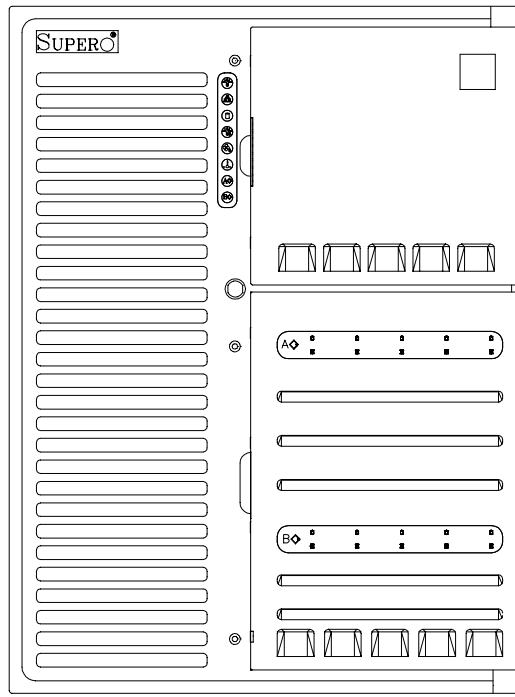
SUPERMICRO®

SUPERSERVER 8050



USER'S MANUAL

1.0

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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 8050. Installation and maintainance should be performed by experienced technicians only.

The SuperServer 8050 is a high-end quad processor server based on the SC850 server chassis and the S2QR6, a quad processor motherboard that supports up to four Pentium III/II Xeon processors.

Manual Organization

Chapter 1 provides a checklist of the main components included with the server system and describes the main features of the SUPER S2QR6 mainboard and the SC850-W chassis, which make up the SuperServer 8050.

Refer to **Chapter 2** for Quick Setup information. You should follow the procedures in this chapter the first time you setup and run the SuperServer 8050. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

See **Chapter 3** for details on the system interface, which includes the functions and information provided by the front control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4 gives a general overview of safety precautions that should be followed when installing and servicing the SuperServer 8050.

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

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

Chapter 7 includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A offers information on BIOS error beep codes and messages.

Appendix B provides post diagnostic error messages.

Appendix C lists the figures included in this manual.

Appendix D lists the system specifications.

SuperServer 8050 User's Manual

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Mainboard	Setup	Cntrl Pnl LEDs	ESD Safety	Conn. Cables	System Fans	Running Setup	List of Figures
Contact Info	OS	SCSI LEDs		CPU Installation	Drive Bay Inst.		System Specs
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		MB LEDs		PCI Cards			
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				DIP Switches			
				Jumper Settings			
				I/O Ports/IDE/ SCSI Conn.			
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Chapter 1
Introduction to the SuperServer 8050

1-1 Overview

The Supermicro SuperServer 8050 is a high-end quad processor server that utilizes the best technology currently available. The SuperServer 8050 is comprised of two main subsystems: the SC850 high-end server chassis and the S2QR6 quad Pentium III/II Xeon processor mainboard. Please refer to our web site for information on operating systems that have been certified for use with the SuperServer 8050.

In addition to the mainboard and chassis, various hardware components have been included with the SuperServer 8050. The letters in parentheses indicate which subsystem that component is included with: SS = server, MB = motherboard, CS = chassis.

- Up to four (4) Pentium III Xeon™ processors* (SS)
- One (1) Memory Expansion Card (MEC) (MB)
- Memory modules for up to 16 GB main system memory* (SS)
- One (1) floppy ribbon cable for 3.5-inch floppy drives (MB)
- One (1) 1.44" floppy drive (SS)
- One (1) IDE ribbon cable (MB)
- One (1) I/O backpanel shield (MB)
- Two (2) CPU Dual Retention Modules (DRMs) with screws (MB)
- SCSI Accessories
  Two (2) 68-pin Ultra160 SCSI cables w/o active termination for two SCA SCSI backplanes (CS)
  One (1) 50-pin Legacy SCSI cable (MB)
  One (1) set of SCSI driver diskettes (MB)
  One (1) SCSI manual (MB)
- Two (2) TMR-008 CPU terminator cards (MB)

- Six (6) VRMs (Voltage Regulator Modules) (MB)

You should also have received a User's Manual and Supermicro diskettes, which contains several drivers and utilities.

* *Type and number depends upon the configuration ordered.*

1-2 Server Chassis Features

The SuperServer 8050 is a high-end, scaleable server platform designed with today's most state-of-the-art features. The following is a general outline of the main features of the SC850 server chassis.

System Power

A triple redundant power supply consisting of three 350W units provides 700W of continuous power with a 350W backup. If either working unit fails, you will be notified by alarm and the backup unit will automatically activate. These are hot-swap units that can be replaced without powering down the system.

SCSI Subsystem

The SCSI subsystem supports up to 10 80-pin SCA Ultra160 SCSI hard drives. (Any standard 1" drives are supported. SCA = Single Connection Attachment.) These can be configured as 10 drives on a single channel or 5 drives on two channels. The SCSI drives are connected to two SAF-TE compliant SCA backplanes that provide power, bus termination and configuration settings. The SCSI drives are also hot-swap units. A RAID controller card can be used with the SCA backplanes to provide data security.
Note: The operating system you use must have RAID support to enable the hot-swap capability of the SCSI drives.

Front Control Panel

The SuperServer 8050's detailed control panel provides comprehensive system monitoring and control. LEDs indicate network activity, power supply failure, fan failure, fan status, SCSI drive activity and failure and SCA backplane overheat conditions. The main power button, system reset button and an alarm reset switch to disable audible alarms are also included.

I/O Backplane

The SC850 is an SWTX form factor chassis. The SWTX I/O back panel provides nine motherboard expansion slots, two COM ports, a parallel port, two USB ports, PS/2 mouse and keyboard ports and an Ethernet port.

Cooling System

The SC850 chassis has an innovative cooling design that includes 9-cm hot-plug redundant system cooling fans and two airflow guides. All fans operate continuously. If one fails, an alarm is activated and the RPM of the remaining fans increase to compensate and maintain sufficient airflow. Additional cooling for the SCSI drive bays is provided by two 12-cm exhaust fans.

1-3 Mainboard Features

At the heart of the SuperServer 8050 lies the S2QR6, a quad processor motherboard designed to provide maximum performance in a four-way system. Below are the main features of the S2QR6.

Processors

The S2QR6 supports Pentium III and II Xeon 100 MHz FSB processors in 1, 2, 3 and 4-way configurations. 400-700 MHz processors and future higher speed processors with a 100 MHz FSB will also be supported. Please refer to the support section of our web site for a complete listing of supported processors (http://www.supermicro.com/TechSupport.htm).

Memory

The MEC (Memory Expansion Card) included with your S2QR6 has 16 DIMM slots that can support up to 16 GB of registered DIMM with ECC. Module sizes of 128MB, 256MB, 512MB and 1 GB may be used to populate the MEC.

Onboard SCSI

Onboard SCSI is provided with an Adaptec AIC-7899 SCSI chip, which supports dual channel, Ultra160 SCSI at a throughput of 160 MB/sec for each channel. The S2QR6 provides three SCSI ports: two 68-pin LVD Ultra160

connectors and one 50-pin Legacy SCSI connector, which is shared with channel B.

PCI Expansion Slots

The S2QR6 has a total of eight PCI expansion slots consisting of two 64-bit 66 MHz slots, four 64/32-bit 33 MHz slots and two 32-bit 33 MHz slots. All together they provide an I/O bandwidth of 931 MB/sec.

Onboard Controllers/Ports

An onboard IDE controller supports up to four UDMA/33 hard drives or ATAPI devices. The color-coded I/O ports include two COM ports, a parallel port, two USB ports, PS/2 mouse and keyboard ports and a 10/100 MB Ethernet port.

Other Features

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

1-4 Contacting Supermicro

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Notes

Chapter 2
Quick Setup

2-1 Overview and Precautions

This chapter provides a quick setup checklist to get your SuperServer 8050 up and operating. Following these steps in the order given should enable you to have the system operating within a minimum amount of time. This quick setup assumes that your SuperServer 8050 system has come to you with processors and memory preinstalled. If your system is not already fully integrated with a motherboard, processors, system memory etc., please turn to the Chapter noted in each step for details on installing these components and configuring the system.

2-2 Setting up the SuperServer 8050

You should inspect the box the SuperServer 8050 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 place for setting up and operating the SuperServer 8050. You will need to place it 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.

Once the 8050 is placed in the appropriate location, slide the locking tabs on each caster down to keep it stationary.

Checking the Motherboard Setup

Open the left side panel (when facing the front of the chassis) to make sure the motherboard is properly installed and all connections have been made.

1. **Remove the left chassis side panel:**
   First, make sure the keylock for the side panels (located near the top at the rear of the chassis) is unlocked. Then remove the four screws that secure the back lip of the side panel to the rear of the chassis. Grasp the handle at the rear of the panel and pull straight back about 1/2 inch, at which point the panel should hit a stop. Swing the top of

the panel out and completely lift it away from the chassis. When reinstalling this panel, make sure the raised holes along the bottom of the chassis fit into the long holes in the bottom lip of the side panel.

2. **Check the CPU core/bus ratio:**
   You should first verify that the CPU core/bus ratio as set with DIP switch 1 matches the speed of your installed processors. This DIP switch is defaulted to 5.5, which corresponds to 550 MHz processors running on a 100 MHz front side bus (FSB). If the setting is different or if you are using processors of a different speed, you may need to change this setting. See page 5-20 for setting the proper value with DIP switch 1. If your system came without processors, refer to page 5-6 for processor installation instructions.
3. **Check the MEC:**
   The Memory Expansion Card (MEC) should be already installed and populated with DIMMs. Make sure the MEC is secure in its slot and that the retention plate is screwed firmly to the chassis. For details on populating the MEC, refer to page 5-8.
4. **Install add-on cards:**
   Install any add-on cards that you want added to the system. See page 5-11 for details on installing add-on cards.
5. **Check all cable connections and airflow:**
   Make sure all power and data cables are properly and firmly connected and not blocking the airflow. See page 5-4 for details on cable connections. Position the airflow guides to concentrate airflow to the processors and their heatsinks.

Checking the Drive Bay Setup

Open the right side panel to make sure the SCA backplanes are properly installed and all connections have been made.

1. **Remove the right chassis side panel:**
   To access the drive bays, remove the right side panel (when facing the front of the chassis) by following the same procedures described on the previous page for removing the left side panel. You will also have to open the front doors on the right side of the chassis to access the front of the drive bays. These doors may be secured with a keylock located just below the system LEDs.
2. **Install a CDROM and floppy disk drives:**
   See page 6-10 if you need to add a CDROM and/or floppy disk drive to the system.

3. **Check the SCSI disk drives:**
   Depending upon your system's configuration, your system may have some SCSI drives already installed. If you need to install SCSI drives or wish to change the channel configuration, please refer to page 6-6. The drives are defaulted to a dual channel (channels A and B) configuration.
4. **Check the airflow:**
   Because most of the excess cabling is kept on this side of the chassis, you should check to make sure all cables have been routed in such a way that they do not block the airflow generated by the fans.
5. **Supply power to the system:**
   The last thing you must do is supply power to the system. Plug all three power cords from the three power supplies into a high-quality power strip that offers protection from electrical noise and surges.

2-3 Installing the Operating System

The SuperServer 8050 is normally shipped without an operating system (OS) installed. This is the last thing you need to do to make the system operational. The OS is normally installed with a CDROM. Refer to the documentation that came with your operating system to install it in the SuperServer 8050.

Notes

Chapter 3
System Interface

3-1 Overview

There are several LEDs on the front control panel as well as others on the power supply units, the SCSI drives and the motherboard 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 three switches that allow you to take action based on the information provided by these LEDs. This chapter explains the meanings of all LED indicators and audible alarms and the appropriate responses you may need to take.

3-2 Switches

The front control panel has three push-button switches: a power on/ off switch, an alarm disable switch and a reset switch. These are accessed by opening the top right door on the front of the chassis.

- **POWER:** This is the main power switch that will turn off the power supply.

- **ALARM:** Depressing the alarm switch will disable the audible alarm that is generated to notify you of chassis overheating or fan/power supply failure. The LED indicating the cause of the alarm will remain illuminated after the alarm is disabled.

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

3-3 Front Control Panel LEDs

As shown in Figure 3-1, the front control panel of the SC850 chassis has eight LEDs. These LEDs keep you informed of the status of your system and indicate the following when illuminated.

- **Power:** Indicates power is being supplied to the system.

- **NIC:** Indicates network activity on the system.

- **HDD:** Indicates IDE drive activity.

- **PWR Fault:** Indicates a power supply failure. This should be accompanied by an audible alarm, which you can disable with the alarm switch on the control panel. Inspect the power supply units at the rear of the chassis. The unit with the amber LED illuminated has failed. Refer to Chapter 6 for instructions on replacing the failed unit. Because they are hot-swap units, you do not need to remove power from the system when replacing.

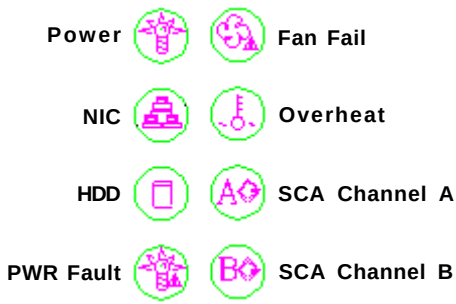
- **Fan Fail:** Indicates a system fan failure. This should be accompanied by an audible alarm, which you can disable with the alarm switch on the control panel. When a fan stops working, all the other system fans will increase their RPM to compensate until the failed unit is replaced. Refer to Chapter 6 for instructions on replacing system fans. It is unnecessary to power down the system as these are hot-swap fans. **Note:** You must use the exact same brand and rating of fan for replacement. These can be obtained directly from Supermicro.

- **Overheat:** Indicates an overheat condition in the chassis.

- **SCA Channel A:** Indicates an overheat condition with SCA SCSI back plane A (which supports the upper drive bays).

- **SCA Channel B:** Indicates an overheat condition with SCA SCSI back plane B (which supports the lower drive bays).

Figure 3-1. Front Control Panel LEDs



3-4 SCSI Drive LEDs

Each SCSI drive carrier has two LEDs.

- **Green:** The green SCSI drive LED indicates drive activity. This LED should blink on and off when that particular drive is being accessed.

- **Red:** If the red LED is illuminated, the drive has experienced a fault or has crashed. Please refer to Chapter 6 for instructions on replacing failed SCSI drives.

3-5 Power Supply LEDs

Each of the three units comprising the power supply has a single LED that can be illuminated either as green or amber.

- **Green:** When green, the unit has power applied to it and is operating normally.

