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AQUANTA™

QS/6 and QS/6U Series Hardware Installation and User's Guide

Aquanta QS/6 and QS/6U
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UNISYS

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About This Guide

The *Aquanta QS/6 and QS/6U Series Hardware Installation and User's Guide* tells you how to plan, install, start, and upgrade your system.

Topics discussed in this section are:

- Scope
- Who should use this guide
- Organization
- Conventions used in this manual
- Related product information

Note: *Quick-start installation procedures begin in Section 3.*

Scope

This manual focuses on hardware-related topics such as: how to upgrade system memory, install feature boards, and connect peripheral equipment (monitors, printers, and so forth). This guide does not cover software installation. If you did not receive a system with preinstalled software, see the software installation instructions that arrived with your software package.

Who Should Use This Guide

Whether you are installing a server for the first time or the twentieth time, you will find this guide a valuable tool. System configurations and options vary widely, and some of the information in this guide may be unnecessary for your initial installation but useful as a reference in case you ever need to add, remove, or replace system components.

You do not need to be an expert, but you should be able to handle common tools like screwdrivers. This guide assumes that you know how to perform basic tasks such as inserting media.

Organization

The *Installation and Owner's Guide* is organized as follows:

Section 1. Site Preparation

This section outlines site requirements and restrictions, unpacking procedures, and safety instructions.

Section 2. About Your System

This section introduces the system. It provides information on system features, controls, and indicators.

Section 3. Getting Started

This section explains how to set up your system. It includes discussions of how to plan your system and connect the monitor, keyboard, and other peripherals to your system unit. Section 3 also provides instructions for plugging in and turning on your system.

Section 4. Configuring Your System

This section describes how to use the BIOS Setup Utility to configure your system. It also includes information about the System Configuration Utility (SCU).

Section 5. dLux Command Display

This section describes the function of the LCD display, and describes messages that can be displayed.

Section 6. Troubleshooting Your System

This section outlines the basics of system troubleshooting. It focuses on the Power-On Self -Test (POST) and common installation problems.

Section 7. Upgrading Your System

This section explains how to install system upgrades, such as system memory, feature boards, internal drives, and SCSI drives.

Appendix A. System Specifications

This appendix provides power, electrical, mechanical, and climatic specifications for your system. This information is crucial to the server planning process.

Appendix B. Drive Types

This appendix provides information such as the number of cylinders, heads, and sectors for each type of disk drive.

Conventions

To simplify discussion, this manual uses the following conventions:

- The terms “server” and “system” are used interchangeably.
- Unless otherwise stated, all directional references are oriented as though you are looking at the front of the equipment. Thus, “left” means “toward the left side as viewed from the front of the device.”
- Keys that you press or characters that you type are shown in bold, for example:

  ENTER

- Keys that you press simultaneously are shown as follows:

  CTRL+ALT+DELETE

- Numbered paragraphs describe step-by-step instructions. Bulleted paragraphs list items that do not follow a particular order.
- Safety warnings and other vital information appear like the statement below:

WARNING

Do not insert any metal objects into the chassis frame.

Related Product Information

The following documents are useful when installing and upgrading your system:

Aquanta QS/6 and QS/6U Series System Map

The system map describes your system as it was shipped from the factory. The map lists all drives and feature boards installed in your system, and defines your memory configuration. If you reconfigure your system, be sure to record all changes on the system map so that you will have an accurate record of your hardware.

System Component Documentation

Some preinstalled hardware components, such as the SCSI controller board and the video board, have their own documentation. To configure those components, see their documentation.

EISA Configuration Utility User's Guide

This guide explains how to use and operate the System Configuration Utility (SCU), a software tool designed specifically to configure EISA and ISA feature boards in EISA-based systems. For more information on the SCU and system configuration in general, see Section 4.

Section 1
Site Preparation

This section describes how to set up your system. The topics discussed are:

- Where to place your equipment
- Unpacking and inspection
- Safety instructions

Where to Place Your Equipment

For your equipment to function correctly, its immediate surroundings must comply with certain power, electrical, mechanical, and climatic specifications. Follow the guidelines listed below when preparing a site for your system:

- Prepare a flat, hard surface for your computer. Allow at least 3 inches at the rear of the chassis for cabling and free air circulation.
- Keep the computer shielded from extremes in temperature and humidity. Avoid direct sunlight, heater ducts, and other hot areas. Make sure the room you choose meets the environmental specifications listed in Appendix A. For example, make sure the room you choose does not heat up in excess of the specified limits.
- You should invest in a 3-prong, 115-volt ac surge control outlet station. The system requires only one outlet; however, future expansion is easier if other outlets are readily available. A surge control station is recommended for protection against ac line spikes.
- Keep your system away from equipment that generates magnetic fields. Even a telephone placed too close to the computer can interfere with it.

Unpacking and Inspection

When you receive the system, it is packed on its side with the wheels off the floor. Before getting started, you need to unpack and inspect the system as follows:

> **WARNING**
>
> **The server is heavy and is on an outward-sloping ramp. We strongly recommend that you have a second person help you tilt the carton and maneuver the system out of the box.**

1. Tilt the box containing the system so the wheels rest on the floor. The system will then slide down the ramp and out of the carton.

Note: *Keep the product carton and packaging in case you have to send the system out for repair, or ship it elsewhere. If your system is returned to Unisys in different packaging, your warranty may be void.*

2. Inspect the system for shipping damage. Please take a moment to fill out the Arrival Quality Report cards that come with your equipment.
3. If you receive a damaged system, call your sales or Hotline representative. If the damages result from shipper mishandling, you also need to file a claim against the carrier who delivered the equipment. In this case, save *all* shipping material and *immediately* contact the shipping firm for information on how to file a claim.
4. Check the packing list to verify that all equipment and associated manuals are included in your shipment.

Note: *Be sure to record the numbers of the keys that are provided with the system unit. You will need to provide the key number if you ever lose a key.*

Important Safety Instructions

The following guidelines should be observed when performing any work on your system:

1. Follow all instructions marked on the product and in the documentation.
2. Unplug the system from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
3. Do not use this system near water. Never spill liquid on the system.
4. Do not place this system on an unstable cart, stand, or table.
5. Openings in the cabinet are provided for ventilation. Do not block or cover these openings. Never place this product near or over a radiator or heat register.
6. Use only the power source indicated on the label. If you are not sure of the type of power available, consult your dealer or local power company.
7. This product is equipped with a 3-wire grounding plug. For your safety, this plug will only fit into a grounded power outlet. If you are unable to insert the plug into the outlet, contact an electrician to replace the outlet.
8. Do not walk on the power cord or allow anything to rest on it.
9. If using an extension cord with this system, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating. Also, the total of all products plugged into the wall outlet must not exceed 15 amperes.
10. Never push objects of any kind into the product through the cabinet slots.
11. Do not attempt to service this product yourself. Adjust only those controls described in the documentation. Opening covers that are marked **Do Not Remove** may expose you to dangerous voltage levels or other risks.

12. If any condition listed below exists, unplug the drawer from the outlet and refer servicing to qualified personnel:
    - The power cord or plug is damaged.
    - Liquid spilled into the system.
    - The system does not operate properly.
    - The system was dropped or the cabinet is damaged.
    - The system exhibits a distinct change in performance.

Section 2
About Your System

This section describes hardware components that make up your system. The topics discussed are:

- System features
- Standard system components
- Optional system components
- Basic architecture
- Front panel features and indicators
- Rear panel features and indicators
- RAID levels
- Power supplies
- System board
- Memory board
- Where to go from here

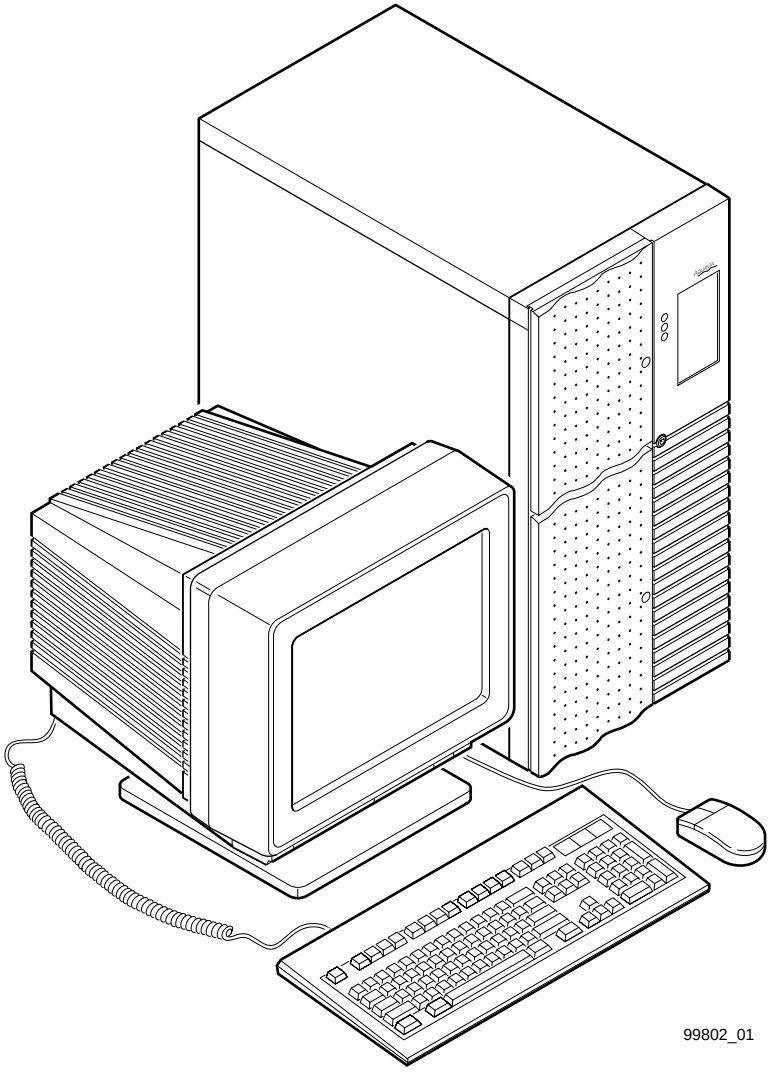
System Features

Aquanta QS/6 and QS/6U Series systems are high-performance servers that provide a wide range of user-configurable options.