- **Amber:** If the LED is amber, it indicates that no power is being applied to that unit. If system power has been turned off this is normal, however if the system is powered on and running an amber LED most likely indicates a failed power unit. First check to make sure the power cord for that unit is plugged in. If it is, then refer to Chapter 6 for instructions on replacing the unit. The power unit's fan may continue to run at low speed even if the unit has failed or has been turned off.

3-6 Motherboard LED

There is only one LED on the motherboard. When illuminated, it indicates that system power is present on the motherboard. This LED is located just below the PWR_SEC connector, which is at the top right corner of the board when installed in the chassis. It provides the same indication as the Power LED on the front control panel.

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 8050 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, the MEC, memory modules and IDE 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 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 (located near the MEC and IDE#2 connectors) 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.

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SuperServer 8050 clean and free of clutter.
- The SuperServer 8050 weighs approx. 84 lbs. (38 kg.) If you have to lift 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 side panels and any system components that have been removed away from the system 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 that can come into contact with electrical circuitry or be pulled into the one of the cooling fans.
- 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 servicing the system, reinstall all covers and side panels and ensure 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 gold 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.

Notes

Chapter 5
Advanced Motherboard Setup

This chapter covers the steps required to install the S2QR6 motherboard into a 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 on pages 5-12 and 5-13. Remember to remount the side panel when you have finished with the installation to better cool and protect the system.

Tools Required

The only tools you will need to install the S2QR6 into a chassis are a long and a short Philips screwdriver.

5-1 Handling the S2QR6 Motherboard

Static electrical discharge can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. Also note that the size and weight of the S2QR6 motherboard can cause it to bend if handled improperly, which may result in damage. To prevent the S2QR6 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 static 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

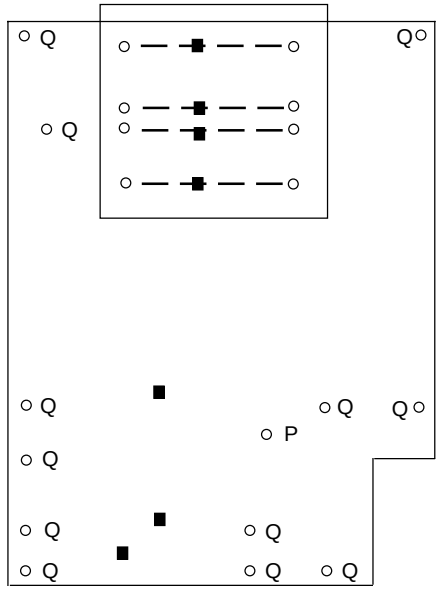
The motherboard is shipped in antistatic packaging to avoid static electrical damage. When unpacking the board, make sure the person handling it is static protected.

5-2 Motherboard Installation

This section explains the first step of physically mounting the S2QR6 into the SC850 chassis. To remove the motherboard, follow the procedure in reverse order. Following the steps in the order given will eliminate the most common problems encountered in such an installation.

1. **Removing the left chassis side panel:**
   The left side panel (when facing the chassis) must be removed to access the motherboard side of the chassis. First, make sure the keylock for the side panels (located at the top rear of the chassis) is unlocked. Then remove the four screws that secure the lip of the side panel to the back of the chassis. Grasp the handle at the rear of the panel and pull straight back about 1/2 inch, at which point the panel should hit a stop. Swing the top of the panel out and completely lift it away from the chassis. When reinstalling this panel, make sure the raised holes along the bottom of the chassis fit into the long holes in the bottom lip of the panel.

2. **Installing metal standoffs and rubber feet:**
   With the side panel removed, the motherboard tray is directly in front of you. First, check that the location of all the mounting holes on both the motherboard and the tray match. Refer to Figure 5-1 for mounting hole locations. Attach metal standoffs to the holes labeled "Q" on the motherboard tray. Make sure these metal standoffs either click in or are screwed in tightly. There are eight additional square metal standoffs that are required for mounting the DRMs (Dual Retention Modules), which should be preinstalled. Several square rubber "feet" must be applied to the motherboard tray to function as shock absorbers. Attach these feet to the small square outlines on the tray.



Please note there are eight holes specifically for mounting the Slot 2 DRMs as well as one hole for a PCI64 connector.

Q: (12) Motherboard mounting holes
P: (1) PCI64 support hole
In Box: (8) DRM mounting holes (preinstalled)

■ Rubber foot

Figure 5-1. Mounting Holes on Motherboard (top view)

3. **Check compatibility of motherboard ports and I/O shield**
The S2QR6 requires a chassis big enough to support a 13" x 18" motherboard, such as Supermicro's SC850 and SC840. Make sure that the I/O ports on the motherboard properly align with their respective holes in the I/O shield at the back of the chassis.

4. **Mounting the motherboard onto the motherboard tray:**
Carefully mount the motherboard to the motherboard tray by aligning the board holes with the metal standoffs you just installed. Insert screws into all the mounting holes provided and tighten until snug. Do not use nonmetal washers; metal screws provide an electrical contact to the motherboard, which grounds it to the chassis.

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 front control panel, the power fail signal (PWR P) cable and the power cables.

Connecting Data Cables

Most of the ribbon cables used to transfer data will be routed from the motherboard to the drive bay side of the chassis. You should connect these to the motherboard first (make sure the red wires connect to the pin 1 locations) and then route them through the rubber-flanged access holes to the drive bay side of the chassis. (See Chapter 6 for details on connecting these cables to the drive bay side.) Pull any excess cabling through to the drive bay side to provide an unobstructed airflow to the motherboard and processors. The following data cables (with their locations noted) should be connected. (See the layout on page 5-12 for connector locations.)

- IDE Device Cables (J13 and J14)
- Floppy Drive Cable (J15)
- SCSI Device Cables (JA1, JA3 and JA5)
- Front Control Panel Cable (JF1, see next page)
- Power Fail Signal Cable (PWR P)

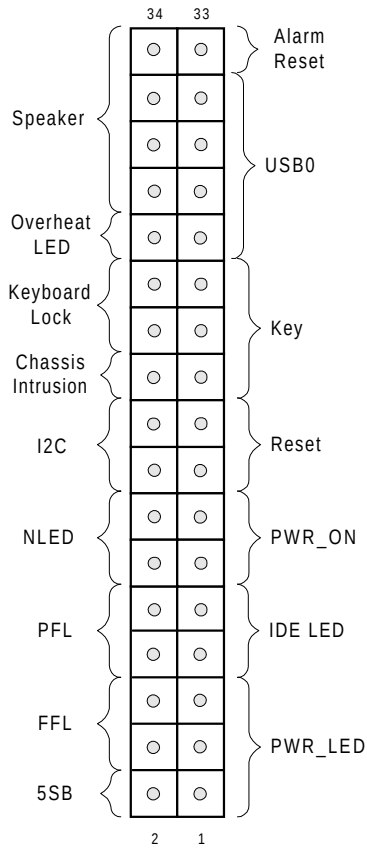
Connecting Power Cables

The S2QR6 has two primary power supply connectors: ATX Power #1 (U21) and ATX Power #2 (U23). You must connect both the primary *and* the secondary ATX power connectors to your power supply. A third power connector (PWR_SEC) is included for extremely power hungry system configurations and requires a 6-pin power connector. See the layout on page 5-12 for connector locations.

Connecting the Front Control Panel

The JF1 header on the S2QR6 contains header pins for various front control panel connectors. See Figure 5-2 for the specific locations of the speaker, overheat LED, keyboard lock, chassis intrusion, I2C, network activity LED, power fail, fan fail, 5v standby, power LED, IDE drive activity LED, power on LED, reset switch, USB0 and alarm reset headers. Note that even and odd numbered pins are on opposite sides of the connector. 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. See pages 5-14 to 5-19 for details and pin descriptions.

Figure 5-2. Front Control Panel Connectors



JF1

5-4 Installing Processors and DRMs

Before installing the Pentium III/II Xeon processors, both DRMs (Dual Retention Modules) must be bolted through the motherboard and into the chassis to protect the processors from shock and vibration.

1. Installing airflow guides:

Two airflow guides are used to channel the incoming cooling air directly to the processors, which generate the most heat. You should see five sets of holes on the frame behind the hot-plug fans. For a quad processor setup, these guides should be installed in the first and third locations from the top. To install, first partly release the retention screws. Then, with the large cutout on the guide nearest you, insert the small tab into the inside hinge hole and then carefully do the same with the tab nearest you. Finish by tightening the retention screws until snug.

2. Mounting fans to the DRMs (optional):

If your chassis provides good cooling, adding DRM fans is not necessary (Supermicro DRMs are aerodynamically designed to make the airflow generated by the system fans sufficient for system cooling). If you want to add fans to the DRMs, mount them before attaching the DRMs to the motherboard. Add either two or four to each DRM - two should be enough in most cases.

3. Installing DRMs (Dual Retention Modules):

Regardless of how many processors you will be using, both DRMs must be installed. Position the DRMs as indicated in Figure 5-3, using the pegs on their bases to help align the mounting holes to those on the motherboard. Then insert the DRM mounting screws through the motherboard and into the motherboard tray, where they should be secured to the standoffs.

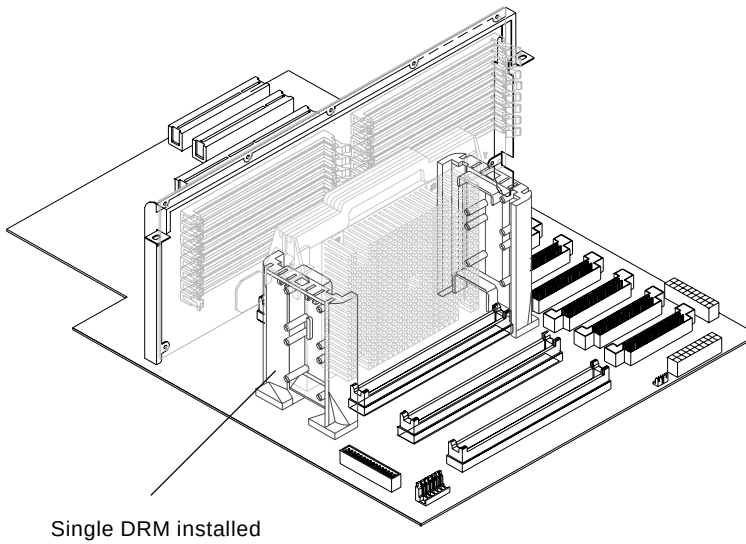
4. Installing handlebar caps on the Xeon processors:

When attaching the caps (top cross pieces) to function as handlebars for the Xeon processors, make sure the two mounting screw holes on the top of each cap face inward. You should test the configuration of the units before mounting the caps.

5. Securing the processors:
Beginning with the CPU1 slot, slide the processor(s) into the DRMs and let it rest in the Slot 2 socket. Then insert the four DRM screws to the base of each DRM and secure the units by screwing them in firmly.

6. Empty processor slots:
Terminator cards (TMR-008) must be installed in the processor slot(s) left empty in 1, 2 and 3-way configurations.

Figure 5-3. Installing the DRMs



Removing the Pentium II/III Xeon Processors

To remove the Xeon processors from the motherboard, follow the installation process in reverse order.

When removing a Pentium II/III Xeon processor, avoid pressing down on the motherboard or any of its components.

5-5 Installing Memory in the MEC

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. The MEC must be populated in the manner described in Step 2 below.

Memory Support: The S2QR6 supports 128MB/256MB/512MB/ and 1 GB registered ECC DIMM memory modules.

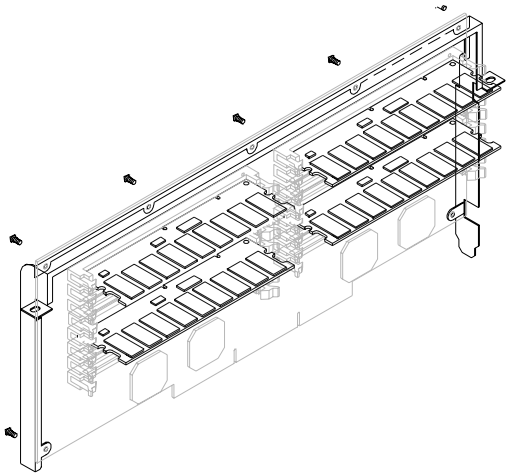
1. Removing the MEC (Memory Expansion Card):
You should remove the MEC whenever installing or removing DIMMs. The MEC is attached to a retention plate with seven screws. Do not remove these. Instead, remove only the two screws that secure the MEC retention plate to the chassis. After removing the board, place it on an antistatic bag before inserting the DIMMs.

2. Populating the MEC:
Important: Because memory is accessed by a four-way interleaving scheme, you must install modules four at a time and in the order shown in Figure 5-4 and described here: If four DIMMs are to be installed, you must populate the four Bank0 slots. If eight are to be installed, you must populate the four Bank0 and the four Bank1 slots, and so on. All four DIMMs installed in a single bank must be the same brand, type, size and speed.

3. Inserting DIMMs:
Insert each DIMM module vertically into its slot. Pay attention to the two notches along the bottom of the module to prevent inserting the DIMM module incorrectly. Gently press down on the DIMM module until it snaps into place in the slot (see Figure 5-5). If you use too much pressure when inserting the DIMMs you may bend and damage the MEC.

4. Installing the MEC:
After populating the MEC, carefully install it back into its slot on the motherboard, making sure it is fully seated. Finish by tightening the two screws that secure the retention plate to the chassis.

Figure 5-4. Populating the MEC
(Four DIMM installation shown)



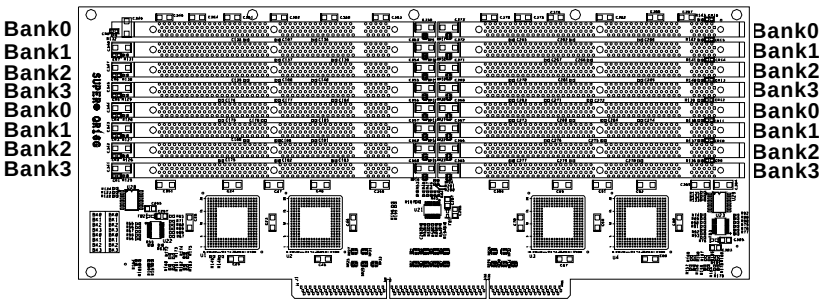
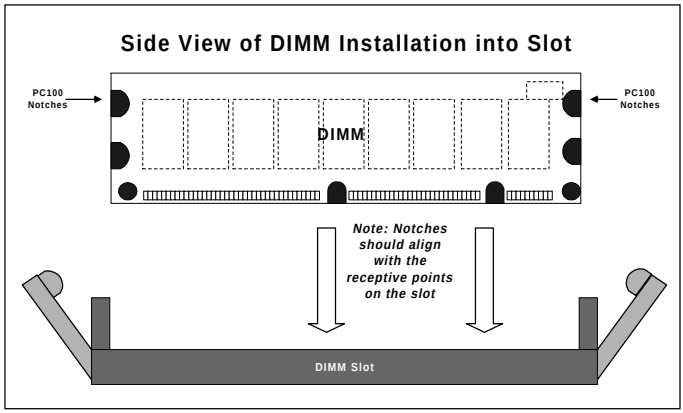


Figure 5-5. DIMM Installation into Socket



To Install: Insert module vertically and press down until it snaps into place. Pay attention to the two notches.

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

5-6 Adding PCI Cards

1. 64-bit PCI slots:

The S2QR6 has six 64-bit PCI slots. Two of these are 66 MHz slots that are keyed to only accept 66 MHz, 3V PCI cards. The other four 64-bit slots run at 33 MHz and are backward compatible with 32-bit cards.

2. PCI card installation:

You are now ready to install your PCI add-on cards. Make sure you choose the correct slot for the type of card you are installing (see step 1). First, remove the I/O shield for the proper slot. Then fully seat the card into the slot, pushing down with your thumbs on both sides of the card. Finish by using a screw to secure the top of the card shield to the chassis. The I/O shields protect the motherboard and its components from EMI and aid in proper ventilation, so make sure there is a shield covering each slot.

Figure 5-6. Adding PCI Cards

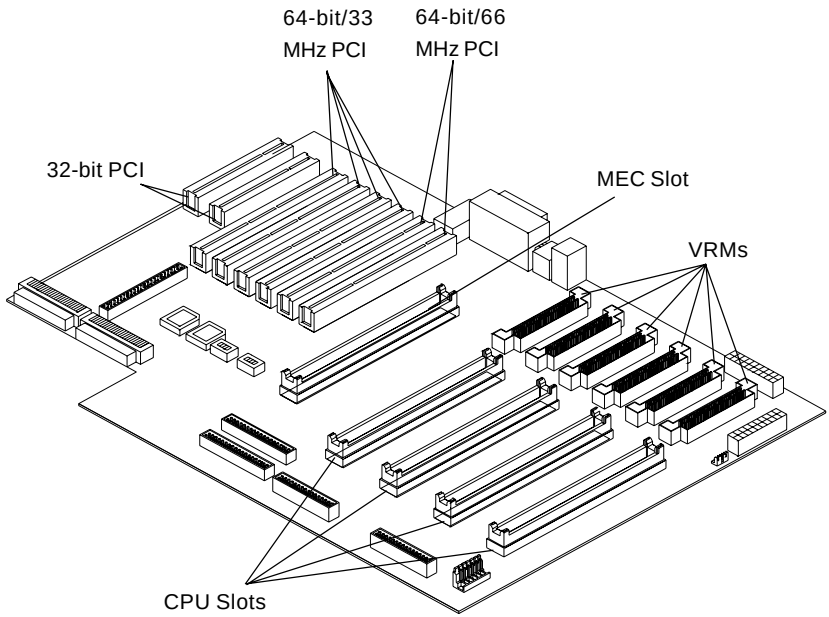
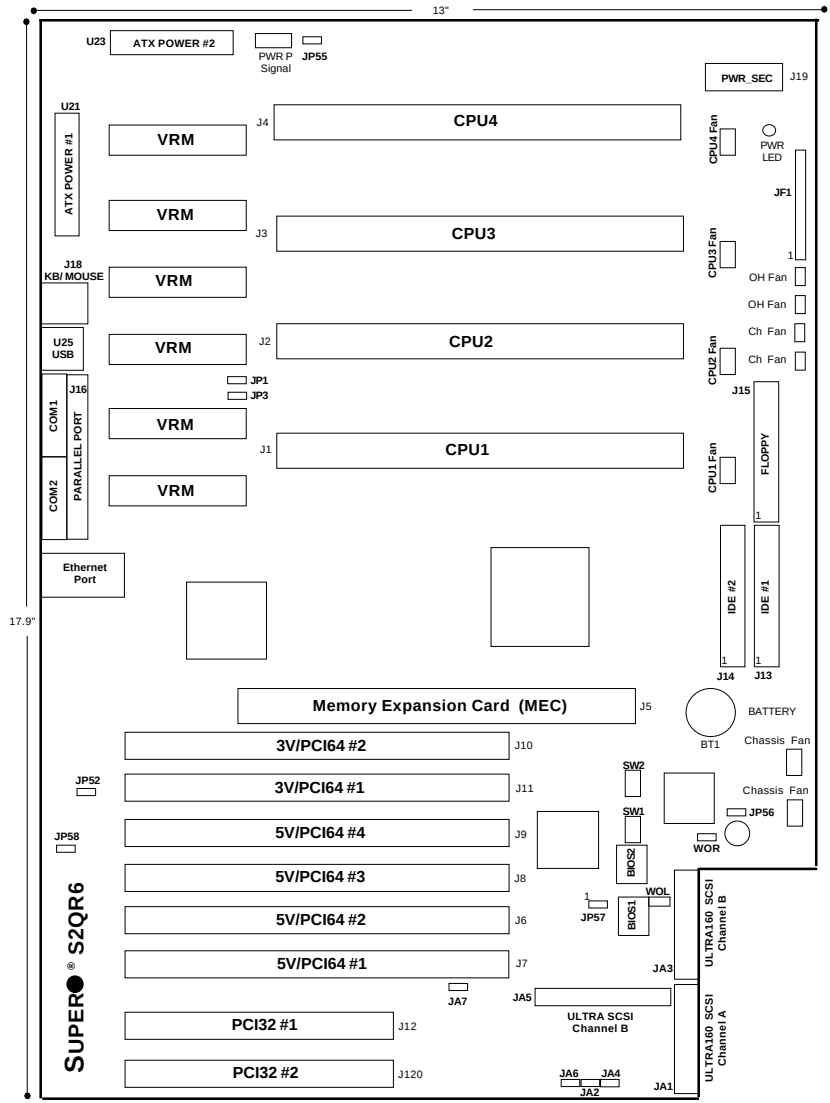


Figure 5-7. SUPER S2QR6 Layout
(not drawn to scale)



Also see the figure on page 5-24 for the locations of the I/O ports and 5-5 for the Front Control Panel (JF1) connectors.

S2QR6 Quick Reference

Jumpers	Description	Default Setting
JA2	LVD SCSI Ch A Term. (p. 5-23)	Open (Enabled)
JA4	LVD SCSI Ch B Term. (p. 5-23)	Open (Enabled)
JA6	50pin SCSI Ch B Term. (p. 5-23)	Open (Enabled)
JA7	Onboard SCSI Enable (p. 5-24)	Open (Enabled)
JP1	Front Side Bus Speed (p. 5-21)	Closed (100 MHz)
JP3	Spread Spectrum Enable	Closed (Enabled)
JP55	P/S Failure Alarm (p. 5-22)	Open (Disabled)
JP56	Buzzer Alarm (p. 5-22)	Closed (Enabled)
JP57	BIOS Select (p. 5-22)	Pin 1-2 (Pri. BIOS)
JP58	Onboard LAN (p. 5-23)	Open (Enabled)

Switches	Description (p. 5-20)	Default Setting
Switch 1	(1-4) CPU/Core Bus Ratio	Only 4 ON (5.5x)
Switch 2	Manufacturer's Setting	

Connectors	Description
ATX Power#1	Primary ATX Power Connector #1 (p. 5-14)
ATX Power#2	Primary ATX Power Connector #2 (p. 5-14)
CHASSIS FAN	Chassis Fan Header (4 total) (p. 5-18)
COM1	COM1 Serial Port Connector (p. 5-18)
COM2	COM2 Serial Port Connector (p. 5-18)
CPU1/2/3/4 FAN	CPU 1/2/3/4 Fan Header (p. 5-18)
Ethernet Port	Ethernet Port (p. 5-19)
J1-J4	CPU Slots 1 through 4 (p. 5-6)
J13, J14	IDE Hard Disk Drive Connectors (p. 5-26)
J15	Floppy Disk Drive Connector (p. 5-25)
J16	Parallel Printer Port (p. 5-25)
J18	PS/2 Keyboard/Mouse (p. 5-19)
JA1	Ultra160 SCSI Connector (Ch A) (p. 5-27)
JA3	Ultra160 SCSI Connector (Ch B) (p. 5-27)
JA5	50-pin SCSI Connector (Ch B) (p. 5-26)
JF1	Front Control Panel (p. 5-5)
JP52	Chassis Intrusion Header (p. 5-21)
MEC	Memory Expansion Card Slot (p. 5-8)
OH FAN	Overheat Fan Header (2 total) (p. 5-18)
PWR P	Power Supply Fail Signal (p. 5-20)
PWR_SEC	Secondary ATX Power Connector (p. 5-14)
U25	Universal Serial Bus Ports (p. 5-19)
WOR	Wake-on-Ring Header (p. 5-19)

Jumpers not indicated are for test purposes only.

5-7 Connector Definitions

Power Supply Connectors

The S2QR6 has two primary power supply connectors: at U21 and U23. You should connect power to both of these two primary connectors. See Table 5-1 for pin definitions.

Table 5-1
ATX Power Supply Connector
Pin Definitions (U21, U23)

Pin Number	Definition	Pin Number	Definition
1	3.3V	11	3.3V
2	3.3V3	12	-12V
3	Ground	13	Ground
4	5V	14	PS-ON
5	Ground	15	Ground
6	5V	16	Ground
7	Ground	17	Ground
8	PW-OK	18	-5V
9	5VSB	19	5V
10	12V	20	5V

Secondary Power Connector

Use of the secondary power connector (PWR_SEC) is recommended when a heavy load of peripherals has been added to the motherboard. ***Note: Be sure to use a 6-pin connector and check the power supply layout before attaching it.*** See Table 5-2 for pin definitions.

Table 5-2
Secondary Power Connector
(PWR_SEC)

Pin Number	Definition
1	Ground
2	Ground
3	Ground
4	+3.3V
5	+3.3V
6	+5V (keyed)

Power LED

The Power LED connection is located on pins 1, 3 and 5 of JF1. See Table 5-3 for pin definitions and Figure 5-2 for pin locations.

Table 5-3
PWR_LED Pin
Definitions (JF1)

Pin Number	Definition
1	+5V
3	Key
5	GND

Fan Fail LED (FFL)

The Fan Fail LED connection is located on pins 2 and 4 of JF1. See Table 5-4 for pin definitions and Figure 5-2 for pin locations.

Table 5-4
Fan Fail LED
Pin Definitions
(JF1)

Pin Number	Definition
4	+5V
6	Ground

IDE LED

The IDE Drive LED connection is located on pins 7 and 9 of JF1. This will send an indication of IDE disk activity to the front control panel. See Table 5-5 for pin definitions and Figure 5-2 for pin locations.

Table 5-5
IDE_LED Pin Definitions (JF1)

Pin Number	Definition
7	+5V
9	HD Active

Power Fail LED (PFL)

The Power Fail LED connection is located on pins 8 and 10 of JF1. See Table 5-6 for pin definitions and Figure 5-2 for pin locations.

Table 5-6
Power Fail LED Pin Definitions (JF1)

Pin Number	Definition
8	+5V
10	Ground

PWR_ON

The PWR_ON connection is located on pins 11 and 13 of JF1. Momentarily contacting both pins will power on/off the system (based on the power management scheme of your operating system). See Table 5-7 for pin definitions and Figure 5-2 for pin locations.

Table 5-7
PWR_ON Connector Pin Definitions (JF1)

Pin Number	Definition
11	PW_ON
13	Ground

NIC_LED

The Network Interface Controller LED connection is located on pins 12 and 14 of JF1. This header is used to display network activity. See Table 5-8 for pin definitions and Figure 5-2 for pin locations.

Table 5-8
NIC_LED Pin Definitions (JF1)

Pin Number	Definition
12	+5V
14	GND

Reset

The Reset connection is located on pins 15 and 17 of JF1. This connector attaches to the hardware reset switch on the computer chassis. See Table 5-9 for pin definitions and Figure 5-2 for pin locations.

Table 5-9
Reset Pin Definitions (JF1)

Pin Number	Definition
15	Reset
17	Ground

Chassis Intrusion (CI)

A Chassis Intrusion connection is located on pin 20 of JF1. If a chassis intrusion condition has been detected, a message will be sent to notify the system administrator. See Table 5-10 for pin definitions and Figure 5-2 for pin locations. **Note:** An extra chassis intrusion header is provided at JP52.

Table 5-10
Chassis Intrusion (CI) Pin Definitions (JF1)

Pin Number	Definition
20	Intrusion Input

Keyboard Lock

The Keyboard Lock connection is located on pins 22 and 24 of JF1. See Table 5-11 for pin definitions and Figure 5-2 for pin locations.

Table 5-11
Keyboard Lock Pin Definitions (JF1)

Pin Number	Definition
22	Kybd Inhibit
24	GND

Extra Universal Serial Bus Connection (USB0)

An additional connection for USB0 is included on pins 25, 27, 29 and 31 of JF1 for front side USB access. You cannot have devices connected to both this and the back side connector at U25. See Table 5-12 for pin definitions and Figure 5-2 for pin locations. You will need a USB cable (not included) to use this connection.

Table 5-12
USB0 Pin Definitions (JF1)

Pin Number	Definition
25	+5V
27	PO-
29	PO+
31	Ground

Overheat LED (OH)

Connect an LED to the OH connection on pin 26 of JF1 to provide advanced warning of chassis overheating. Refer to Table 5-13 for pin definitions and Figure 5-2 for pin locations.

Table 5-13
Overheat LED (OH) Pin Definitions (JF1)

Pin Number	Definition
26	OH Input

Speaker

The speaker connection is located on pins 28, 30, 32 and 34 of JF1. See Table 5-14 for pin definitions and Figure 5-2 for pin locations.

Table 5-14
Speaker Connector Pin Definitions (JF1)

Pin Number	Definition
28	Power
30	NC
32	NC
34	Data

Alarm Reset

Pin 33 of JF1 provides a connection for a switch to disable the system's audible alarm, which indicates either a chassis overheat condition, a power supply failure or a fan failure. The alarm reset switch will only disable the audible alarm; the alarm LED corresponding to the alarm will remain illuminated until corrective actions have been taken. See Table 5-15 for pin definitions and Figure 5-2 for pin locations.

Table 5-15
Alarm Reset Switch
Pin Definitions (JF1)

Pin Number	Definition
33	Alarm Input

Fan Headers*

There are several fan headers on the S2QR6 to provide cooling for various components. In addition to one fan header for each processor, there are two overheat and four chassis fan headers. See the motherboard layout on page 5-10 for locations. Refer to Table 5-16 for pin definitions. **Note: The maximum current limitation for the onboard fans is 0.35 amps for each, not to exceed 1.2 amps for any group of four fans (i.e. the four CPU fans or the four chassis fans).**

Table 5-16
Fan Header Pin Definitions
(CPU, CHASSIS and OH FANs)

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

* Caution: These fan headers are DC power.