Your system has up to 48 GB of hard disk drive storage (for use with a fast/wide SCSI controller or RAID controller card), a floppy disk drive, one 3.5-inch expansion bay, and eleven 5.25-inch expansion bays.

Your workstation consists of the system unit and peripherals such as the monitor, mouse, and keyboard. Figure 2–1 shows a typical system.

Figure 2–1. A Typical System



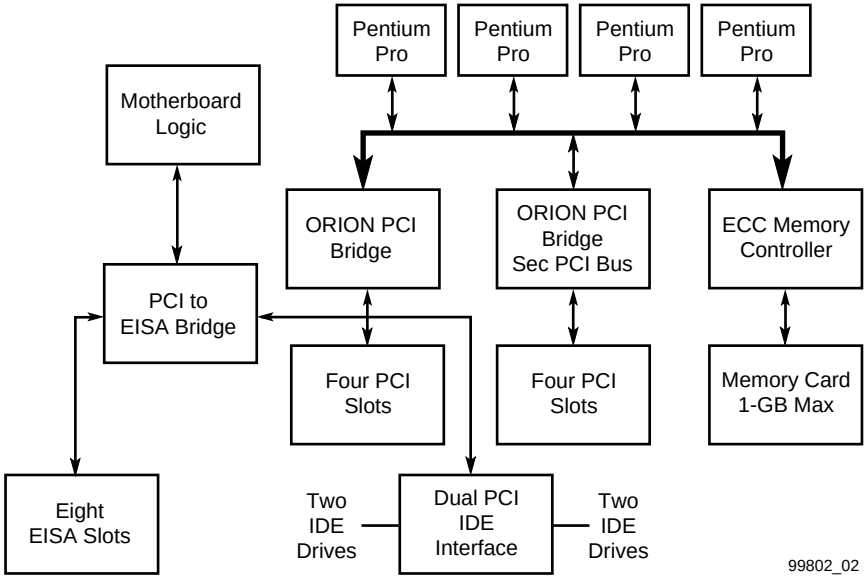
System Architecture

The system has an EISA\PCI-based bus which supports up to four high-speed Pentium Pro microprocessors. Up to 2 GB of Error Control Code (ECC) RAM memory may be installed.

The main board contains the CPUs, and the logic circuitry needed to drive the EISA bus, the PCI bus, and the I/O bus. It also contains the PCI IDE controller, the battery-backed CMOS clock chip, and the flash EPROM BIOS chip.

Figure 2–2 shows how the system components interact.

Figure 2–2. System Architecture



Your system incorporates a wide range of features, from upgradeable system memory to user-installable internal drives. It comes with a base configuration plus a wide range of optional items depending on what you ordered.

Standard System Components

The Aquanta QS/6 and QS/6U system comes standard with the following:

- System board with up to four CPUs, seven PCI slots, one shared PCI/EISA slot, and seven EISA slots
- Memory board with up to 2 GB of RAM and Error Control Code (ECC) circuitry
- LCD display of system information and operation
- Dual power supplies with load share module
- Triple cooling fans for feature cards
- One two-mode floppy disk drive supporting 1.44 MB and 720 KB floppy disks
- Hot-swappable-drive bays with cooling fans

To upgrade the CPU speed, the CPU is replaced with a higher-speed CPU. Always use CPUs of the same speed on a system.

The mass storage devices (SCSI hard disk drives, RAID drives, and so on) are purchased separately to meet the needs of the individual customer.

Optional System Features

This system can be upgraded to include:

- Up to four CPUs
- SCSI hard disk drives or other SCSI peripherals
- Hot-swappable hard disk drives
- CD-ROM drives
- VGA video card
- PCI/EISA adapter card

Symmetrical Multi-Processing

Symmetrical Multi-Processing (SMP) enables all CPUs in the system to service interrupts, access system memory, and perform I/O operations. In other words, all CPUs in the system work together to run the programs. Also, all CPUs in the drawer run the same instance of your operating system, not a different instance of an operating system per CPU. The Aquanta QS/6 and QS/6U architecture is based on Intel SMP Specification 1.4.

The following operating systems support SMP:

- Microsoft Windows NT Server
- SCO UNIX 3.2.4.2 with MPX 3.0 or SCO Release 5
- UnixWare 2.1
- Novell NetWare SMP

The actual performance from an SMP computer is dependent on many factors, not just the quantity of CPUs. The speed of the hard drives, the size and speed of system RAM, the size of cache RAM on each CPU, the speed of each CPU, and how well the mix of operations performed by the computer work in parallel all affect the overall performance.

If your operating system does not support SMP, the system adjusts the processing mode to Asymmetrical, meaning only the first CPU accepts I/O interrupts.

Front Panel Features and Indicators

Your server features several switches and LEDs (Light Emitting D**iodes**) that let you manage system functions and keep track of device status.

You need to open the front panel doors to access some switches and LEDs. The doors are equipped with spring-loaded latches. To open the doors, push and release quickly; the latch will push the door open. To close the door, push gently until the latch clicks once.

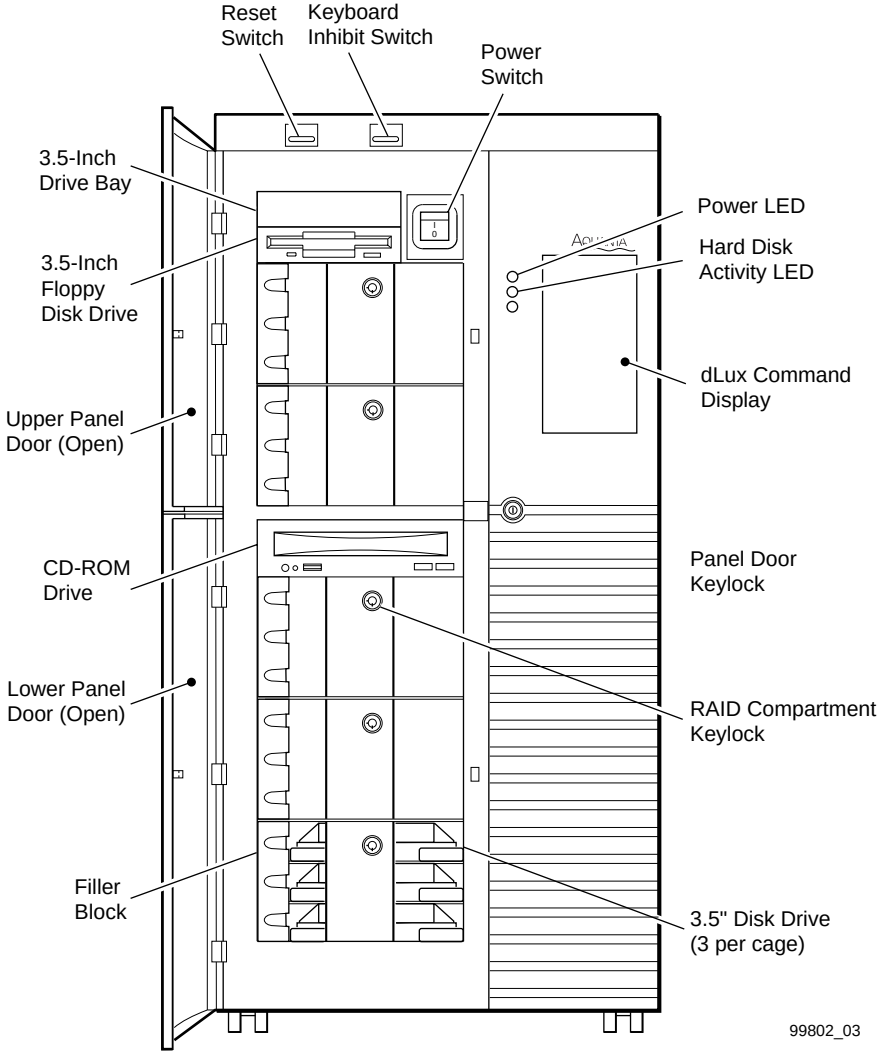
The upper door allows access to the power switch, 3.5-inch drives, and the top 5.25-inch drives; the lower door allows access to the bottom 5.25-inch drives.

Aquanta QS/6 and QS/6U systems are equipped with the following controls and indicators as shown in Figure 2–3.

Power switch	This switch enables and disables power for the system unit. When you turn on the system unit you will see the Power LED light and hear the fan start. If your monitor is plugged into the ac convenience outlet at the rear of the system unit, the power supply also cycles ac power to the monitor.
Reset switch	This switch reboots your system. When you press the Reset switch, the system unit runs a Power-On Self-Test (POST) and reloads the operating system. Use this switch whenever you need to reboot your system without turning off the power.
Keyboard Inhibit switch	This switch enables and disables the keyboard. Use this switch in conjunction with the front panel keylock to prevent unauthorized use of the system.
Power LED	This indicator lights when the server is turned on.
Hard Disk Activity LED	This indicator lights only when the hard disk is accessed.
Other LED	Not used.
dLux Command Display	This LCD panel accesses and monitors the following: •• System operation and information •• Fans •• Temperature •• Power supplies •• CPU and disk drive activity •• Fault displays This feature is described in detail in Section 5, “dLux Command Display.”

Panel Door Keylock	Use the keylock on the front of the system unit to lock the upper and lower panel doors.
RAID Compartment Keylocks	These keylocks provide security for SCSI drives installed in RAID Cages. The same key unlocks all RAID Cages.
Drive Bays	The system supports up to thirteen internal drives: two 3.5-inch and eleven 5.25-inch. All drive bays are designed for removable-media devices such as tape and floppy drives.

Figure 2–3. Front Panel Features



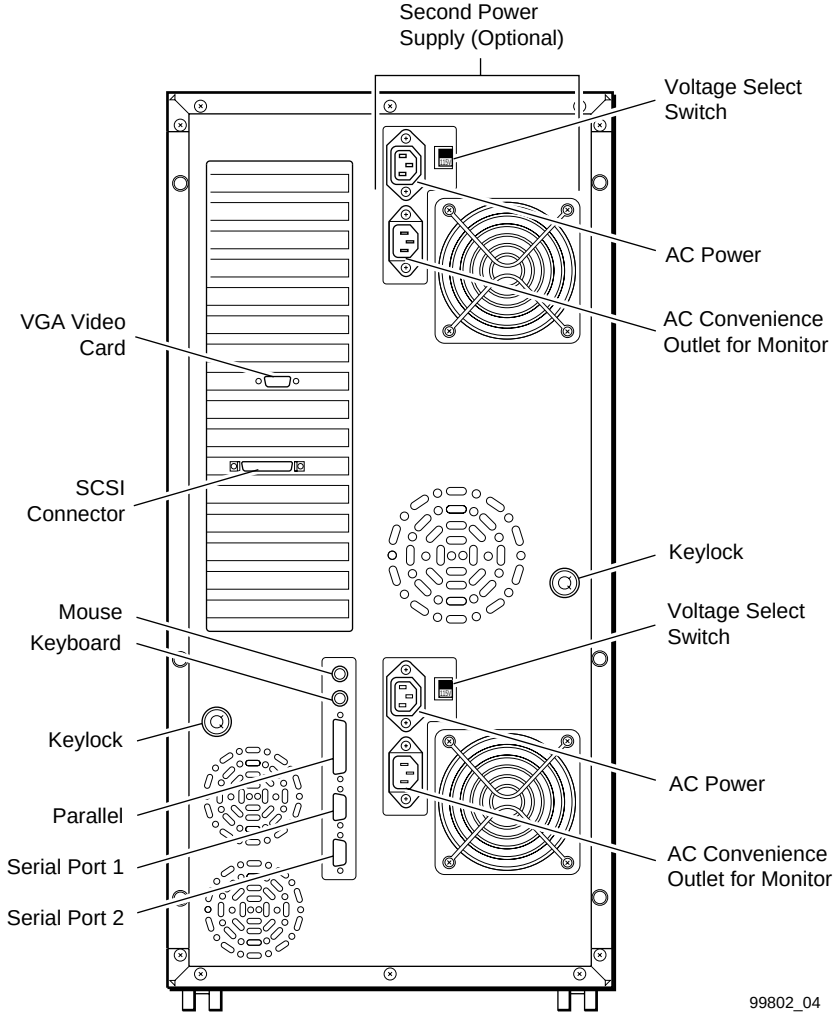
Rear Panel Features and Connectors

The rear panel is equipped with I/O ports, connectors, and switches as illustrated in Figure 2–4 and explained below.

Serial Port 1	This is a high-speed serial port which uses the First-In-First-Out (FIFO) protocol. If you have a serial mouse, connect it to this port. Other serial devices such as serial printers or modems can also be connected to this port.
Serial Port 2	This is a high-speed serial port which uses the First-In-First-Out (FIFO) protocol. Serial devices such as serial printers or modems can be connected to this port.
Parallel Port	Parallel devices such as parallel printers or scanners can be connected to this port.
Mouse Port	This port supports any mouse with a miniature circular DIN (mini-DIN) connector.
Keyboard Port	This port supports any keyboard with a miniature circular DIN (mini-DIN) connector.
Video Port	The location of this port depends on whether the video card is EISA or PCI, and what other cards are installed. A PCI video card should be installed in a primary PCI slot.
Memory Fault Reset Switch	This switch allows you to reset the system when a memory fault occurs.
Power Supply Alarm Reset Switch	In the event of a power supply failure, pressing this switch turns off the alarm signal and resets the power supply.

AC Power (2)	There are two ac power sockets on the SFE system rear panel. One connects directly into the standard power supply. The second socket is designated for the optional redundant power supply. The system has one ac power socket that connects to the standard power supply.
AC Convenience Outlet (2)	These are used to connect monitors to the server.

Figure 2–4. Rear Panel Features



About RAID

RAID, or a Redundant Array of Inexpensive Disks, is a storage capacity-efficient, high-performance method of storing data redundantly. The Aquanta QS/6 and QS/6U system supports numerous RAID configurations.

This system supports up to five RAID Cages each of which can hold up to three SCSI drives. The drives you ordered are preconfigured and installed in the system. However, if you need to install and configure additional drives, see Section 7, "Upgrading Your System."

The exact capabilities of the drives depend on the capabilities designed into the controller card. When used with one of the recommended SCSI controller cards, your system will be capable of implementing several RAID levels 0, 1, 5, 10, and 30. Refer to the RAID manuals for details of RAID operation.

The minimum number of hard drives that can be installed is one. This single drive will function properly but without the safety benefits of RAID (no data redundancy to safeguard your data in the event of a failure).

- For the highest performance, we recommend RAID level 0.

  This level requires one or more drives.

  At this level, the system writes data across multiple disk drives. This approach, known as disk striping, delivers very high performance with no disk overhead allocated for fault-tolerant redundant data storage. However, without that built-in redundancy, there is a risk of data loss if an array disk goes down. Storage capacity is maximized, because all disks in the array are devoted to data striping.

- For the best security, we recommend RAID level 1.

  This level requires two drives.

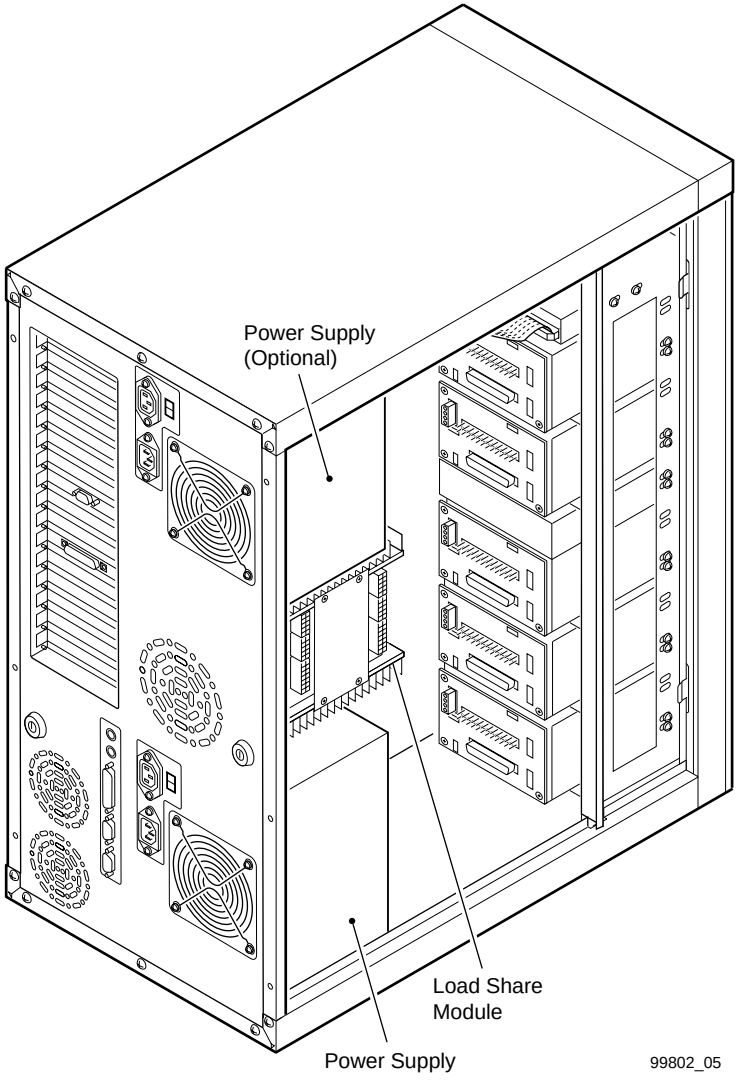
Each disk in a mirrored pair contains an exact copy of the data on its companion drive.

This system comes standard with a 575-Watt power supply providing the necessary voltage for the system's logic (electronic components) as well as storage media such as disks, tape drives, and CD-ROMs.

The SFE model has an additional 575-Watt power supply, and is also equipped with a load share module that regulates power so the load is evenly distributed between the two power supplies. If one power supply fails, the system continues uninterrupted operation. The load share module also provides fault information on the power supply. If either power supply fails, the module triggers audible and visual alarms.

Figure 2–5 shows the power supplies and load share module in the SFE system.

Figure 2–5. Power Supplies and Load Share Module in the SFE System



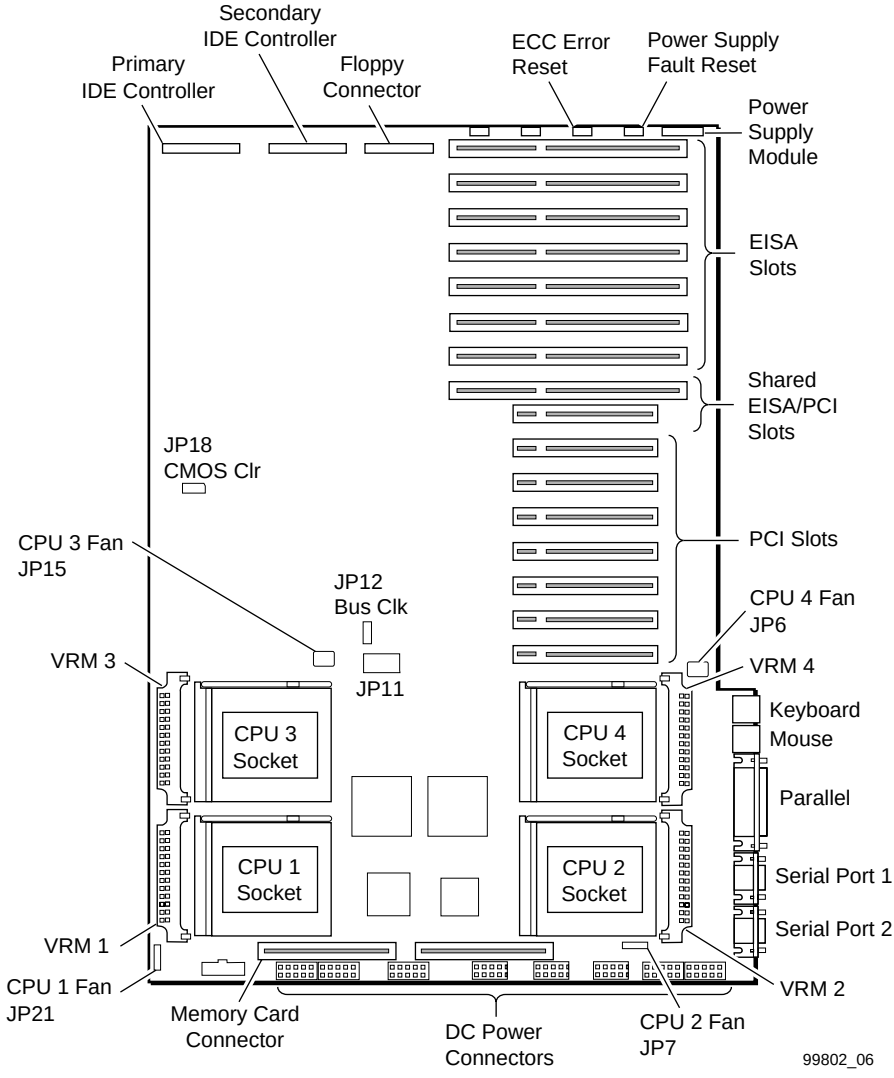
System Board

The system board is the main component of the computer system, and acts as the primary interface between the CPUs, memory, and peripherals. It accommodates up to four Pentium Pro processors for a high-performance, symmetrical, multi-processing design.