Serial Ports

The two serial connectors (COM1 and COM2 serial ports) are located below the parallel port (see Figure 5-8). See Table 5-17 for pin definitions.

Table 5-17
Serial Port Pin Definitions
(COM1, COM2)

Pin Number	Definition	Pin Number	Definition
1	DCD	6	CTS
2	DSR	7	DTR
3	Serial In	8	RI
4	RTS	9	Ground
5	Serial Out	10	NC

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J18. See Table 5-18 for pin definitions. (The mouse port is above the keyboard port. See Figure 5-8.)

Table 5-18
PS/2 Keyboard and Mouse Port Pin Definitions (J18)

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

Universal Serial Bus (USB)

Two Universal Serial Bus connectors are located on U25. USB0 is the bottom connector and USB1 is the top connector.

Note: USB0 is shared with pins 25, 27, 29 and 31 of JF1 (see page 5-17). Only one of these two connections may be used at one time.

USB0/USB1 Ports

Ethernet Port

An Ethernet port is located beside the COM2 port on the I/O backplane. This port accepts RJ45 type cables.

RJ45 Ethernet Port

Wake-On-Ring

The Wake-on-Ring header is designated WOR. This function allows your computer to receive and be "woken up" by an incoming call when in the suspend state. Refer to Table 5-19 for pin definitions. The S2QR6 meets the PCI 2.2 standard, which provides the PME function to support WOR and WOL. You must also have a WOR card and cable to use WOR.

Table 5-19
Wake-on-Ring Pin Definitions (WOR)

Pin Number	Definition
1	Ground
2	Wake-up

PWR P Header

A four-pin connector from the power supply connects to the PWR P header on the motherboard to notify you in the event of a power supply failure. If your system does not have three power supply units, you should disable this with JP55 to prevent false alarms. See Table 5-20 for the pin definitions of the PWR P header. (The power supplies are numbered from top to bottom.)

Table 5-20
PWR P Header Pin Definitions

Pin Number	Definition
1	P/S1 signal
2	P/S2 signal
3	P/S3 signal
4	Reset

5-8 DIP Switch Settings

DIP Switch 1: Core/Bus Ratio

Two DIP switches labeled SW1 and SW2 are located on the S2QR6. Each has four "DIP" switches. SW1 is used to set the core/bus ratio. The example on the right will show you which CPU Core/Bus Ratio to use. The general rule is to divide the CPU speed by the bus speed (100 MHz for the S2QR6). If you have a 550 MHz CPU, dividing it by 100 will give you a CPU Core/BUS Ratio of 5.5. After determining the CPU Core/Bus Ratio, refer to Table 5-21 for the correct settings of DIP switch 1.

Table 5-21
CPU Core/Bus Ratio Selection (DIP Switch1)

CPU Core/ Bus Ratio	SW1 #4	SW1 #3	SW1 #2	SW1 #1
2.0	ON	ON	ON	ON
3.0	ON	ON	OFF	ON
4.0	ON	OFF	ON	ON
4.5	ON	OFF	ON	OFF
5.0	ON	OFF	OFF	ON
5.5	ON	OFF	OFF	OFF
6.0	OFF	ON	ON	ON
6.5	OFF	ON	ON	OFF
7.0	OFF	ON	OFF	ON
7.5	OFF	ON	OFF	OFF
8.0	OFF	OFF	ON	ON

550 MHz = 100 MHz x 5.5

CPU Speed = Bus Freq. x Ratio

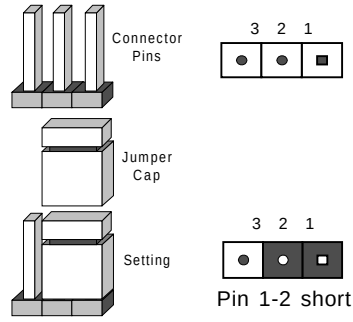
DIP Switch 2

Only DIP switch 1 is functional at this time. DIP switch 2 should be left as set by the manufacturer.

5-9 Jumper Settings

Explanation of Jumpers

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



Front Side Bus Speed

The JP1 jumper sets the FSB speed. Since the S2QR6 only runs at a 100 MHz front side bus speed, you do not need to change this setting. Table 5-22 describes the jumper settings.

Table 5-22
Front Side Bus Speed
Jumper Settings (JP1)

Jumper Position	Definition
OFF	Auto
ON	100 MHz

* Note: The Auto setting allows the CPU to set the speed.

Extra Chassis Intrusion Header

In addition to the one on JF1, another chassis intrusion header is provided at JP52. If a chassis intrusion condition has been detected, the mouse and keyboard will be disabled (but no audible alarm will be activated). All system operations will halt until the intrusion microswitch is set back to normal. See Table 5-23 for pin definitions.

Table 5-23
Chassis Intrusion
Header Pin Definitions
(JP52)

Pin Number	Definition
1	Intrusion Input
2	Ground

Power Supply Failure Alarm Enable/Disable

The system will notify you in the event of a power supply failure. This feature assumes that three power supply units are installed in the chassis, with one acting as a backup. If you only have one or two power supply units installed, you will want to disable this with JP55 to prevent false alarms. You need to have the PWR P cable connected for this feature. The default setting is enabled. See Table 5-24 for jumper settings.

Table 5-24
Power Supply Failure Alarm Enable/Disable Jumper Settings (JP55)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

Overheat Buzzer Alarm Enable/Disable

JP56 gives you the option of disabling the audio alarm signal that notifies you of power failure, fan failure and overheat conditions. If disabled, you will still be notified of such conditions by the LED corresponding to the fault. The default setting is enabled. See Table 5-25 for jumper settings.

Table 5-25
Overheat Alarm Enable/Disable Jumper Settings (JP56)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

BIOS Select

The S2QR6 has two BIOS chips to provide a backup if one becomes corrupted. (Switching from one BIOS chip to the other must be done manually.) The setting of jumper JP57 determines which of the two BIOS chips will be used. The Primary BIOS chip is the default setting. See Table 5-26 for jumper settings.

Table 5-26
BIOS Select Jumper Settings (JP57)

Jumper Position	Definition
1-2	Primary BIOS
2-3	Secondary BIOS

Onboard LAN/NIC Enable/Disable

Change the setting of jumper JP58 to enable or disable the onboard LAN or NIC (Network Interface Card) on your motherboard. See Table 5-27 for jumper settings.

Table 5-27
Onboard LAN/NIC Enable/Disable Jumper Settings (JP58)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

LVD Channel A SCSI Termination Enable/ Disable

Jumper JA2 allows you to enable or disable termination for the LVD Channel A SCSI connector. The normal (default) position is open to enable SCSI termination. See Table 5-28 for jumper settings.

Table 5-28
LVD CH A SCSI Termination Jumper Settings (JA2)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

LVD Channel B SCSI Termination Enable/ Disable

Jumper JA4 allows you to enable or disable termination for the LVD Channel B SCSI connector. The normal (default) position is open to enable SCSI termination. See Table 5-29 for jumper settings.

Table 5-29
LVD CH B SCSI Termination Jumper Settings (JA4)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

50-pin Legacy Channel B SCSI Termination Enable/ Disable

Jumper JA6 allows you to enable or disable termination for the 50-pin Channel B SCSI connector. The normal (default) position is open to enable SCSI termination. See Table 5-30 for jumper settings.

Table 5-30
50-pin Legacy CH B SCSI Termination Jumper Settings (JA6)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

SCSI Enable/Disable

Jumper JA7 allows you to enable or disable all onboard SCSI. The normal (default) position is open to enable SCSI operation. See Table 5-31 for jumper settings.

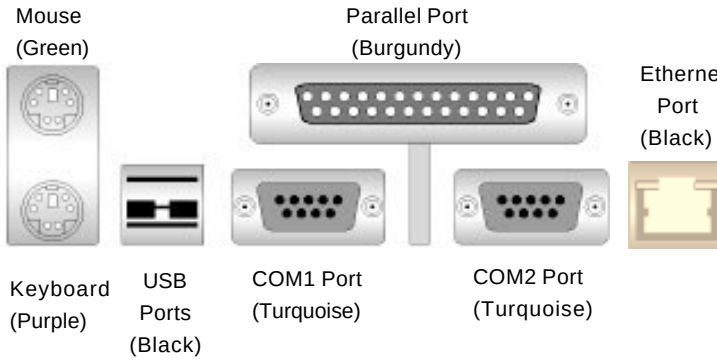
Table 5-31
SCSI Enable/Disable
Jumper Settings (JA7)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

5-10 Port/Control Panel Connector Locations

The I/O ports on the S2QR6 are color coded in conformance with the PC 99 specification. These should be the last connections you make on the motherboard before you can apply power. See Figure 5-8 below for the colors and locations of the various I/O ports.

Figure 5-8. I/O Port Locations and Definitions



5-11 Parallel Port, Floppy/Hard Disk Drive and SCSI 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.

Table 5-32
Parallel (Printer) Port Pin Definitions (J16)

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

Parallel Port Connector

The parallel port is located on J16 and requires a 26-pin ribbon cable for operation. See Table 5-32 for pin definitions.

Floppy Connector

The floppy connector is located on J15 and requires a 34-pin ribbon cable for operation. See Table 5-33 for pin definitions.

Table 5-33
Floppy Connector Pin Definitions (J15)

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 connectors J13 and J14. Refer to Table 5-34 for pin definitions.

Table 5-34
IDE Connector Pin Definitions
(J13, J14)

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

50-pin Legacy SCSI Connector

Refer to Table 5-35 for pin definitions of the 50-pin Legacy SCSI connector located at JA5.

Table 5-35
50-pin Legacy SCSI Connector Pin Definitions
(JA5)

Pin Number	Function	Pin Number	Function
1	GND	26	-DB (0)
2	GND	27	-DB (1)
3	GND	28	-DB (2)
4	GND	29	-DB (3)
5	GND	30	-DB (4)
6	GND	31	-DB (5)
7	GND	32	-DB (6)
8	GND	33	-DB (7)
9	GND	34	-DB (P)
10	GND	35	GND
11	GND	36	GND
12	Reserved	37	Reserved
13	Open	38	Termpwr
14	Reserved	39	Reserved
15	GND	40	GND
16	GND	41	-ATN
17	GND	42	GND
18	GND	43	-BSY
19	GND	44	-ACK
20	GND	45	-RST
21	GND	46	-MSG
22	GND	47	-SEL
23	GND	48	-C/D
24	GND	49	-REQ
25	GND	50	-I/O

Ultra160 SCSI Connectors

Refer to Table 5-36 for pin definitions for the Ultra160 SCSI connectors located at JA1 and JA3.

Table 5-36
68-pin Ultra160 SCSI Connectors (JA1, JA3)

Connector Contact Number	Signal Names	Connector Contact Number	Signal Names
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DB(P1)	39	-DB(P1)
6	+DB(0)	40	-DB(0)
7	+DB(1)	41	-DB(1)
8	+DB(2)	42	-DB(2)
9	+DB(3)	43	-DB(3)
10	+DB(4)	44	-DB(4)
11	+DB(5)	45	-DB(5)
12	+DB(6)	46	-DB(6)
13	+DB(7)	47	-DB(7)
14	+DB(P)	48	-DB(P)
15	GROUND	49	GROUND
16	DIFFSENS	50	GROUND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20	GROUND	54	GROUND
21	+ATN	55	-ATN
22	GROUND	56	GROUND
23	+BSY	57	-BSY
24	+ACK	58	-ACK
25	+RST	59	-RST
26	+MSG	60	-MSG
27	+SEL	61	-SEL
28	+C/D	62	-C/D
29	+REQ	63	-REQ
30	+I/O	64	-I/O
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

5-12 IRQs

Some PCI bus mastering devices share IRQs (Interrupt Requests) without performance penalties. See Table 5-37 for details on shared IRQs.

Table 5-37. IRQs

32-bit PCI#1 (J12) and 32-bit PCI#2 (J120) share IRQs 10 and 11.
64-bit/33 MHz PCI#1 (J7) shares IRQ0 with the onboard SCSI.
64-bit/33 MHz PCI#2 (J6) has a dedicated IRQ.
64-bit/33 MHz PCI#3 (J8) has a dedicated IRQ.
64-bit/33 MHz PCI#4 (J9) has a dedicated IRQ.
64-bit/66 MHz PCI#1 (J11) has a dedicated IRQ.
64-bit/66 MHz PCI#2 (J10) has a dedicated IRQ.
The onboard LAN has a dedicated IRQ.

Chapter 6
Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC850 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

Static electrical discharge 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 static discharge.