The system board has seven EISA slots, one shared EISA/PCI slot, and seven PCI slots. It also supports two serial ports, one parallel port, one floppy controller, and two PCI IDE channels for up to four IDE devices.

Figure 2–6 shows a system board.

Figure 2–6. System Board



Processors (CPUs)

The system board accommodates up to four Pentium Pro processors ranging from 2.1 to 3.5 Volts. A Voltage Regulator Module (VRM) circuit controls the required core voltage of the processor. Each CPU requires a fansink to cool it to a safe operating temperature.

The Pentium Pro processors supported have internal speeds of 166 and 200 MHz. Internal speeds are derived as shown in Table 2–1.

Table 2–1. CPU Processing Speeds

Processing Speed	Derived By
166 MHz	66 MHz external bus x 2.5
200 MHz	66 MHz external bus x 3.0

See Section 7 for more information on selecting CPU speed.

Memory Board

The memory board occupies a proprietary slot on the system board. It provides sixteen 72-pin, 5.0 Volt SIMM sockets for memory expansion. The sockets support the following single- or double-sided SIMM modules:

- 1 M x 36 (4 MB)
- 2 M x 36 (8 MB)
- 4 M x 36 (16 MB)
- 8 M x 36 (32 MB)
- 16 M x 36 (64 MB)

Up to 2 GB of Error Control Code (ECC) memory may be installed in the interleaved 64-bit banks. Eight identical SIMMs must be installed in each occupied bank (A - D Odd and Even). Each bank has a dedicated LED to indicate memory fault. Memory faults are communicated through LCD panel flashes and beeps (see Section 6, “Troubleshooting Your System”).

Note: *Use only Unisys-approved tin-plated SIMMs on your system memory board.*

For a specific interleave support, all populated SIMM sockets must use the same memory size. If memory sizes are mixed within an interleave, system performance is significantly degraded the memory controller defaults to no interleave or to the next lower interleave level. The system BIOS automatically detects memory size and type.

Error Control Code (ECC)

ECC is a powerful feature designed to detect memory errors as they occur and correct them without interrupting system operation.

Two types of memory errors can be generated:

- Correctable errors occur when a single bit (out of 64 bits) has failed. The RAM indicator on the LCD panel flashes and beeps, but the system continues operation.
- Non-correctable errors occur when more than one bit (out of 64 bits) has failed. The RAM indicator on the LCD panel flashes, and the system stops operation. A parity error may be reported.

For procedures to recover from these errors, see Section 6, “Troubleshooting Your System.”

Where to Go From Here

You have now been introduced to the features and controls of your system. The next section describes how to set up your system.

Section 3
Setting Up Your System

This section provides the following information:

- Connecting the monitor and keyboard
- Connecting optional peripherals
- Setting the system voltage
- Powering on the system
- Loading an operating system
- If you have preinstalled software
- Installing software
- Backing up your system
- Installing the online manual

Before You Begin

This section assumes that you have followed site preparation, unpacking, and safety instructions provided in Section 1, “Site Preparation.” It also assumes some familiarity with system architecture, features, and components described in Section 2, “About Your System.”

Connecting the Monitor and Keyboard

Your system peripherals connect to receptacles on the rear panel (Figure 2-4).

To connect the keyboard and optional monitor to their respective I/O ports with properly shielded cables:

1. Plug the keyboard into the keyboard port.
2. Connect the monitor's video cable to the video adapter. The location of the port may vary depending on the type of video card installed in your system.
3. Connect the monitor power cable to the ac-out power connector on the system's power supply.

Note: *You do not have to use the system's ac-out power source. If you do, your monitor is powered on and off with the system's power.*

As an alternative, you can plug the monitor power cable into the wall outlet.

4. Connect the system's power cable to the ac-in power socket on the system's power supply.

Note*: Make sure that both the ac voltage selection switches (see Figure 2–4) are set for the wall voltage (115 or 230 volts).*

5. Connect the other end of the system power cable to an ac outlet.

Connecting Optional Peripherals

All of your server peripherals are cabled to the receptacles at the rear of the system unit. Notice that SFE systems (shown in Figure 2–4) have an extra ac power outlet, voltage selection switch, and ac convenience outlet.

Caution

To reduce Radio-Frequency Interference (RFI), use shielded cables for RS-232C connections and peripheral device connections. All cables provided by Unisys meet these requirements.

The following ports may be used for connecting optional peripherals.

- **Serial Port 1** - a high-speed serial port which uses the First-In-First-Out (FIFO) protocol. If you have a serial mouse, it connects to this port. Other serial devices such as serial printers or modems can also be connected to this port.

Note: *If you have a PS/2 mouse, you must use the Mouse Port described below.*

- **Serial Port 2** - a high-speed serial port which uses the First-In-First-Out (FIFO) protocol. Serial devices such as serial printers or modems can be connected to this port.
- **Parallel Port** - Supports parallel devices such as parallel printers or scanners.
- **Mouse Port** - supports a PS/2-style mouse.
- **Keyboard Port** - Supports a PS/2-style keyboard.

Setting the System Voltage

Wall voltage is supplied at two levels: 115 volts and 230 volts (ac).

Your system unit supports both input voltage ranges through two manual voltage selection switches, one for each power supply. These switches are preset at the factory for 115-volt or 230-volt operation. Make sure the settings match the wall voltage used in your country. For the location of the voltage selection switches, see Figure 2–4.

To change the setting, remove the yellow labels that cover the voltage selection switches. Set the switches to “115” or “230,” as appropriate. Also, verify that all peripherals attached to the system unit are set to the correct wall voltage.

Powering On the System

After setting the system voltage, you can plug in and start your system by completing this sequence:

1. Make sure that all power switches are turned off.
2. Connect one end of the system unit power cable to the power receptacle at the rear of the unit. Plug the other end into the wall socket.

3. If the monitor power supply is not connected to the system ac-out power source, power on your monitor manually.
4. If you have any other devices, plug each one into an outlet.
5. After connecting all equipment to power sources, turn on your system by pressing the power On/Off switch on the front panel. Rock the switch up (**I**) to power the system on; rock the switch down (**0**) to power the system off. The green LED on the front panel will light up.

The system self-checks the memory even if the monitor is not connected. If the monitor is connected and powered ON, the screen will display the power-up sequence.

If the system detects a memory error, the RAM button on the LCD panel flashes. If this condition occurs, refer to "Error Control Code (ECC)" in Section 6.

If more than one CPU is installed, the system will display which CPU it is currently testing.

If any errors are encountered, your system will display them on the monitor.

Note: *If you turn your system off, wait at least ten seconds before turning it back on.*

If you encounter an error, it will most likely be a nonfatal one. Under most conditions, the system will continue to function until the error is corrected (usually through the BIOS Setup as described in Section 4, "Configuring Your System"). If a fatal error occurs, contact your Unisys Customer Service Engineer.

If You Have Preinstalled Software

For servers with preinstalled software, the system attempts to load the software when you first turn on the system. If the system does not indicate that it has loaded the software, verify that you completed all hardware installation procedures correctly and that all connections are firmly in place.

For servers that are otherwise operational, reinstall the system software by following the installation procedures in the documentation supplied with these products. If the system does not appear to be working, follow the troubleshooting instructions in Section 6, "Troubleshooting Your System."

After the self tests are run, the system attempts to boot (load an operating system). This requires a hard disk (with software loaded) or a bootable floppy disk.

If you have added your own drive, you may have to format it and run the BIOS Setup before the system can boot, see Section 4, "Configuring Your System."

The following operating systems are supported:

- SCO UNIX 3.2.4.2
- SCO UNIX ODT 3.0
- SCO UNIX Open Server 5.0
- UnixWare 2.1
- Windows NT Advanced Server 3.1, 3.5
- Novell NetWare 3.1x, 4.x, and 4.1 SMP

Notes for Windows NT users:

- *Users installing Windows NT must follow special procedures so that Windows NT can detect more than two processors (in its standard configuration, a maximum of two processors are detected).*
- *When running under Windows NT 3.51, and first printing to the serial port, do not use the default COM port setting, but follow this sequence:*

  1. *From the Control Panel, click on Ports and Settings.*
  2. *Click on Advanced, and select the COM Port and Base I/O Port Address.*

  The printer configuration procedure is now complete, and subsequent print commands will automatically access the selected COM port.

Because each operating system operates differently, refer to the operating system documentation for specific instructions on what to do after the system boots.

Installing Software

If everything is working properly and your system did *not* come with preinstalled software, install your software in the following order:

1. Install the operating system software. This software includes the operating system and basic utilities.
2. Install device drivers. Device drivers are programs used for communications between the system unit and peripherals, for example, between the system and the video monitor. To install device drivers, use the driver installation floppy disks that came with your system. Your system provides device drivers for the video board, CD-ROM drive, and SCSI controller. See the documentation for each of those hardware components for information on installing device drivers.

   If you have an SFE system and you want to configure a RAID array, see the RAID user manuals for information.
3. Install your application software. These are the programs used to do your daily work, for example, word processing or spreadsheet applications.

Backing Up Your System

After you have your system set up, it is a good idea to back up your system files in case you experience drive problems. Many backup utilities are available for this purpose.

In addition, consider creating backup copies of your original system disks.

To back up your original system disks using MS-DOS:

1. From the DOS prompt, type

   ```
   C:>DISKCOPY A: A:
   ```
2. Insert the first disk, then press **Enter**.
3. Replace the source disk with the blank backup disk when prompted.

If you have a different operating system, see your operating system documentation.

Where to Go From Here

You have now finished installing your system hardware.

- To review your system configuration using the BIOS Setup utility, see Section 4, “Configuring Your System.”
- If you encountered any problems when you started your system, see Section 6, “Troubleshooting Your System” for information on system troubleshooting.

If you need to install internal hardware, such as drives or feature boards, see Section 7, “Upgrading Your System.”

Section 4
Configuring Your System

This section discusses additional tasks that you may need to perform before using your system. You may also need to perform some of these tasks later on; for example, you'll need to run the BIOS Setup utility any time you change your system hardware configuration.

The BIOS Setup is a factory-installed program in the BIOS chip on the system board. This program stores information about your system configuration as well as the different types of devices installed. The BIOS Setup program also allows you to customize your system configuration.

This section discusses the following topics:

- Rebooting the system
- BIOS Setup utility
- Updating the Flash BIOS EPROM
- System Configuration Utility (SCU)

Rebooting the System

When you configure your system components, you sometimes need to reboot (restart) the system for the changes you made to take effect.

Every time you restart your system, it conducts a short Power-On Self-Test (POST) to test the system memory, system board, video controller, floppy disk drives, hard disk drives, drive controllers, and peripheral devices. While the POST is running, it displays information about your system configuration.

BIOS Setup Utility

Your system stores information about the system unit and attached devices in CMOS memory. This information is used by a special type of software called a *BIOS* (Basic Input/Output System). Every time you turn on your system, the BIOS reads the CMOS-stored settings and instructs the CPU and other hardware in your system to operate according to these values.

For example, the CMOS memory contains information on which type of video monitor is installed, which type of floppy disk drive is being used as Drive A, which feature boards are installed, and so forth. The settings stored in CMOS memory are determined, in part, by the System Configuration Utility (SCU) and, in part, by the BIOS Setup utility.

Before your system leaves the factory, the basis of your hardware configuration is loaded into CMOS memory using the BIOS Setup utility. The values loaded by the BIOS Setup utility pertain to functions managed by the system board (keyboard and serial port, for example). The values loaded by the SCU include those pertaining to feature boards. Unisys runs the BIOS Setup utility and the SCU prior to shipment. Therefore, you usually do not need to run either of them when you first install your system.

The following information describes how to alter the system configuration information using the BIOS Setup Utility. Refer to "System Configuration Utility (SCU)" later in this section for information on using the SCU.

When to Run the BIOS Setup Utility

You run the BIOS Setup utility for the following reasons:

- To change the date and time on your system.
- To enter IDE hard drive parameters.
- To change the display type (for example, VGA to SVGA).
- To change the password or security features.
- To implement configuration changes; for example, if you add a hard disk or memory. If you don't run Setup after adding or changing components, the system will halt and prompt you to run Setup.
- To customize your system. Your system may be operational, but you may want to run Setup to take advantage of some of its options, for example, to turn off the **NUM LOCK** key at startup.

- To change the memory size or configuration.
- To configure the PCI adapter card features.
- If you lose CMOS memory; this is an uncommon situation, but it can happen. Therefore, it is a good idea to write down the Setup options in case you need to restore them if you lose the CMOS information.

Note: *Some configuration options need to be specified through the System Configuration Utility (SCU), not using Setup. For more information on the SCU, see the discussion about the SCU later in this section and the EISA Configuration Utility User's Guide. If you need to change an option that is not included in Setup, check the system map that came with your system to see if the option can be set by running the SCU.*

Starting the BIOS Setup Utility

You can start the BIOS Setup utility in one of the following ways:

- Press **F2** to start Setup during the system boot process.
- If your system is already running, reboot the system. Then press **F2** to start Setup.
- If your system detects a configuration error during the boot process, the system halts and displays the following message:

  ```
  Press F2 to run SETUP UTILITY
  Press <F1> to Continue
  ```

  To start Setup, Press **F2**.

You may be prompted to enter a password to start Setup. If so, type the password and press **Enter**.

Using BIOS Setup

You can use the following keys while running Setup:

Table 4–1. Key Mapping

Key	Description
ESC	Returns you to the previous menu
F10	Loads previous values into the Setup
F9	Loads default values into the Setup
F1	Gets Help
↑	Moves the cursor to the previous field
↓	Moves the cursor to the next field
← →	Move through the BIOS Setup menus
-/+	Change values of the selected parameter
ENTER	Selects submenu
>	If a parameter is preceded by >, press **ENTER** or **SPACEBAR** to display the options

BIOS Setup Menus

The BIOS Setup utility includes four menus described later in this section:

- **Main menu** — Use this menu to define the basic hardware configuration, system time and date, daylight savings time, floppy disk drive type, monitor type, and so forth. You also use the menu to review your system memory configuration and set the **NUM LOCK** key at bootup.
- **Advanced menu** — Use this menu to configure features like serial and parallel ports, drive controllers, and so forth.
- **Security menu** — Use this menu to define a system password, user password, and so forth.
- **Exit menu** — Use this menu to exit the BIOS Setup utility.

Once you select an option, the BIOS Setup utility generates appropriate menus and guides you through the configuration process. Each menu includes a list of keystrokes you can use.

Configuring Your System by Using BIOS Setup

Follow these general steps to configure your system using BIOS Setup:

1. Press **F2** during system bootup to run Setup.

   The Main menu is displayed (see Figure 4–1).

2. Verify that the configuration information displayed reflects your current configuration. Change any of the settings, as required.

3. Select *ADVANCED* near the top of the screen.

   Tip: You can also move through the Setup menus using the ← and → keys.

4. Check the configuration information and change any of the settings, as required.

   You can use the ↑ and ↓ keys to highlight any incorrect information. Use the **+** and **-** keys to change the highlighted parameters.

5. Select *SECURITY* near the top of the screen.

6. Check the configuration information and change any of the settings, as required.

7. When you have finished changing your system configuration using BIOS Setup, select *EXIT*.

8. Select one of the *EXIT* options by pressing the appropriate key.

Note: *To activate your configuration changes, you must save them and reboot the system*.

The following subsections describe many of the options on the BIOS Setup menus.

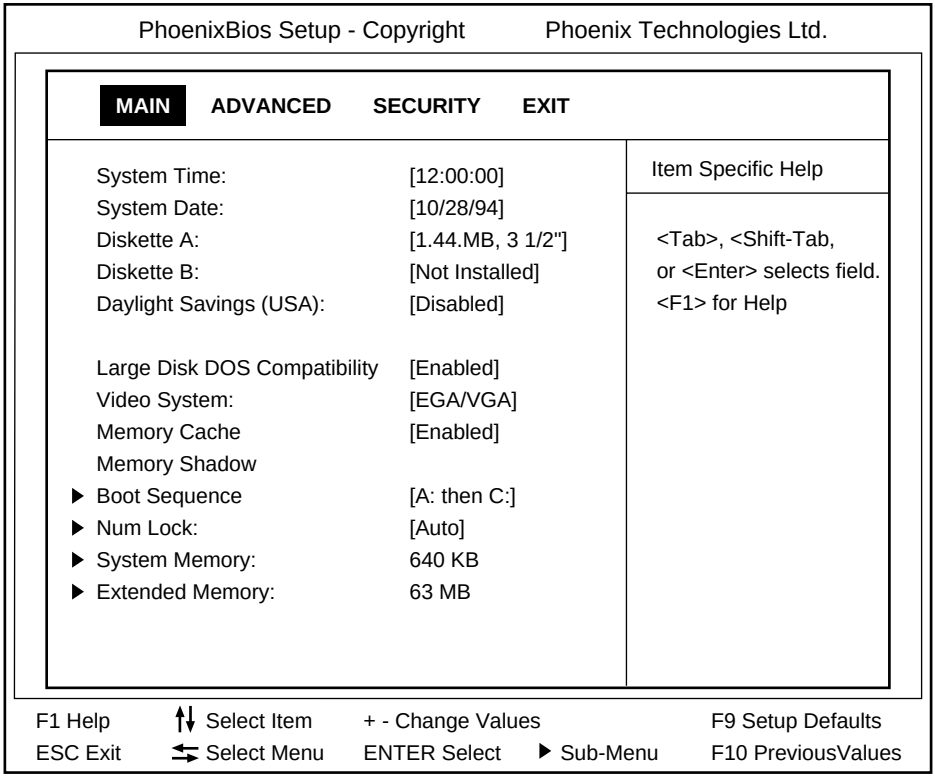
Main Menu

The Main menu shown in Figure 4–1, is first displayed when you run the BIOS Setup utility. Descriptions of menu options follow.

Caution

Setting values incorrectly through this menu may cause the system to malfunction.

Figure 4–1. BIOS Setup — Main Menu



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System Time

You set the time using a 24-hour clock. For example, to set the clock for 1:00 PM, enter **13:00**. The system clock keeps the date and time current even when the system is turned off.

System Date

Enter the correct date in the form mm/dd/yy.

We recommend that you set these fields, as many software packages require the correct time and date to operate correctly.

Diskette A, Diskette B

The *Diskette A* and *Diskette B* options define the type of floppy disk drive installed in your system. Your system supports the following floppy disk drives:

- 360 KB, 5.25-inch
- 1.2 MB, 5.25-inch
- 720 KB, 3.5-inch
- 1.44 MB and 2.88 MB, 3.5-inch

The default for diskette A is *3.5 inch, 1.44 MB*. The default for diskette B is *Not Installed*.

Note: *All supported drives are physically different. This means, for example, you can only set your floppy disk drive to a 2.88 MB, 3.5-inch drive if you have that type of drive installed.*

Daylight Savings (USA)

You can *Enable* or *Disable* (default setting) daylight savings time if you are in a region of the United States that observes daylight savings time. When enabled, your system automatically moves forward by one hour in the spring and backward by one hour in the fall.