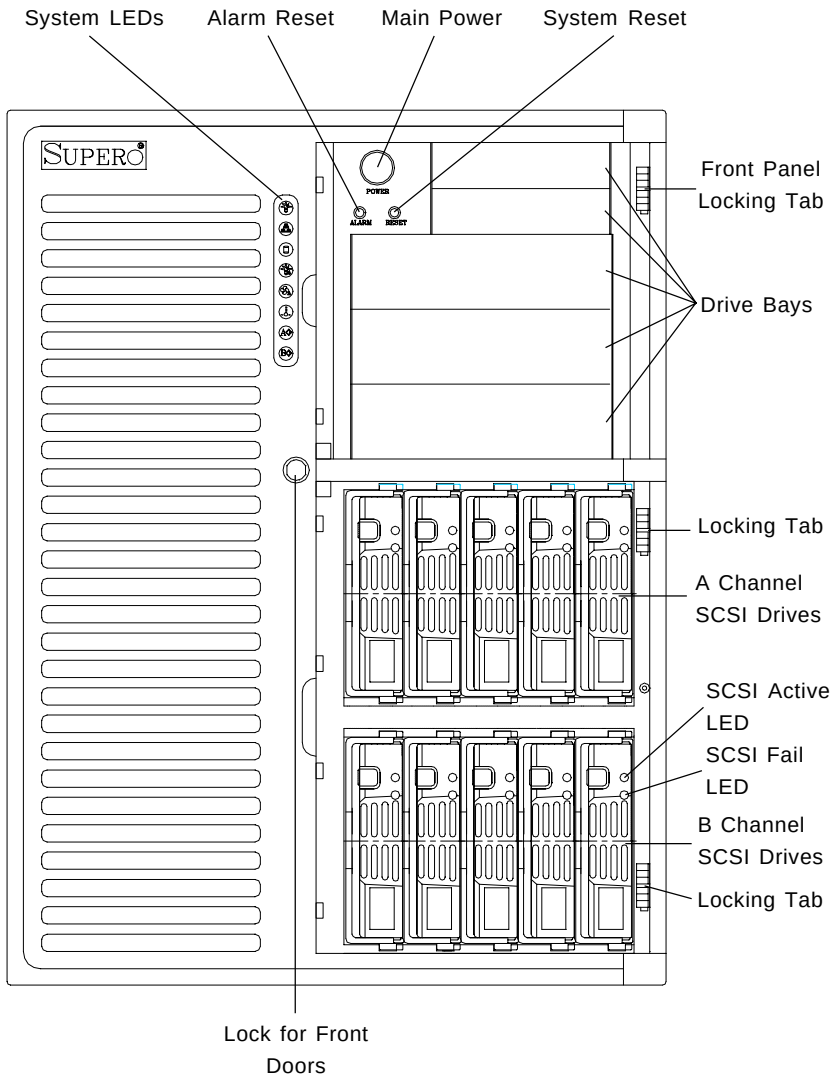
Precautions

- 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
(with right front doors removed)



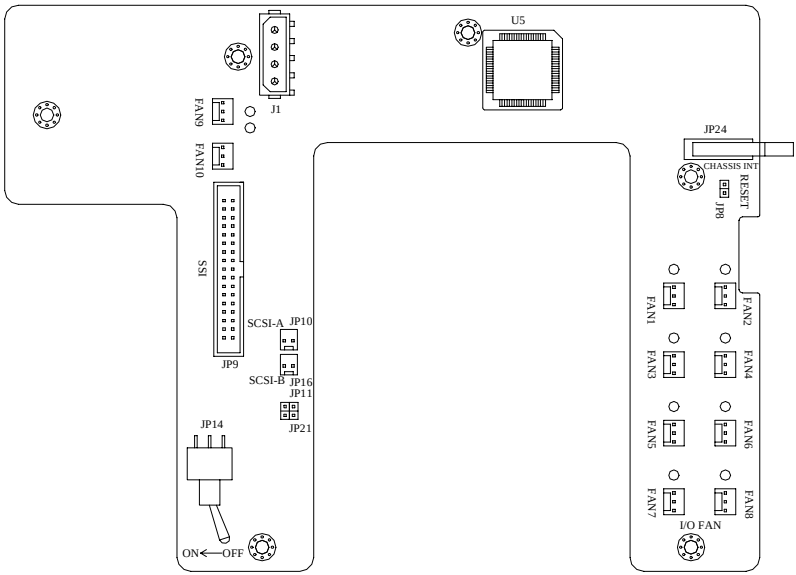
6-2 Front Control Panel

The front control panel must be connected to the JF1 connector on the motherboard to provide you with system status and alarm indications. A ribbon cable has been included to simplify this connection. Connect the cable from JF1 on the motherboard (making sure the red wire plugs into pin 1) to JP9 on the front control panel PCB (printed circuit board). Pull all excess cabling over to the control panel side of the chassis. The LEDs inform you of system status - see Figure 6-2 for details. Figure 6-3 shows the connections, jumpers and indicators located on the front control panel PCB. See the Advanced Motherboard Installation chapter for details on JF1.

Figure 6-2. Front Control Panel LEDs

Power		Indicates power is being supplied to the system.
NIC		Indicates network activity on the system.
HDD		Indicates IDE hard disk drive activity.
PWR Fault		Indicates a power supply failure.
Fan Fail		Indicates a system fan failure.
Overheat		Indicates an overheat condition in either the chassis or any one or more of the processors.
SCA Channel A		Indicates an overheat condition at SCA SCSI backplane A
SCA Channel B		Indicates an overheat condition at SCA SCSI backplane B

Figure 6-3. Front Control Panel PCB



Fan Headers: FAN1 + FAN2 are for cooling CPU3 and CPU4. FAN3 + FAN4 are for cooling CPU1 and CPU2 . FAN5 + FAN6 are for cooling main memory. FAN7 + FAN8 are for cooling the add-on cards. FAN9 + FAN10 are for cooling the hard drive bay.

Fan LEDs: The red LEDs located above each fan header allow you to identify which fan needs replaced in the event of a fan failure.

Headers: JP8 can be shorted to reset the microcontroller on this PCB
JP10 connects to SCA backplane A to sense for overheating.
JP16 connects to SCA backplane B to sense for overheating.

Fan Power Override Switch: Turn this switch ON to manually supply power to the system fans. The default setting for this switch is OFF.

6-3 System Cooling Fans

Four redundant fans (two in each of four fan housings for a total of eight) are located in the motherboard side of the chassis to provide the air intake for cooling the system (see Figure 6-4).

System Cooling Fan Failure

Under normal operation, all eight fans run at 80% of their maximum speed, which supplies sufficient airflow while prolonging fan life. If any fan fails, the rest will automatically increase their RPM to the full 100% to compensate. An audible alarm and an LED on the front control panel will notify you of any fan failure. Disable the alarm with the alarm button located by the control panel. The system cooling fans are hot-swap components, which allows you to replace them without powering down the system.

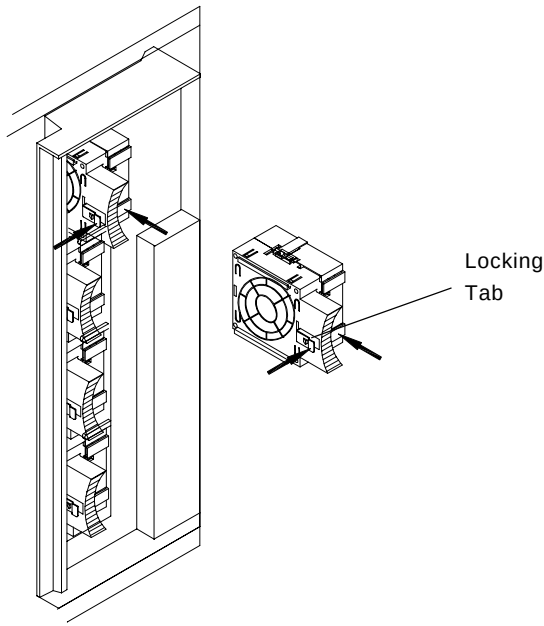
Replacing System Cooling Fans

1. Identifying the failed fan:
To identify and replace a failed fan, you must first remove the left side panel of the chassis. Look at the back of the circuit board that the fans plug into. The red LED that is illuminated indicates which fan has failed. As each fan housing contains two fans, examine it closely to verify which of the two has failed.

2. Removing a hot-plug fan housing:
Unplug the fan cable corresponding to the failed fan and remove the fan housing from the chassis by depressing its locking tab and pulling the unit straight out. The fan housings come apart in the middle to allow you access to each set of redundant fans.

3. Installing a new system fan:
Replace the failed fan with an identical 9-cm, 12 volt fan (available from Supermicro). After the new fan has been installed, reassemble the fan housing and plug the housing back into its slot. You should hear it click into place when fully inserted. Then plug the fan cable back into the header on the circuit board you removed it from. You should then wind the excess cable around the tabs on the fan housing to keep it out of the way. Check that the fan is working properly and that the LEDs on the front control panel circuit board (Figure 6-3) and the front control panel have turned off. Finish by replacing the left side chassis panel.

Figure 6-4. System Cooling Fans



6-4 Drive Bay Installation

Accessing the Drive Bays

There are two doors on the right front of the chassis that cover the peripheral and SCSI drive bays. Both are open-hinged for easy removal. To remove these doors, swing them open to about 90 degrees and then pull straight out from the hinges. Refer to Figure 6-6 when configuring your SCSI drives. **Note: You must use standard 1" high, 80-pin SCA SCSI drives in the SuperServer 8050.**

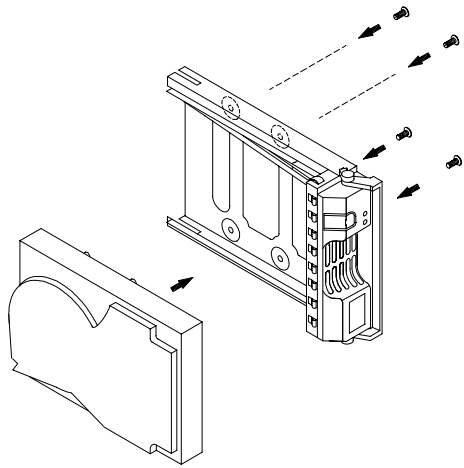
SCSI Drives

Exercise caution when working around the SCSI backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the airflow holes in the SCSI backplane.

1. Mounting a SCSI drive in a drive carrier:

The SCSI drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also work to promote proper airflow for the SCSI drive bays. For this reason, even those carriers without SCSI drives must remain installed. If you need to add a new SCSI drive, insert the 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. (See Figure 6-5.)

Figure 6-5. Mounting a SCSI Drive in a Carrier

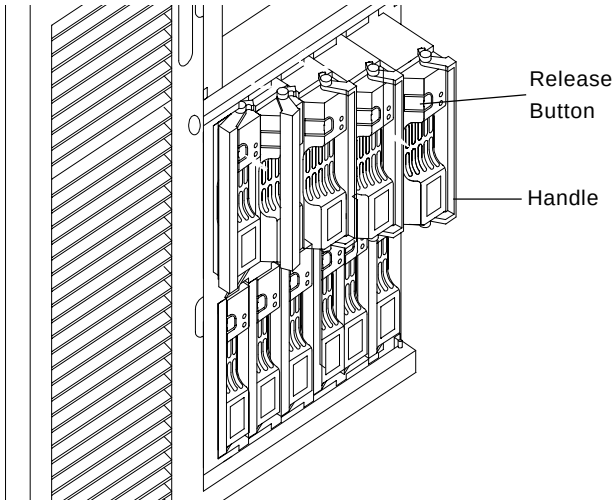


2. Installing/removing hot-plug SCSI drives:

Open or remove the lower front door as described above to access the 10 SCSI drive bays. The SCSI drives can be removed and installed without powering down the system (hot-plug). To remove, first push the release button located beside the drive LEDs, then swing the burgundy colored

Important: Regardless of how many SCSI hard drives are installed, all 10 SCSI drive carriers must remain in the drive bays for proper airflow.

Figure 6-6. Removing SCSI Drives



3. Configuring the hot-plug SCSI drives:

The SCSI backplane has several jumpers and connectors used for assigning IDs to the drives and for configuring them for either single or dual channel operation. The top drive bay holds the channel A drives and the bottom bay holds the channel B drives. See Figure 6-3 for the locations of backplane connectors and jumpers.

Dual channel: Connect the Ultra160 SCSI cables from the motherboard to the LVD2 connectors on both the A and B SCSI backplanes. Do this by routing the A channel (as noted on the board) to the A (upper) backplane and the B channel to the B (lower) backplane so that the LEDs will reflect status for the correct drives. See the jumper settings in the next section to finish configuring your SCSI drives for dual channel operation.

Single channel/daisy chain: If you prefer to run all 10 SCSI drives on a single channel, first connect the Ultra160 cable from the SCSI controller to the LVD2 connector on backplane A. Then chain the backplanes together by connecting another Ultra160 cable from the LVD1 connector on backplane A to the LVD2 connector on backplane B. See the jumper settings in the next section to finish configuring your SCSI drives for single channel operation.

SCSI Backplane Jumper Settings

The SCSI subsystem is preset to provide dual channel operation. The easiest way to reconfigure for single channel operation is to simply remove both JP5 and JP21 from backplane A only (leaving those on backplane B unchanged) and setting JP24 to different settings on each backplane. See Figure 6-7 for jumper locations.

- **JP5:** SCSI SAF-TE ID jumper. This jumper determines how the backplane assigns IDs to the drives.
ON: SCSI SAF-TE ID set to 8. **OFF:** SCSI SAF-TE ID set to 6.
Dual Channel: Set JP5 to the same pins on both backplanes.
Single Channel: Set JP5 differently on both backplanes.

- **JP21:** SCSI termination jumper (ON for termination and OFF for non-termination). SCSI channels **must** be terminated to operate. The termination settings must be changed when reconfiguring channels.
Dual Channel: Set JP21 to ON on both back planes to provide the termination for each channel.
Single channel: Set to OFF (remove the jumper) on backplane A and ON on backplane B to provide a single termination.

- **JP24:** SCSI ID. This jumper determines how indicator IDs are to be assigned to the drives. This is used for the front control panel to allow you to identify the current status of each individual drive.
1-2: SCSI ID's set to 0,1,2,3 and 4.
2-3: SCSI ID's set to 9,10,11,12 and 13.
Dual Channel: N/A (settings have no effect)
Single channel: Set JP24 differently on both backplanes.

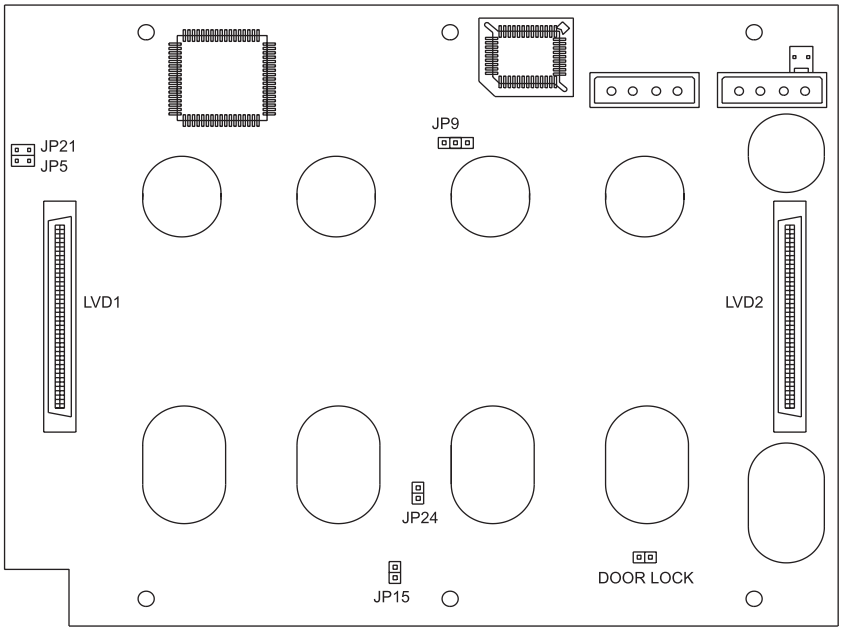
- **JP9:** I2C Link

- **JP15:** Delay Start

- **JP6:** Manufacturer's setting. You do not need to change this jumper.

Figure 6-7. SCSI Backplane Connectors and Jumpers

(See previous section for jumper definitions and settings.)



Note: SCSI power cables should be routed through the bottom of the power supply housing in the 850 chassis. There are two 4-pin connectors on each of two sets of cables. Connect both connectors on each set to both backplanes as noted in Step 3 ("Configuring the hot-plug SCSI drives").

Door Lock Header: This two-pin header connects to a microswitch mounted at the door that covers the SCSI drive bays. When the SCSI drive bay door is opened, as message will be sent to the system administrator to inform you of a possible unauthorized access.

IDE and Floppy Drives

Installing IDE and floppy drives:

The main front chassis door must be opened to access the IDE and floppy drive bays. To do so, first remove the two front doors as described at the beginning of this section. Then push the three locking tabs on the right side of the front chassis panel up to unlock the main chassis door, which you can then swing out. (You must power down the system before installing or removing floppy or IDE drives.) Drives mount on rails and should "click" into place to be correctly and fully installed in their bays. You should keep the metal shields in place on any unused drives to reduce EMI and noise and to facilitate the airflow inside the chassis.

- 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.

6-5 Power Supply Units

The SC850 has a 700 watt power supply that consists of three separate 350 watt units. Two units provide a continuous 700 watts of power to the system and the third acts as a backup, which will automatically activate if one of the other two units fail. (The backup unit is automatically determined and controlled by the power supply backplane.) All three are hot-swap units, allowing you to replace faulty units without powering down the system. These power supply units also have an auto-switching capability, which enables them to automatically sense and operate with either 110 or 220 volt inputs.

Power Supply Failure

If any one of the three power units fails, the third backup unit will automatically power up and enable the system to continue operating without interruption. An audible alarm will notify you of a power unit failure, which you can disable by pressing the alarm switch on the front control panel. The PWR Fail LED will also illuminate and remain on until the failed unit has been replaced.

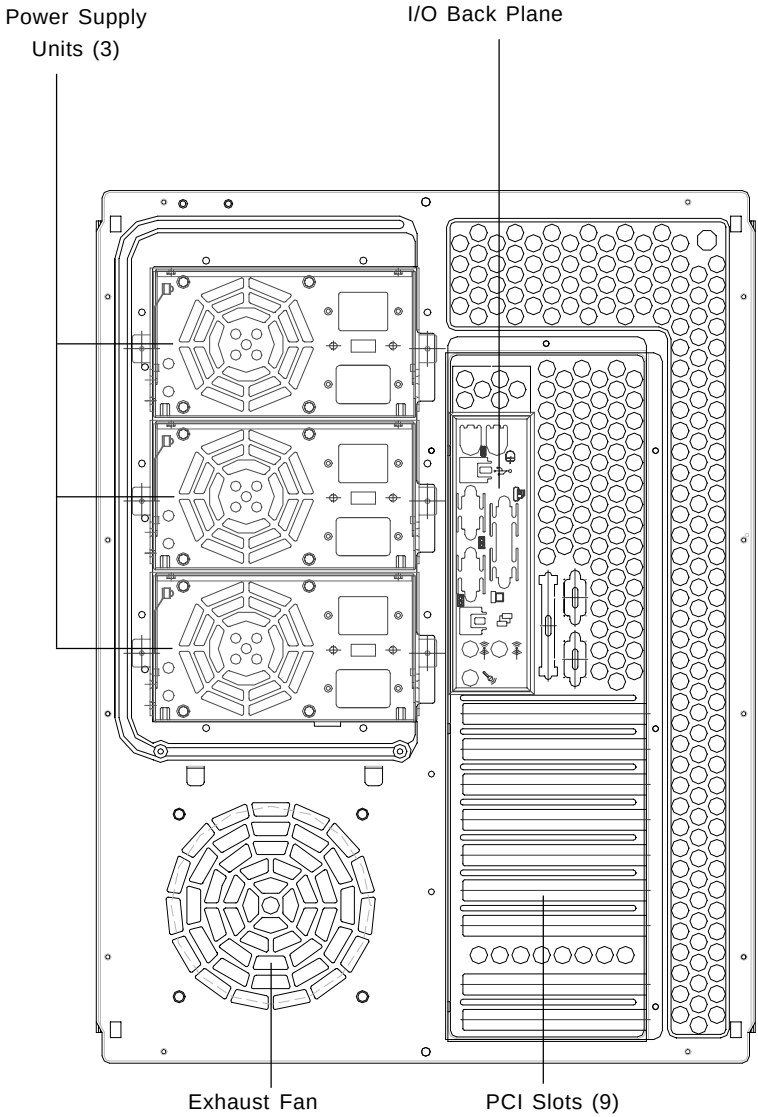
Replacing Power Units

1. Identifying the failed power unit:
Inspect the power units mounted in the rear of the chassis. The unit with the illuminated amber LED indicates the failed unit and should be replaced as soon as possible.

2. Removing a hot-plug power unit:
You do not need to power down the system to replace a failed power unit. First, unplug the power cord ***from the failed unit only***. Remove the screws that secure the unit to the chassis and then grasp the handles and pull the unit completely out.

3. Installing a new hot-plug power unit:
Replace the failed unit with another unit of the same wattage. It is highly recommended that all three power units are exactly the same. Gently but firmly push the new unit all the way into the open bay. Secure it to the chassis with the screws provided. After connecting the power cable, the green LED should illuminate to show that the unit is powered up and operational.

Figure 6-5. Chassis Rear View



Notes

Chapter 7
BIOS/Setup

7-1 Introduction

This chapter describes the AMIBIOS for ServerWorks Pentium III/II Xeon 400-700 processors with a 100 MHz FSB. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily upgraded using a floppy disk-based program.

Configuration Data

The original IBM AT had 64 kbytes of non-volatile memory storage in CMOS RAM. All AT-compatible systems have at least 64 kbytes of CMOS RAM, which is usually part of the Real Time Clock. Many systems have 128 kbytes of CMOS RAM.

How Data Is Configured

AMIBIOS provides a Setup utility in ROM that is accessed by pressing <Del> at the appropriate time during system boot. Setup configures data in CMOS RAM.

POST Memory Test

Normally, the only visible POST routine is the memory test. The screen that appears when the system is powered on is shown on the next page.

A BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

7-2 BIOS Features

- Supports Plug and Play V1.0A and DMI 2.3
- Supports Intel PCI 2.2 (Peripheral Component Interconnect) local bus specification
- Supports Advanced Power Management (APM) specification v 1.1
- Supports ACPI
- Supports Flash ROM

AMIBIOS supports the LS120/zip drive:

- Can be used as a boot device
- Is accessible as the next available floppy drive

AMIBIOS supports PC Health Monitoring chips. When a failure occurs in a monitored activity, AMIBIOS can sound an alarm and display a message. The PC Health Monitoring chips monitor:

- Four CPU temperatures
- System Overheat
- Chassis intrusion
- Four positive voltage inputs
- Four fan-speed monitor inputs

7-3 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 Standard 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).

```
        AMIBIOS  HIFLEX  SETUP  UTILITY  VERSION  1.18

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                    STANDARD  CMOS  SETUP
                    ADVANCED  CMOS  SETUP
                  ADVANCED  CHIPSET  SETUP
                  POWER  MANAGEMENT  SETUP
                PCI  /  PLUG  AND  PLAY  SETUP
                     PERIPHERAL  SETUP
                  AUTO-DETECT  HARD  DISKS
                   CHANGE  USER  PASSWORD
                CHANGE  SUPERVISOR  PASSWORD
                  CHANGE  LANGUAGE  SETTING
          AUTO  CONFIGURATION  WITH  OPTIMAL  SETTINGS
         AUTO  CONFIGURATION  WITH  FAIL-SAFE  SETTINGS
                  SAVE  SETTINGS  AND  EXIT
                    EXIT  WITHOUT  SAVING


Standard CMOS setup for changing time, date, hard disk
type, etc.

Esc:Exit ↑↑↓↓:Sel  F2/F3:Color  F10:Save  &  Exit
```

```
AMIBIOS  SETUP-STANDARD  CMOS  SETUP
(C)1998  American  Megatrends,  Inc.  All  Rights  Reserved

Date  mm/dd/yyyy):Thurs  March  2,2000  Base  Memory:  640KB
Time  (hh/mm/ss)  :16:05:13              Extd  Memory:  127MB

Floppy  Drive  A:  1.44MB  3½
Floppy  Drive  B:  Not  Installed

                                      LBA   Blk   PIO   32Bit
     Type  Size  Cyln  Head  Wpcom  Sec  Mode  Mode  Mode  Mode

Pri  Master:  Auto
Pri  Slave:  Not  Installed
Sec  Master:  Not  Installed
Sec  Slave:  Not  Installed

     Boot  Sector  Virus  Protection  Disabled

Month:  Jan–Dec                ESC:Exit  ↑↓:Sel
Day:    01  –  31              PgUp/PgDn:Modify
Year:  1901  –  2099           F2/F3:Color
```

Standard CMOS Setup

Date and Time Configuration

Select the Standard option. Select the *Date/Time* icon. The current values for each category are displayed. Enter new values through the keyboard.

Floppy A

Floppy B

Choose the Floppy Drive A or B icon to specify the floppy drive type. The settings are *Not Installed, 360 KB 5¼ inch*, *1.2 MB 5¼ inch*, *720 KB 3½ inch*,*1.44 MB 3½ inch or 2.88 MB 3½ inch*. ***Note: The Optimal and Fail-Safe settings for Floppy Drive A are 1.44 MB 3 1/2 inch and for Floppy Drive B are Not Installed***.

Pri Master
Pri Slave
Sec Master
Sec Slave

Type	How to Configure
Type	Select *Type*. The options are *1-46, User, Auto, CDROM, ARMD. 1-46* indicates the prefined type of the parameters. Select *Enter* to enter the parameter type manually. If *Auto* is selected, the parameter type will be set automatically on each boot. Select *CDROM* when ATAPI CDROM drives are used. Select *ARMD* if LS120, MO, Iomega Zip drives are used, or Press *enter* to let the BIOS autodetect the parameter type.

Entering Drive Parameters

You can also enter the hard disk drive parameters. The drive parameters are:

Parameter	Description
Type	The number for a drive with certain identification parameters.
Cylinders	The number of cylinders in the disk drive.
Heads	The number of heads.
WPCOM	The size of a sector gets progressively smaller as the track diameter diminishes. Yet each sector must still hold 512 bytes. WPCOM circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number where WPCOM begins.
Sectors	The number of sectors per track. MFM drives have 17 sectors per track. RLL drives have 26 sectors per track. ESDI drives have 34 sectors per track. SCSI and IDE drive may have even more sectors per track.

Boot Sector Virus Protection

This setting allows you to prevent any data from being written the boot sector of the hard drive. While this may prevent viruses from infecting your system, you may need to change information here when installing new programs. The options for this setting are *Enabled* or ***Disabled***.

Advanced CMOS Setup

Quick Boot

The options are ***Disabled*** and *Enabled*. Set to *Enabled* to permit AMIBIOS to boot quickly when the computer is powered on. This option replaces the old Above 1 MB Memory Test Advanced Setup option. The settings are:

Setting	Description
Disabled	AMIBIOS tests all system memory. AMIBIOS waits up to 40 seconds for a READY signal from the IDE hard disk drive. AMIBIOS waits for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. AMIBIOS checks for a <Del> key press and runs AMIBIOS setup if the key has been pressed.

Enabled AMIBIOS does not test system memory above 1 MB. AMIBIOS does not wait up to 40 seconds for a READY signal from the IDE hard disk drive. If a READY signal is not received immediately from the IDE drive, AMIBIOS does not configure that drive. AMIBIOS does not wait for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. In *Enabled,* the keyboard will be bypassed.

Note: The AMIBIOS Setup can be run at system boot but no display is given.

Pri Master ARMD Emulated as
Pri Slave ARMD Emulated as
Sec Master ARMD Emulated as
Sec Slave ARMD Emulated as
The options for this setting are ***Auto***, *Floppy* and *Hard disk*. If set to Auto, the default emulation type depends on the ARMD drive. The default emulation type is floppy for LS120, Hard Disk for MO and Hard Disk for Iomega Zip.

1st Boot Device
2nd Boot Device
3rd Boot Device
The options for the 1st Boot Device are *Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD,* ***Floppy***, *ARMD-FDD, ARMD-HDD, ATAPI CDROM, SCSI, Network* and *I_20*. The options for the 2nd Boot Device are *Disabled,* ***1st IDE-HDD***, *2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM* and *SCSI*. The options for the 3rd Boot Device are *Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD* and ***ATAPI CDROM***.

1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD and 4th IDE-HDD are the four hard disks that can be installed by the BIOS. 1st IDE-HDD is the first hard disk installed by the BIOS, 2nd IDE-HDD is the second hard disk, and so on. For example, if the system has a hard disk connected to Primary Slave and another hard disk to Secondary Master, then 1st IDE-HDD will be referred to as the hard disk connected to Primary Slave and 2nd IDE-HDD will be referred to as the hard disk connected to the Secondary Master. 3rd IDE-HDD and 4th IDE-HDD are not present. Note that the order of the initialization of the devices connected to the primary and secondary channels are Primary Master first, Primary Slave second, Secondary Master third, and Secondary Slave fourth.

The BIOS will attempt to read the boot record from 1st, 2nd, 3rd and 4th boot device in the selected order until it is successful in reading the booting record. The BIOS will not attempt to boot from any device which is not selected as the boot device.

Try Other Boot Devices

This setting controls the action of the BIOS if all the selected boot devices failed to boot. The settings for this option are ***Yes*** and *No*. If *Yes* is selected, the BIOS will try to boot from the other boot devices that are present in the setup but not selected if all selected Boot Devices failed to boot. If *No* is selected, the BIOS will not try to boot from the other boot devices when all selected boot devices failed to boot.

Initialize I2O Devices

The options for this setting are ***Yes*** and *No*. If *Yes* is selected, the BIOS will initialize I2O processor(s), I2O storage devices and provide INT13 support for I2O storage devices. If *No is* selected, the BIOS will not initialize I2O processor(s) and I2O storage devices.

Initial Display Mode

This option determines the display screen with which the POST is going to start the display. The options for this setting are *BIOS* and ***Silent***. If selected as *BIOS,* the POST will start with the normal sign-on message screen. If *Silent* is selected, the POST will start with the Supermicro screen.

Display Mode at Add-On ROM Init

The options for this setting are ***Force BIOS*** and *Keep Current*. If *Force Bios* is selected, the Add-on ROM will take control of the POST screen.

Floppy Access Control

The options for this setting are ***Read-Write*** and *Read-Only*. This option will be effective only if the device is accessed through BIOS.

Hard Disk Access Control

The options for this setting are ***Read-Write*** and *Read-Only*. This option will be effective only if the device is accessed through BIOS.

S.M.A.R.T. for Hard Disks

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a technology developed to manage the reliability of the hard disk by predicting future device failures. The hard disk needs to be S.M.A.R.T. capable. The options for this setting are ***Disabled*** and *Enabled*. Note: **S.M.A.R.T. cannot predict all future device failures. S.M.A.R.T.** should be used

as a warning tool, not as a tool to predict the device reliability.