IDE Adapter 0 Master/Slave and 1 Master/Slave

Use these fields to specify the physical and electronic properties of the IDE fixed disk drives installed in your system.

The options for this field are *None*, *Drive Types 1-39*, and *Autodetect*. For most drives, *Autodetect* will correctly determine the type of drive you have installed. If the drive you are installing is not shown, you can manually enter the drive specifications as described in your hard disk drive documentation.

The default setting for Fixed Disk 0 Type is *None*; the default setting for Fixed Disk 1 Type is also *None*.

Cylinders — The number of cylinders in your hard disk drive is directly related to its storage capacity. It refers to the number of tracks on each of the hard disks inside the drive. Refer to your hard disk drive documentation.

Heads — The device within the hard drive that actually reads and writes data to the disk. Larger and faster drives usually have more heads. Refer to your hard disk drive documentation.

Sectors/Track — A sector is a 512-byte block of data on one of the tracks of your hard drive. Larger drives generally have more sectors per track. Refer to your hard disk drive documentation.

Write Precomp — This drive parameter is either *Autodetected* or entered manually. Refer to your hard disk drive documentation.

Multi-Sector Transfers — Determines the number of sectors per block for multiple sector transfers. The options for this parameter are *2 sectors*, *4 sectors*, *8 sectors*, *16 sectors*, and *Disabled*.

LBA Mode Control — When *Enabled* (default setting), this option causes Logical Block Addressing (LBA) to be used in place of Cylinders, Heads, and Sectors. Options for this setting are *Enabled* and *Disabled*.

32-bit I/O — When *Enabled* (default setting), this parameter allows for a faster data transfer rate. Options for this setting are *Enabled* and *Disabled*.

Transfer Mode — Selects the method for moving data to and from the drive. The options for this field are *Standard* (default setting), *Fast PIO 1, Fast PIO 2, Fast PIO 3, or Fast PIO 4*. If you are not sure which option to select, use *Autodetect* to select the optimum transfer mode.

Large Disk DOS Compatibility

Enable this feature if you have a disk with more than 1024 cylinders. This feature works with DOS, OS/2 and Windows NT. You should disable this feature if you are running Novell or UNIX. The options are *Enabled* (default) and *Disabled*.

Video System

This option specifies the type of video card your system uses. The options are *Monochrome, CGA 80x25,* and *EGA/VGA* (default).

Memory Cache

This is normally *Enabled* (default setting). This feature enables and disables both internal and external cache. Disabling cache can severely degrade your system performance. This parameter is normally only used for troubleshooting speed-related problems. The options are *Enabled* and *Disabled*.

Cache System BIOS Area — places the code from the BIOS chip into RAM. It is similar to System Shadow. Options for this feature are *Uncached* and *Write Protect* (default).

Cache Video BIOS Area — places the code from the video chip into RAM. It is similar to Video Shadow. Options for this feature are *Uncached* and *Write Protect* (default).

Cache Base 0-512k — Controls caching of the 512 K base memory. Options for this feature are *Write Back* (default), *Write Through,* and *Uncached*.

Cache Base 512k-640k — Controls caching of the 512 K to 640 K base memory. Options for this feature are *Write Back* (default), *Write Through*, and *Uncached*.

Cache Extended Memory Area — Controls caching of the system memory above 1 MB. Options for this feature are *Write Back* (default), *Write Through,* and *Uncached*.

Cache Memory Regions — allows you to copy specific regions of memory into the high-speed RAM of the external cache, resulting in increased performance. Options for this feature are *Uncached* (default), *Write-Back, Write Protect*, *Write Through*, *Restricted Caching*, and *USWC Caching.*

Memory Shadow

System Shadow — This option is not configurable. It copies the contents of the BIOS chip into RAM for faster execution, increasing system performance.

Video Shadow — When *Enabled*, the contents of the BIOS chip on your video card will be copied into RAM. This allows faster execution and increased performance. Options for this feature are *Enabled* and *Disabled*; the default is *Enabled*.

Shadow Memory Region — allows specific memory addresses into RAM for faster execution. Options for this feature are *Enabled* and *Disabled* (default).

Boot Sequence (Options)

Boot Sequence — tells your system where to look for an operating system or system disk when it initially boots. The options are:

- *A: then C:* — This is the default. The system tries to boot from floppy disk drive A first. Should the boot attempt fail, the system then tries to boot from hard disk drive C.
- *C: then A:* — The system tries to boot from hard disk C first, and failing that, from floppy disk drive A.
- *C: Only* — The system will attempt to boot from hard drive C, and failing that, an error message is displayed.

Setup Prompt — When *Enabled* (default setting), the Setup prompt tells you to press **F2** to enter Setup during power-up. The options are *Enabled* and *Disabled*.

POST Errors — When *Enabled* (default setting), POST Errors tell you what to do when the system BIOS does not match the system configuration. The options are *Enabled* and *Disabled*.

Floppy Check — When *Enabled (*default setting), Floppy Check ensures that the diskette parameter matches the installed floppy disk drive. For faster bootup, you should disable this feature. The options are *Enabled* and *Disabled*.

Summary Screen — When *Enabled* (default setting), Summary Screen displays the system configuration during the power-up sequence. The options are *Enabled* and *Disabled*.

Numlock Options

Numlock — determines the power-on state for the **NUM LOCK** key. The options are *Auto* (default), *On*, and *Off*.

System Memory

This field reflects the current amount of memory installed in your system and cannot be changed. If you changed your memory configuration, first save this new value before exiting the BIOS Setup, and then run the SCU (described later in this section) to register the change.

Extended Memory

This field reflects the current amount of extended memory in your system. If you changed your memory configuration, make sure you save this new value before exiting the BIOS Setup.

Extended memory is automatically configured by the system and cannot be changed.

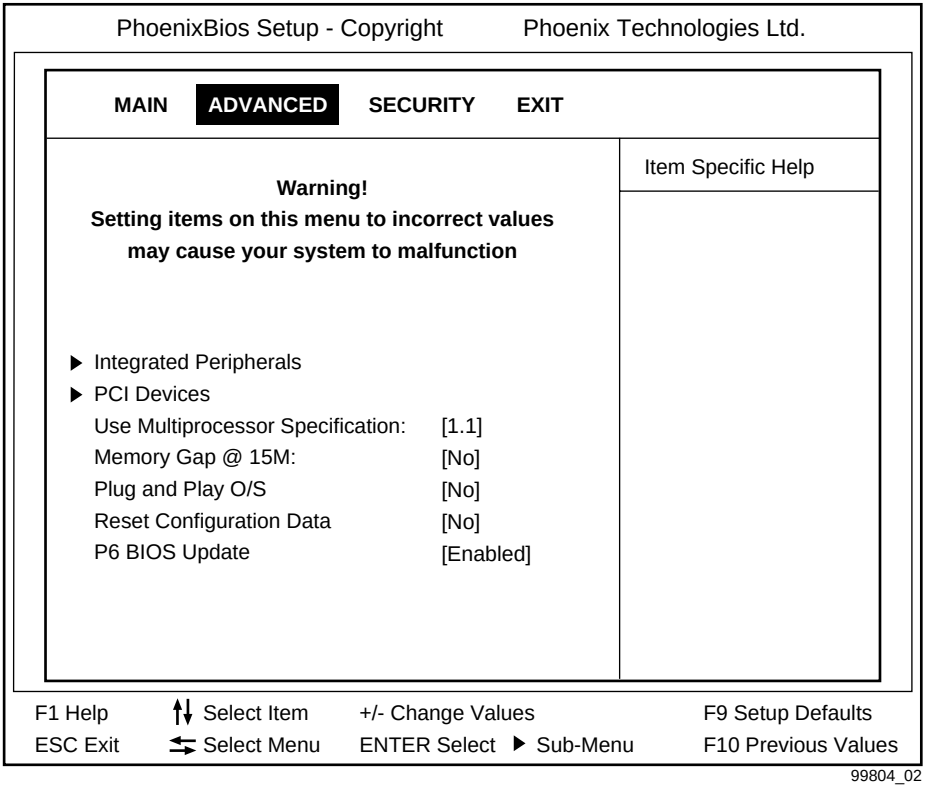
Advanced Menu

When you select ADVANCED near the top of the screen, the Advanced menu is displayed (see Figure 4–2). The Advanced BIOS Setup screen enables you to fine-tune and customize your system. Descriptions of menu options follow.

Caution

Setting values incorrectly through this menu may cause the system to malfunction.

Figure 4–2. BIOS Setup — Advanced Menu



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Integrated Peripherals

The following subsections describe the parameters you can change on the Integrated Peripherals screen. To change the parameters, use the ↓ key to highlight the value you want to change, then press + or –.

COM Port 1 — reflects the address and interrupt values currently reserved for this port with twelve settings including *Disabled* and *Auto.* The default for this port is *3F8; IRQ4.*

COM Port 2 — reflects the address and interrupt values currently reserved for this port with twelve settings including *Disabled* and *Auto.* The default for this port is *2F8; IRQ3.*

LPT Port — reflects the address and interrupt values currently reserved for that port with the following options: *Disabled, Auto, 278 IRQ7, 378 IRQ7* (default setting).

LPT Mode — allows for a faster data transfer rate which increases system performance. The options are *ECP, Bi-Directional, and Output Only* (default setting).

Diskette Controller — allows you to enable or disable the onboard floppy disk drive controller. The options are *Enabled* (default setting) and *Disabled*.

Integrated PCI IDE Adapter — allows you to configure your onboard hard drive controller. It can be set to *Disabled* (default setting) if you want to install your own hard drive controller; to *Primary* or *Secondary* if you only have one or two hard drives installed; or to *Both* if you have three or four hard drives installed.

Primary IDE Read Ahead — allows you to enable or disable the primary PCI IDE read ahead feature. The options are *Enabled* and *Disabled* (default).

Secondary IDE Read Ahead — allows you to enable or disable the secondary PCI IDE read ahead feature. The options are *Enabled* and *Disabled* (default).

I2C Address — defines the I2C address with options from *0 to 7*. The default setting is *1*.

Note: *The I2C Address must be the same as the ID assigned to the LCD panel in Section 5.*

PCI Devices

Allowed PCI Interrupts — limits the allowed PCI interrupts to avoid conflict with ISA cards. The options are *Yes* (default setting) and *No*.