Boot Up Num-Lock

The options for this setting are ***On*** and *Off*. When this option is set to *On*, the BIOS turns off the Num Lock key when the system is powered on. This will enable the end user to use the arrow keys on both the numeric keypad and the keyboard.

PS/2 Mouse Support

The options for this setting are ***Enabled*** and *Disabled*. When this option is set to *Enabled*, AMIBIOS supports a PS/2-type mouse.

Primary Display

The options for this setting are *Absent, **VGA/EGA**, CGA 40x25, CGA 80x25* and *Mono*.

Password Check

This setting enables the password check option every time the system boots or the end user runs WinBIOS Setup. If *Always* is chosen, a user password prompt appears every time the computer is turned on. If ***Setup*** is chosen, the password prompt appears if WinBIOS Setup is executed.

Boot to OS/2

If DRAM size is over 64 MB, set this option to *Yes* to permit AMIBIOS to run with IBM OS/2. The options are ***No*** and *Yes*.

Processor Serial Number

Intel included a serial number in their Pentium III and Pentium III Xeon processors as a unique system identifier. Select *Enabled* to allow the processor's serial number to be detected by application software programs. For privacy reasons, you can disable the release of this identifier. The options for this setting are *Enabled* and ***Disabled***.

CPU Microcode Updation

This option allows the BIOS to update the CPU Microcode. The options for this setting are *Disabled* and ***Enabled***.

Internal Cache (L1 Cache)

This option is for enabling or disabling the internal cache memory. The options for this setting are *Disabled, WriteThru* and ***WriteBack***.

External Cache (L2 Cache)

This option is for enabling or disabling the external cache memory. The options for this setting are *Disabled, WriteThru* and ***WriteBack***.

System BIOS Cacheable

When set to *Enabled*, the contents of the F0000h system memory segment can be read from or written to cache memory. The contents of this memory segment are always copied from the BIOS ROM to system RAM for faster execution. The options are ***Enabled*** and *Disabled*. ***Note: The Optimal default setting is Enabled and the Fail-Safe default is Disabled. Set this option to Enabled to permit the contents of F0000h RAM memory segment to be written to and read from cache memory.***

C000 Shadow (16K) (Cached)
C400 Shadow (16K) (Cached)
C800 Shadow (16K) (Cached)
CC00 Shadow (16K) (Cached)
D000 Shadow (16K)
D400 Shadow (16K)
D800 Shadow (16K)
DC00 Shadow (16K)

These settings specify how the 16 KB of video ROM at C0000h (or D0000h) is treated. The options are: *Disabled*, *Enabled* and *Cached*. The default is *Disabled* for all settings except C000, C400, C8000, CC00 which are *Cached* for default. When set to *Disabled,* the contents of the video ROM are not copied to RAM. When set to *Enabled,* the contents of the video ROM area from C0000h-CFFFFh (or D0000h-D7FFFh) are copied (shadowed) from ROM to RAM for faster execution. When set to *Cached*, the contents of the video ROM area from C0000h-C7FFFh (or D0000h-D7FFFh) are copied from ROM to RAM, and can be written to or read from cache memory.

Advanced Chipset Setup

USB Function

The options for this setting are ***Enabled*** and *Disabled*. Set this option to *Enabled* to enable the USB (Universal Serial Bus) functions.

USB KB/Mouse Legacy Support

The options for this setting are *Keyboard, Auto, Keyboard+Mouse* and ***Disabled***.

Port 64/60 Emulation:

The options for this setting are ***Enabled*** and *Disabled*.

Write Combining for P6-to-PCI:
The options for this setting are ***Enabled*** and *Disabled.* This bit enables or disables the combining (bursting) of accesses within the PCI memory regions. The BWCR register provides the write combining enable/disable bit for each region. This bit acts as a master bit to enable the write combining for all the regions.

The main memory system of the CNB30 supports various clock speeds and memory speeds. The MTCR (Memory Timing Control Register) dictates the memory controller to generate the DRAM timing accordingly.

Act to Deact
The options for this setting are ***6CLKS*** and *5CLKS*.

Act to Read/Write
The options for this setting are ***3CLKS*** and *2CLKS*.

RAS Precharge Time
This setting defines the RAS Precharge Time. The options are ***3 CLKS***, and *2 CLKS.*

RAS Cycle Time
This option defines the RA Cycle Time. The options are *10CLKS, 9CLKS,* ***8CLKS****,* and *7CLKS.*

Write to Deact
The options for this setting are ***3CLKS*** and *2CLKS*.

SDRAM CAS Latency
The options for this setting are ***CAS Latency3*** and *CAS Latency2*.

Memory Auto Precharge
The options for this setting are ***Enabled*** and *Disabled*.

SDRAM Fast Timing
The options for this setting are ***10-1-1-1*** and *11-1-1-1*. When the value set to 10-1-1-1, the CNB30 drives the CAS# signal one clock earlier and reduces the lead time of a page hit read by one clock.

Memory Write Posting
The options for this setting are ***Enabled*** and *Disabled*.

ISA IO Cycle Delay
The options for this setting are *Full,* ***1.5 BCLK,*** *2.5 BCLK* and *3.5 BCLK*.

Scrubbing Enable

The options for this setting are *Disabled* and ***Enabled***. Set "Enabled" to allow the CNB30 to perform "scrubbing"(--i.e. writing the ECC corrected memory data back to the DRAM).

MPS Support

The options for this setting are ***Enabled*** and *Disabled*. Select "Enabled" to activate Multi-Processor System Support.

Power Management

ACPI Aware O/S

The options for this setting are *No* and ***Yes***. Available with ACPI only. The operating system has the built-in ACPI features. Select "Yes" to permit the OS to detect the ACPI functions in the system.

Power Management/APM

The options for this setting are *Enabled* and ***Disabled***. If "Enabled" is selected, the Power Management/Advanced Power Management mode will be activated.

Video Power Down Mode

When in the AMP mode, this option specifies the power conserving state that the VGA video subsystem enters after the specified period of display inactivity has expired. The options are ***Disabled*** and *Suspend*. ***Note: The Optimal default setting for this option is Suspend and the Fail-Safe default setting is Disabled***.

Hard Disk Power Down Mode

When in the AMP mode, this option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The options are *Disabled* and ***Suspend***. ***Note: The Optimal default setting for this option is Suspend and the Fail-Safe default setting is Disabled***.

Hard Disk Time Out (Minutes)

When in the AMP mode, this option specifies the length of a period of hard disk drive inactivity. When this length of time expires, the computer enters the power-conserving state specified in the Hard Disk Power Down Mode option. The options are ***Disabled*** and *1 Min* through *14 Min* in 1 minute increments.

Suspend Time Out

When in the AMP mode, this option specifies the length of a period of system inactivity while in the suspend state. When this length of time expires, the computer enters a suspend power. The options are *Disabled* and *1 Min* through *14 Min* in 1 minute increments. The default setting is **5**.

Power Button Enable

When in the AMP mode, this in the AMP mode, this option specifies how the power button mounted externally on the computer chassis is used. The options are: *Suspend, PowerOn* and ***PowerOff***. When set to *PowerOn or PowerOff*, pushing the power button turns the computer on or off. The *Suspend* setting places the computer in Suspend mode or Full On power mode.

The BIOS has the capability to detect the IRQ events. When the BIOS detects an IRQ trigger event being activated, then, the system will "wake up" and resumes its activities.

IRQ1:

The options are: *Ignore* and ***Monitor***.

IRQ3:

The options are: ***Ignore*** and *Monitor*.

IRQ4:

The options are: ***Ignore*** and *Monitor*.

IRQ5:

The options are: ***Ignore*** and *Monitor*.

IRQ6:

The options are: ***Ignore*** and *Monitor*.

IRQ7:

The options are: ***Ignore*** and *Monitor*.

IRQ9:

The options are: ***Ignore*** and *Monitor*.

IRQ10:

The options are: ***Ignore*** and *Monitor*.

IRQ11:

The options are: ***Ignore*** and *Monitor*.

IRQ12:
The options are: *Ignore* and ***Monitor***.

IRQ14:
The options are: ***Ignore*** and *Monitor*.

IRQ15:
The options are: ***Ignore*** and *Monitor*.

USB Resume
When in the AMP mode, this setting allows you to wake up the system from a USB device. The options for this setting are *Enabled* and ***Disabled***.

PME Resume
When in the AMP mode, this option allows you to wake up the system from a PME device. The options for this setting are *Enabled* and ***Disabled***.

R1 Resume
When in the AMP mode, this option allows you to wake up the system from a R1 device. The options for this setting are *Enabled* and ***Disabled***.

PCI/Plug and Play Setup

Plug and Play-Aware OS
The options for this setting are ***No*** and *Yes*. Set this option to *Yes* to allow the operating system to detect ISA Plug and Play devices. (Since the S2QR6 has no ISA slots, this should always be set to ***No***.)

PCI Latency Timer (PCI Clocks)
This setting specifies the latency timings in PCI clocks for all PCI devices. The options are *32*, ***64***, *96*, *128*, *160*, *192*, *224*, and *248*.

PCI VGA Palette Snoop
The options for this setting are ***Disabled*** and *Enabled*. When set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA) and this option is disabled, data read and written by the CPU is only directed to the PCI VGA device's palette registers. If Enabled, data read and written by the

CPU is directed to both the PCI VGA device's palette registers and the ISA VGA palette registers. This will permit the palette registers of both devices to be identical. This option must be set to Enabled if any ISA adapter card installed in the system requires VGA palette snooping.

PCI IDE Busmaster
The options for this setting are ***Disabled*** and *Enabled*. Set to Enabled to specify the IDE Controller on the PCI bus has bus mastering capabilities. Under Windows 95, you should set this option to Disabled and install the Bus Mastering driver.

Offboard PCI IDE Card
This setting specifies if an offboard PCI IDE controller adapter card is installed in the computer. The PCI expansion slot on the motherboard where the offboard PCI IDE controller is installed must be specified. If an offboard PCI IDE controller is used, the onboard IDE controller is automatically disabled. The options are ***Auto*** (AMIBIOS automatically determines where the offboard PCI IDE controller adapter card is installed), *Slot 1*, *Slot 2*, *Slot 3*, *Slot 4, Slot 5* and *Slot 6*.

This setting forces IRQ14 and IRQ15 to a PCI slot on the PCI local bus. This is necessary to support non-compliant ISA IDE controller adapter cards. If an offboard PCI IDE controller adapter card is installed in the computer, you must also set the Offboard PCI IDE Primary IRQ and Offboard PCI IDE Secondary IRQ options.

Offboard PCI IDE Primary IRQ
Offboard PCI IDE Secondary IRQ
These settings specify the PCI interrupt used by the primary (or secondary) IDE channel on the offboard PCI IDE controller. The options are ***Disabled***, *Hardwired*, *INTA*, *INTB*, *INTC* and *INTD*.

Onboard USB IRQ
Use this setting to specify the IRQ priority for Onboard USB devices installed in the PCI expansion slots. The options are ***Auto***, *(IRQ) 3, 4, 5, 7, 9, 10,* and *11,* in priority order**.**

PCI Slot 1 and Slot 2 IRQ
Use these settings to specify the IRQ priority for PCI devices installed in the PCI expansion slots. The options are ***Auto***, *(IRQ) 3, 4, 5, 7, 9, 10,* and *11,* in priority order**.**

Onboard LAN IRQ
Use this setting to specify the IRQ priority for Onboard LAN devices installed in the PCI expansion slots. The options are ***Auto***, *(IRQ) 3, 4, 5, 7, 9, 10,* and *11,* in priority order**.**

PCI Slot 3 and Onboard SCSI IRQ
Use this setting to specify the IRQ priority for PCI Slot 3 and Onboard SCSI devices installed in the PCI expansion slots. The options are ***Auto***, *(IRQ) 3, 4, 5, 7, 9, 10,* and *11,* in priority order**.**

PCI Slot 4 IRQ
PCI Slot 5 IRQ
PCI Slot 6 IRQ
PCI Slot 7 IRQ
PCI Slot 8 IRQ
Use these settings to specify the IRQ priority for PCI devices installed in the PCI expansion slots. The settings are ***Auto***, *(IRQ) 3, 4, 5, 7, 9, 10,* and *11,* in priority order**.**

DMA Channel 0
DMA Channel 1
DMA Channel 3
DMA Channel 5
DMA Channel 6
DMA Channel 7
These DMA channels control the data transfers between the I/O devices and the system memory. The chipset allows the BIOS to choose which channels to do the job. The options are ***PnP*** and *ISA/EISA.*

IRQ3
IRQ4
IRQ5
IRQ7
IRQ9
IRQ10
IRQ11
IRQ14
IRQ15
These settings specify which bus the specified IRQ line is used on and allow you to reserve IRQs for legacy ISA adapter cards. If more IRQs must be removed from the pool, the end user can use these options to

reserve the IRQ by assigning an *ISA/EISA* setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as PCI/PnP.

IRQ14 and 15 will not be available if the onboard PCI IDE is enabled. If all IRQs are set to *ISA/EISA* and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ 9 will still be available for PCI and PnP devices. This is because at least one IRQ must be available for PCI and PnP devices. The options are ***PCI/PnP*** and *ISA/EISA.* (See page 3-5 for information on shared IRQs.)

Reserved Memory Size
This setting specifies the size of the memory area reserved for legacy ISA adapter cards. The options are ***Disabled***, *16K*, *32K* and *64K*.

Reserved Memory Address
This setting specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards. The options are *C0000*, *C4000*, ***C8000***, *CC000*, *D0000*, *D4000*, *D8000* and *DC000*.

Peripheral Setup

Onboard SCSI
This setting enables or disables the onboard SCSI. The options are ***Enabled*** and *Disabled.*

CPU1 Current Temperature
The current temperature of CPU1 is displayed here.

CPU2 Current Temperature
The current temperature of CPU2 is displayed here.

CPU3 Current Temperature
The current temperature of CPU3 is displayed here.

CPU4 Current Temperature
The current temperature of CPU2 is displayed here.

System Overheat Warning
The options for this setting are *Enabled* and ***Disabled***. When set to *Enabled* the user is given the opportunity to set the overheat warning temperature.

Overheat Warning Temperature
Use this setting to set the CPU overheat warning temperature. The options are *25 °C* through *75 °C* in 1 °C intervals. ***Note: The Optimal and Fail-Safe default settings are 55 °C***.

H/W Monitor CPU1
H/W Monitor CPU2
H/W Monitor CPU3
H/W Monitor CPU4
H/W Monitor (+3.3V)
H/W H/WMonitor (+5V)
H/W Monitor (+12V)
H/W Monitor (+2.5V)
CPU1 Fan
CPU2 Fan
CPU3 Fan
CPU4 Fan

The above features are for PC Health Monitoring. The motherboards with W83781D have seven onboard voltage monitors for the CPU core, CPU I/O, +3.3V, +5V, -5V, +12V, and-12V, and for the four-fan status monitor.