From this submenu you can control any PCI cards installed in your system. The settings for all four PCI slots are the same.

Enable Master — enables or disables the selected PCI device as bus master. The options are *Enabled* (default setting) and *Disabled*.

Default Latency Timer — when set to *Yes* does not program the Latency Timer value which can be set in the field below. The options are *Yes* (default setting) and *No*.

Latency Timer — defines the maximum number of PCI bus clocks that the master may burst. The default is *40*.

Use Multiprocessor Specification

This option configures the MP specification revision level for compatibility reasons. Options are *1.1* and *1.4*; the default is *1.1*.

Memory Gap @ 15M

This option defines a 1M memory hole at 15M for Banyan cards. Options are *No* and *Yes*; the default is *No*.

Plug and Play O/S

Set this feature to *Yes* if you are using a Plug-and-Play-capable operating system. The other option is *No* (default setting).

Reset Configuration Data

When set to *Yes*, this feature clears the system configuration data. The system automatically configures all PNP devices at bootup. The other option is *No* (default setting).

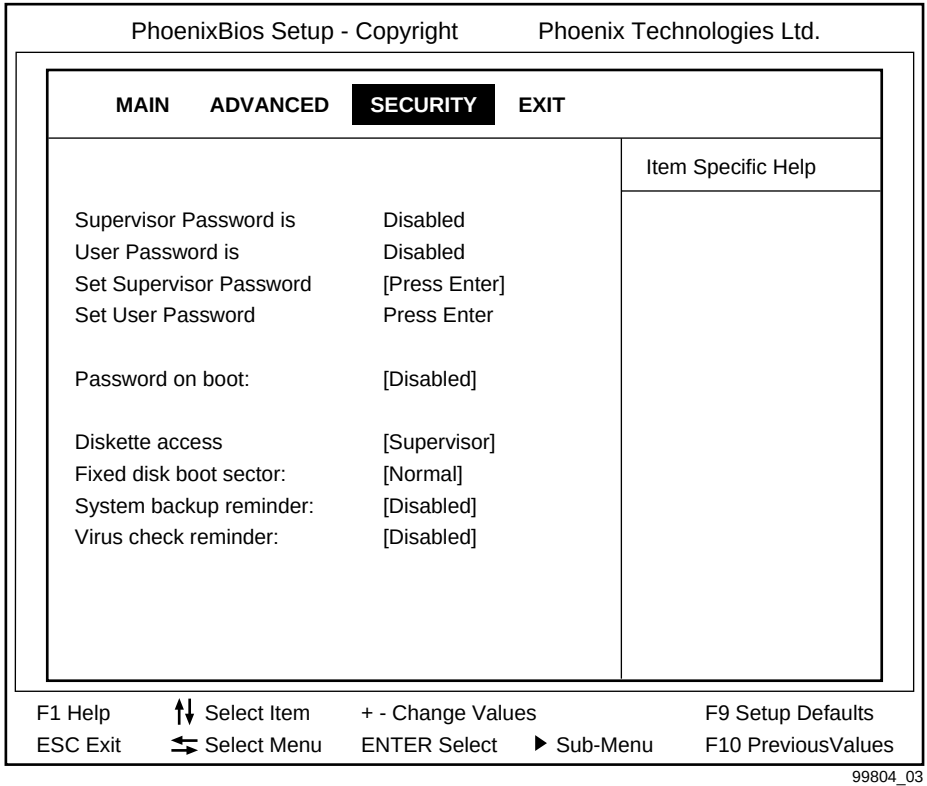
P6 BIOS Update

When *Enabled* (default setting), this feature updates the P6 BIOS. The other option is *Disabled*.

Security Menu

The options in the Security menu (shown in Figure 4–3) allow you to manage system security, prevent unauthorized access, and protect against destructive computer viruses. Descriptions of menu options follow.

Figure 4–3. BIOS Setup — Security Menu



Supervisor Password is

This parameter is for information purposes and cannot be changed in this field. It indicates whether the supervisor password is *Enabled* or *Disabled*. This password allows full access to the system and is required to start the BIOS Setup utility. The default setting is *Disabled*. This option must be enabled before you can enable the user password. To set the supervisor password, set to *Enabled* and select Set Supervisor Password and press **Enter**.

User Password is

This parameter is for information purposes and cannot be changed in this field. It indicates whether the user password is *Enabled* or *Disabled*. This password allows full access to the system and limits access to the security features. The default setting is *Disabled*. The supervisor password must be enabled before you can enable and set a user password. To set the user password, set both supervisor and user passwords to *Enabled*, select Set User Password, and press **Enter**.

Set Supervisor Password

This option allows full access to the system. When *Enabled*, the supervisor may assign or delete Supervisor and User Passwords. This parameter must also be *Enabled* before you can access the User Password.

To set the password, type in the new password and press **Enter.** Retype the same password when the system prompts you to confirm it. To disable the password, press **Enter** twice.

Set User Password

This option allows full access to the system and limited access to the security features. The Supervisor Password must be *Enabled* before you can access the User Password.

To set the password, type in the new password and press **Enter.** Retype the same password when the system prompts you to confirm it. To disable the password, press **Enter** twice.

Password on Boot

If *Enabled*, this option causes the system to prompt for a password before booting the system. The other option is *Disabled* (default setting).

Diskette Access

This option prevents unauthorized access to the floppy disk drives, reducing the possibility of file copying and virus contamination. When set to *Supervisor*, the floppy disk drive is accessible to the Supervisor only; when set to *User*, the floppy disk drive is accessible to both User and Supervisor. The options are *Supervisor* (default setting) and *User*.

Fixed Disk Boot Sector

This field allows you to protect the boot sector from viruses by choosing the write-protect mode. The options are *Normal* and *Write Protect*; the default is *Normal*.

System backup reminder

This field, if enabled, causes the system to send a reminder to perform a system backup at various intervals. The options are *Disabled* (default setting), *Daily*, *Weekly*, and *Monthly*.

Virus check reminder

This field, if enabled, causes the system to send a reminder to perform a virus check at various intervals. The options are *Disabled* (default setting), *Daily*, *Weekly*, and *Monthly*.

What to Do If You Forget Your Password

If you forget your password, you need to clear CMOS memory to delete the password.

Note: *When you clear CMOS memory, you erase all of your Setup settings. You will need to re-enter them after clearing CMOS memory.*

WARNING

Make sure you turn off the system and unplug the system unit before you clear CMOS memory. If the power is left on, you may experience an electrical shock and damage the system.

To clear CMOS memory,

1. Turn off the system and unplug the system unit.
2. Remove the system side panel, as explained in Section 7, “Upgrading Your System.”

3. On the system board, locate the JP18 jumper (see Figure 2-6). Jumper pins 2 and 3. (Table 4–2 describes the function of this jumper.)

Table 4–2. JP18 CMOS Jumper Settings

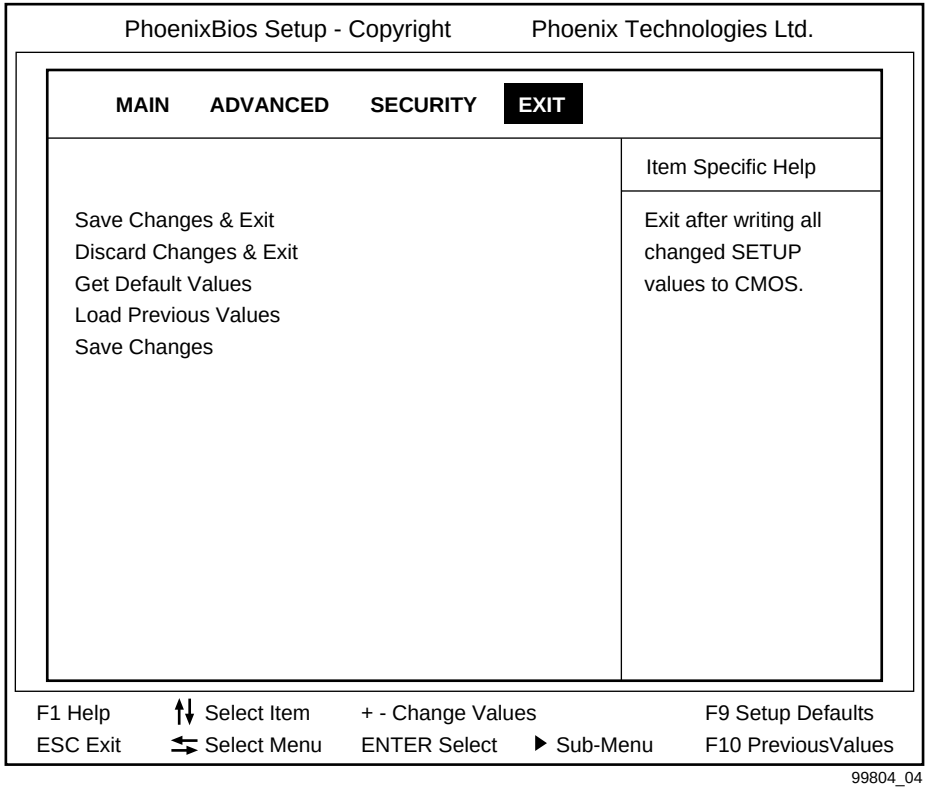
Jumper These Pins...	To Do This...
1 and 2	Normal system operation
2 and 3	Clear CMOS memory

4. Replace the side panel and plug the system unit back in.
5. Run the BIOS Setup utility and re-enter your configuration settings.

Exit Menu

When you select EXIT near the top of the screen (or press the → key), the Exit menu is displayed (see Figure 4–4). When you have examined or made changes to your system configuration, you must exit the BIOS Setup and reboot.

Figure 4–4. BIOS Setup — Exit Menu



To exit the BIOS Setup, press the ↓ key to select the appropriate save option and press **Enter**.

Save Changes & Exit

This option saves your current values, and allows you to exit the BIOS program. The system automatically reboots using the new values stored in the system BIOS.

Exit Without Saving Changes

This option allows you to exit the BIOS Setup program without saving any changes. The system will automatically reboot.

Get Default Values

This option sets all values to the factory-specified defaults. This does not allow you to exit from the BIOS program.