OnBoard FDC
This setting enables the FDC (Floppy Drive Controller) on the motherboard. The options are *Disabled* and ***Enabled***.

OnBoard Serial Port1
This setting specifies the base I/O port address of serial port 1. The options are *Disabled*, ***3F8h***, *2F8h*, *3E8h* and *2E8h*.

OnBoard Serial Port2
This setting specifies the base I/O port address of serial port 2. The options are *Disabled*, *3F8h*, ***2F8h***, *3E8h* and *2E8h*.

Serial Port2 Mode
The options for this setting are ***Normal***, *IrDA SIR-A,. IrDA SIR-B, ASKIR, Consumer* and *Raw IR*. When set to anything but *Normal,* the IR Duplex Mode becomes available and can be set to either *Half* or ***Full***.

Serial Port2 Duplex Mode
This setting is enabled by the selection made in the previous Serial Port 2 Mode setting. This makes the IR Duplex Mode available, which can be set to either *Half* or ***Full***.

Onboard Parallel Port
This setting specifies the base I/O port address of the parallel port on the motherboard. The options are *Auto* (AMIBIOS automatically determines the correct base I/O port address), *Disabled*, ***378h***, *278h* and *38Ch*.

Parallel Port Mode
This setting specifies the parallel port mode. The options are *Normal*, *Bi-Dir, EPP* and ***ECP***. When set to *Normal,* the normal parallel port mode is used. Use *Bi-Dir* to support bidirectional transfers. Use *EPP* (Enhanced Parallel Port) to provide asymmetric bidirectional data transfer driven by the host device. Use *ECP* (Extended Capabilities Port) to achieve data transfer rates of up to 2.5 Mbps. ECP uses the DMA protocol and provides symmetric bidirectional communication. ***Note: The Optimal default setting for this option is ECP and the Fail-Safe setting is Normal***.

EPP Version
The options are *Enabled* and *Disabled*. ***Note: The Optimal and Fail-Safe default settings are N/A***.

Parallel Port IRQ
This setting specifies the IRQ to be used by the parallel port. The options are *5* and ***7***.

Parallel Port ECP DMA Channel
This setting is only available if the parallel port mode is *set to ECP*. The options are *0*, *1*, *2*, ***3***, *5*, *6* and *7*.

Onboard IDE
This setting enables the IDE (Hard Disk Drive Controller) device(s) on the motherboard. The options are ***Enabled*** and *Disabled*.

Auto-Detect Hard Disks

This section allows BIOS to look for and configure any hard disk drives on your system. After highlighting this setting, hit <Enter> and wait momentarily while BIOS performs the auto-detect. You will soon see the disk drives appear properly configured.

Change User Password

Change Supervisor Password

The system can be configured so that all users must enter a password every time the system boots or when the AMIBIOS setup is executed. You can set either a Supervisor password or a User password. If you do not want to use a password, just press <Enter> when the password prompt appears.

The password check option is enabled in the Advanced Setup by choosing either *Always* or *Setup*. The password is stored in CMOS RAM. You can enter a password by typing it out on the keyboard or by selecting each letter via the mouse or a pen stylus. Pen access must be customized for each specific hardware platform.

When you select to change the Supervisor or User password, AMIBIOS prompts you for the new password. You must set the Supervisor password before you can set the User password. Enter a 1-6 character password. (It will not appear on the screen when typed.) Retype the new password as prompted and press <Enter>. Make sure you write it down. If you forget it, you must clear CMOS RAM and reset the password.

Change Language Setting

Because this version of BIOS only supports English at this time, this setting cannot be chosen. Future releases may support other languages.

Auto Configuration with Optimal Settings

The Optimal default settings provide optimum performance settings for all devices and system features.

Auto Configuration with Fail Safe Settings

The Fail-Safe default settings consist of the safest set of parameters. Use them if the system is behaving erratically. They should always work but do not provide optimal system performance characteristics.

Save Current Settings and Exit

Highlight this and hit <Enter> when you wish to save any changes made to settings in BIOS and exit back to the system boot-up procedure.

Exit Without Saving

Highlight this and hit <Enter> when you wish to exit back to the system boot-up procedure without saving any changes.

Appendix A
BIOS Error Beep Codes & Messages

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

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

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

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

AMI BIOS Error Beep Codes

1 beep: System needs to update BIOS. Insert the diskette in that has the system BIOS file (SUPER.ROM) in the root directory.

2 beeps: BIOS file (SUPER.ROM) absent or not in root directory.

4 beeps: Flash program successful.

5 beeps: Floppy read error.

7 beeps: No flash part detected. The BIOS cannot be updated.

8 beeps: The ROM checksum value does not match the value encoded in the BIOS.

10 beeps: Flash erase error.

11 beeps: Flash program error.

12 beeps: Wrong BIOS file size.

13 beeps: ROM image mismatch.

If you hear...	it's because...
5 short and 1 long beeps	no memory is installed
6 short and 1 long beeps	EDO memory detected
7 short and 1 long beeps	SMBUS (System Management Bus) error

Notes

Appendix B

AMIBIOS POST Diagnostic Error Messages

This section describes the power-on self-tests (POST) port 80 codes for the AMIBIOS.

Check Point	Description
00	Code copying to specific areas is done. Passing control to INT 19h boot loader next.
03	NMI is Disabled. Next, checking for a soft reset or a power-on condition.
05	The BIOS stack has been built. Next, disabling cache memory.
06	Uncompressing the post code unit next.
07	Next, initializing the CPU init and the CPU data area.
08	The CMOS checksum calculation is done next.
0B	Next, performing any required initialization before keyboard BAT command is issued.
0C	The keyboard controller I/B is free. Next, issuing the BAT command to the keyboard controller.
0E	The keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test.
0F	The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next.

Check Point	Description
10	The keyboard controller command byte is written. Next, issuing the pin 23 and 24 blocking and unblocking commands.
11	Next, checking if the <End or <Ins> keys were pressed during power on. Initializing CMOS RAM if the Initialize CMOS RAM in every boot AMIBIOS POST option was set in AMIBCP or the <End> key was pressed.
12	Next, disabling DMA controllers 1 and 2 and interrupt controllers 1 and 2.
13	The video display has been disabled. Port B has been initialized. Next, initializing the chipset.
14	The 8254 timer test will begin next.
19	The 8254 timer test is over. Starting the memory refresh test next.
1A	The memory refresh test line is toggling. Checking the 15 second on/off time next.
23	Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24	The configuration required before interrupt vector initialization has completed. Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on.
25	Interrupt vector initialization is done. Clearing the password if the POST DIAG Switch is on.
27	Any initialization before setting video mode will be done next.

Check Point	Description
28	Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
2A	Bus initialization system, static, output devices will be done next, if present.
2B	Passing control to the video ROM to perform any required configuration before the video ROM test.
2C	All necessary processing before passing control to the video ROM is done. Looking for the video ROM next and passing control to it.
2D	The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control.
2E	Completed post-video ROM test processing. If the EGA/VGA controller is not found, performing the display memory read/write test next.
2F	The EGA/VGA controller was not found. The display memory read/write test is about to begin.
30	The display memory read/write test passed. Look for retrace checking next.
31	The display memory read/write test or retrace checking failed. Performing the alternate display memory read/write test next.
32	The alternate display memory read/write test passed. Looking for alternate display retrace checking next.
34	Video display checking is over. Setting the display mode next.
37	The display mode is set. Displaying the power on message next.

Check Point	Description
38	Initializing the bus input, IPL, and general devices next, if present.
39	Displaying bus initialization error messages.
3A	The new cursor position has been read and saved. Displaying the Hit <DEL> message next.
40	Preparing the descriptor tables next.
42	The descriptor tables are prepared. Entering protected mode for the memory test next.
43	Entered protected mode. Enabling interrupts for diagnostics mode next.
44	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0 next.
45	Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size next.
46	The memory wraparound test has completed. The memory size calculation has been completed. Writing patterns to test memory next.
47	The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory next.
48	Patterns written in base memory. Determining the amount of memory below 1 MB next.
49	The amount of memory below 1 MB has been found and verified. Determining the amount of memory above 1 MB memory next.
4B	The amount of memory above 1 MB has been found and verified. Checking for a soft reset and clearing the memory below 1 MB for the soft reset next. If this is a power on situation, going to checkpoint 4Eh next.

Check Point	Description
4C	The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next.
4D	The memory above 1 MB has been cleared via a soft reset. Saving the memory size next. Going to checkpoint 52h next.
4E	The memory test started, but not as the result of a soft reset. Displaying the first 64 KB memory size next.
4F	The memory size display has started. The display is updated during the memory test. Performing the sequential and random memory test next.
50	The memory below 1 MB has been tested and initialized. Adjusting the displayed memory size for relocation and shadowing next.
51	The memory size display was adjusted for relocation and shadowing. Testing the memory above 1 MB next.
52	The memory above 1 MB has been tested and initialized. Saving the memory size information next.
53	The memory size information and the CPU registers are saved. Entering real mode next.
54	Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI next.
57	The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing next.
58	The memory size was adjusted for relocation and shadowing. Clearing the Hit <DEL> message next.
59	The Hit <DEL> message is cleared. The <WAIT> message is displayed. Starting the DMA and interrupt controller test next.

Check Point	Description
60	The DMA page register test passed. Performing the DMA Controller 1 base register test next.
62	The DMA controller 1 base register test passed. Performing the DMA controller 2 base register test next.
65	The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
66	Completed programming DMA controllers 1 and 2. Initializing the 8259 interrupt controller next.
7F	Extended NMI source enabling is in progress.
80	The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next.
81	A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
82	The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next.
83	The command byte was written and global data initialization has been completed. Checking for a locked key next.
84	Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data next.
85	The memory size check is done. Displaying a soft error and checking for a password or bypassing WINBIOS Setup next.
86	The password was checked. Performing any required programming before WINBIOS Setup next.

Check Point	Description
87	The programming before WINBIOS Setup has been completed. Uncompressing the WINBIOS Setup code and executing the AMIBIOS Setup or WINBIOS Setup utility next.
88	Returned from WINBIOS Setup and cleared the screen. Performing any necessary programming after WINBIOS Setup next.
89	The programming after WINBIOS Setup has been completed. Displaying the power-on screen message next.
8B	The first screen message has been displayed. The <WAIT...> message is displayed. Performing the PS/2 mouse check and extended BIOS data area allocation check next.
8C	Programming the WINBIOS Setup options next.
8D	The WINBIOS Setup options are programmed. Resetting the hard disk controller next.
8F	The hard disk controller has been reset. Configuring the floppy drive controller next.
91	The floppy drive controller has been configured. Configuring the hard disk drive controller next.
95	Initializing the bus option ROMs from C800 next.
96	Initializing before passing control to the adaptor ROM at C800.
97	Initialization before the C800 adaptor ROM gains control has been completed. The adaptor ROM check is next.
98	The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control.

Check Point	Description
99	Any initialization required after the option ROM test has been completed. Configuring the timer data area and printer base address next.
9A	Set the timer and printer base addresses. Setting the RS-232 base address next.
9B	Returned after setting the RS-232 base address. Performing any required initialization before the Coprocessor test next.
9C	Required initialization before the Coprocessor test is over. Initializing the Coprocessor next.
9D	Coprocessor initialized. Performing any required initialization after the Coprocessor test next.
9E	Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command next.
A2	Displaying any soft errors next.
A3	The soft error display has completed. Setting the keyboard typematic rate next.
A4	The keyboard typematic rate is set. Programming the memory wait states next.
A5	Memory wait state programming is over. Clearing the screen and enabling parity and the NMI next.
A7	NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000 next.
A8	Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h next.

Check Point	Description
A9	Returned from adaptor ROM at E000h control. Next, performing any initialization required after the E000 option ROM had control.
AA	Initialization after E000 option ROM control has completed. Displaying the system configuration next.
AB	Building the multiprocessor table, if necessary. POST next.
B0	The system configuration is displayed.
AC	Uncompressing the DMI data and initializing DMI.
B1	Copying any code to specific areas.
D0h	The NMI is disabled. Power on delay is starting. Next, the initialization cade checksum will be verified.
D1h	Initializing the DMA controller. Performing the keyboard controller BAT test. Starting memory refresh, and entering 4 GB flat mode next.
D3h	Starting memory sizing next.
D4h	Returning to real mode. Executing any OEM patches and setting the stack next.
D5h	Passing control to the uncompressed code in shadow RAM at E000:0000h. The initialization code is copied to segment 0 and control will be transferred to segment 0.
D6h	Control is in segment 0. Next, checking if <Ctrl><Home>was pressed and verifying the system BIOS checksum. If either <Ctrl><Home> was pressed or the system BIOS checksum is bad, next the system will go to checkpoint code E0h. Otherwise, going to checkpoint code D7h.

Notes

Appendix C

List of Figures

The following is a list of the figures in this manual and the page numbers they appear on.

Notes

Appendix D

System Specifications

Processors

Up to four Intel Pentium III/II Xeon 400-700 MHz CPUs with a 100 MHz FSB in 1, 2, 3 or 4 way configurations

Memory Capacity

MEC (Memory Expansion Card) with 16 DIMM slots to support a maximum of 16 GB SDRAM

DIMM Sizes

128MB/256MB/512MB/1GB/ SDRAM modules supported

SCSI Controller

Adaptec AIC-7899 for Ultra160 SCSI drives

SCSI Backplane Controller

QLogic GEM354 controller for two SAF-TE compliant SCA backplanes

SCSI Drive Bays

Two drive bays housing a maximum of 10 standard **1" 80-pin** SCA SCSI drives

Peripheral Bays

2 x 3.5" and 3 x 5.25" (open bay)

PCI Expansion Slots

Two 64-bit/66 MHz, four 64/32-bit/33 MHz and two 32-bit slots.

Power Supply

Type: 3 x 350W triple redundant, hot-plug units with +3.3V, +5V, +12V, -5V and -12V main DC outputs and a 5V standby output.
Input Voltage: 120V or 230V (units are autoswitching capable)
Fans: Each unit has one 80 mm ball bearing fan
Operating Temperature Range: 10 to 40 degrees C
Humidity Range: 5-90%, non-condensing
Safety Regulations: UL 1950, CUL, TUV
EMI: FCC Class A, CISPR 22 Class A

Cooling Fans

System: Eight (four redundant) 9-cm, hot-plug ball bearing fans
Exhaust: Two 12-cm ball bearing fans
Onboard Fan Headers: Four CPU, four chassis and two overheat headers; max. current = .035 amps/ea. or 1.2 amps/set of four

Form Factor: SWTX tower

Dimensions: 14.9 x 19.9 x 22.8 in.; 380 x 505 x 580 mm (W x H x D)

Weight: ~84 lbs. (38 kg.), depending upon configuration

Regulations: Class A, CE, UL, TUV