Load Previous Values

This option sets all values to the last-saved settings. This does not allow you to exit from the BIOS program.

Save Changes

This option saves new values just entered. This does not allow you to exit from the BIOS program.

Updating the Flash BIOS EPROM

Your system incorporates a flash EPROM for the BIOS that allows you to upgrade your system's BIOS version without having to install a new EPROM. To update the code in the Flash BIOS, use the PROGBIOS.EXE program available on disk from Unisys Customer Support.

Before you can run PROGBIOS.EXE, you need to clean your system memory by removing memory-resident programs and device drivers. You can do this in two ways:

- If you're running MS-DOS 6.0, you can reboot and then press **F5**. This bypasses your CONFIG.SYS and AUTOEXEC.BAT files and only loads the DOS kernel into memory.
- You can boot from a system boot disk.

Note: *A system boot disk contains only required operating system files. To create one, insert a disk into drive A: and type* ***FORMAT A:/S****. This will format the disk and transfer the system information onto it.*

Once you have booted your system clean using one of the two methods described above, you can begin updating the Flash BIOS.

To update the flash BIOS:

1. Insert the disk containing the PROGBIOS.EXE into drive A.
2. Run the program by typing the following:

   A:PROGBIOS

   Press **Enter** and wait while the BIOS is being updated.

> **WARNING**
>
> **While updating the BIOS, the flash programming sequence can take 45 seconds (or longer). DO NOT turn off your system or reboot during this time or else the BIOS will be corrupted beyond recovery. In that case, you will have to replace the BIOS chip.**

3. Press the system RESET button or power down for at least 5 seconds.

   The next time you boot your system, it will use the new information in the BIOS.

System Configuration Utility (SCU)

As described earlier, your system stores information about the system unit and attached devices in CMOS memory. This information is used by your system BIOS. Every time you turn on your system, the BIOS reads the CMOS-stored settings and instructs the CPU and other hardware in your system to operate according to these values.

Before your system leaves the factory, the SCU is run to load values pertaining to feature boards. Unisys runs the SCU prior to shipment. Therefore, you usually do not need to run it when you first install your system.

When you run the SCU, the system reads the factory settings from the CMOS memory to determine which system resources are still free. You then use the SCU to appropriately assign these resources for the feature boards you are configuring. The SCU also lets you manually assign system resources or change the resource allocation.

As the SCU executes, be sure to evaluate the information on your screen and make any needed changes. Once the run is over, the SCU writes the hardware configuration to CMOS memory and generates an SCI file on the SCU floppy disk; this file is a record of the settings you chose during the SCU run.

Note: *CMOS memory is maintained by an internal CMOS chip with an embedded battery backup so your settings are retained when you turn off the system. However, if the CMOS chip fails, CMOS memory is cleared. If you replace the chip, be sure to redefine the hardware configuration using the SCU. Alternatively, you can create a backup SCI file, as described later in this section.*

Tasks Performed by the SCU

The SCU lets you generate a hardware configuration record, define various hardware characteristics, and allocate your system resources.

In almost all cases, the SCU is able to configure system resources automatically, and unresolvable resource conflicts are seldom encountered. If a resource conflict does occur, the SCU will notify you and specify exactly what resources are in conflict.

You use the SCU to complete the following tasks:

- Configure the system when adding, removing, or moving feature boards.
- Review the system configuration when adding or removing system memory.
- Review the keyboard, monitor, mouse, serial port, and parallel port settings.
- Save the SCI file (the file that stores the updated information), as a backup.

When using the SCU, you can allocate the following resources:

- **Expansion slots** — Expansion slots are the EISA connectors that feature boards are installed into.
- **Interrupt Requests (IRQ)** — Hardware devices use interrupts to access the CPU. Each device in your computer must use a unique interrupt request number.
- **Input/Output (I/O) addresses** — Hardware devices use I/O ports to transfer data to and from the CPU. Each device must have a unique I/O address.

- **Direct Memory Access (DMA) channels** — Some hardware devices require a unique DMA channel to communicate with the system memory. A DMA channel allows a hardware device to communicate with the system memory by sending messages to a specific memory address, which increases data transfer efficiency.
- **Feature board memory** — Some feature boards include their own onboard memory. These boards often map their onboard memory to portions of your system's extended memory. This allows the board's memory to be treated like standard system memory.

After configuring your system, the SCU sends a record of how the resources are allocated to CMOS memory. Any discrepancy between this information and the hardware detected when the system starts up results in an error message asking you to run the SCU. The configuration information is also saved in the SCI file.

When to Run the SCU

You should run the SCU in the following instances:

- If your system displays a message indicating that the preinstalled software has failed a verification test.
- After you make changes to the system hardware.
- If you add a feature board.

  Notes:

  - *If you are adding an ISA feature board or a PCI board, be sure to run the SCU before you install the board. Then, set the jumpers and switches on the board according to the values that the SCU assigned during the run.*
  - *If you have an ETH100-ESA EISA Ethernet board installed, make sure to configure it as an alternate rather than as primary; it will not work if configured as primary.*
- When your system experiences a configuration error or conflict.

- If you lose the contents of CMOS memory due to a CMOS chip failure.

  Note: *In this situation, be sure to run the BIOS Setup utility to configure the basic system resources (keyboard, monitor, cache, and so forth) before attempting to run the SCU.*

Starting the SCU

To start the SCU, make sure the system unit is turned off, insert the SCU floppy disk into drive A, and reboot the system.

Note: *In the event of a system error or configuration incompatibility, you may be prompted automatically to start the SCU. In this case, a message is displayed asking if you want to run the SCU. Depending on the type of error the system experienced, you may need to run the SCU only, or both the SCU and BIOS Setup utility.*

Configuring Your System by Using the SCU

The SCU is common to a wide range of Unisys systems. Many of these systems use the SCU to configure all of the system hardware (cache, keyboards, monitors, and so forth), so you will find instructions for each of these procedures in the *EISA Configuration Utility User's Guide.*

Because your system uses BIOS-stored values to set up most of the hardware configuration, you should limit your use of the SCU to configuring feature boards, system memory, keyboard, mouse, monitor, serial ports, and parallel port. Be sure to disregard the instructions for other hardware configuration procedures.

When you run the SCU, keep these points in mind:

- If you use a feature board to replace a function normally performed by the system board (for example, a communications board to replace the system board serial port interface), be sure to deactivate the function for the system board.

  To deactivate system board functions, you first need to run the BIOS Setup utility and set the system board function to *Disable.* Next, you need to run the SCU and disable the same function. If you do not use both the BIOS Setup utility and the SCU, the system may have a conflict.

- If your system has a configuration conflict, you may need to resolve the conflict by first running the BIOS Setup utility and then running the SCU.

As you read the *EISA Configuration Utility User's Guide*, you need to consider several special issues related to the SCU. Among these issues are generating writeable copies of the SCU and creating SCI file backups, as explained in the following discussions.

Creating a Writeable Version of the SCU

Unisys strongly urges all customers to maintain two copies of the SCU floppy disk: a permanent copy and a writeable copy. There are several advantages in keeping two copies. First, if you create a writeable copy of the SCU floppy disk, you can add one or more customized SCI files to that disk. Having customized SCI files can shorten the hardware configuration process should you ever need to rerun the SCU. Second, by maintaining a permanent, nonwriteable version of the SCU, you will be ensured of a backup if your other copy of the SCU is damaged or you have made irretrievable configuration errors while running the SCU.

Backing Up the SCI and CFG Files

The SCU floppy disk contains the SCU and various files needed for system configuration including the following file types:

- **System Configuration Information (SCI) file** — This file contains a copy of the information that the SCU writes to CMOS memory. This information includes resource allocations, interrupt requests, and so forth.
- **Board configuration (CFG) files** — These files contain information about the system board and specific feature boards. Without CFG files, the system would not provide the resources required for the associated circuitry to function properly.

You can use the SCU to back up SCI and CFG files and store them on a floppy disk. Backup files can prove handy if installing multiple systems with a common hardware configuration. Backup files also save time if your hardware configuration is lost due to CMOS chip corruption. If you plan on creating backup files, make a writeable copy of the SCU and use the *Maintain System Configuration Diskette* option to complete any of the following tasks:

- Back up the SCI file
- Load a backup SCI file
- Copy a CFG file to the SCU floppy disk

- Copy a SCI file to the SCU floppy disk
- Delete CFG files from the SCU floppy disk
- Delete SCI files from the SCU floppy disk

Note: *Be sure that the writeable SCU floppy disk is inserted before you run the* Maintain System Configuration Diskette *option. Also, be sure to adhere to the SCU file naming conventions. These conventions specify up to eight characters in the file name, with an optional three-character extension, and a dot (period) between the name and the extension. The file name must start with an exclamation point (!). For example, you might name a CFG file* !Vid192.CFG.

The *EISA Configuration Utility User's Guide* provides detailed instructions on creating SCI and CFG backup files.

Where to Go From Here

By now, your hardware should be installed and your system should be configured. If you encountered any problems with the installation, refer to Section 6, "Troubleshooting Your System."

Section 5
dLux Command Display

Your system is equipped with a server hardware management feature designed to continuously monitor and report the physical and electrical environments of the system.

A microcontroller chip embedded on the system board checks the performance of various devices installed in the computer as well as their temperature and voltage levels.

This section describes the dLux Command Display LCD panel on your system. The topics discussed are:

- Main display
- CPU display
- Disk activity display
- Power display
- System status display
- RAM display
- Fan and temperature display
- Lock status display
- Alarm speaker and ID setup display

The touch-sensitive LCD screen displays system status information and allows user interaction. If there is no user interaction for five minutes, the LCD panel turns its display off. Touching the screen returns the display. Note that the five minute delay is always enabled, and cannot be made shorter or longer.

Note: *System information is enclosed in rectangles with square corners, whereas interactive buttons are rectangles with rounded corners.*

Navigation through the various displays is achieved by triangle-shaped icons at the bottom of the screen. If the triangle icon is in outline only, it has no function in this display; if the triangle icon is filled, it functions as described below:

- ◄
  The left-pointing triangle advances to the next display in the sequence.
- ►
  The right-pointing triangle returns to the previous display in the sequence.
- ▲
  The upward-pointing triangle returns to the main display.

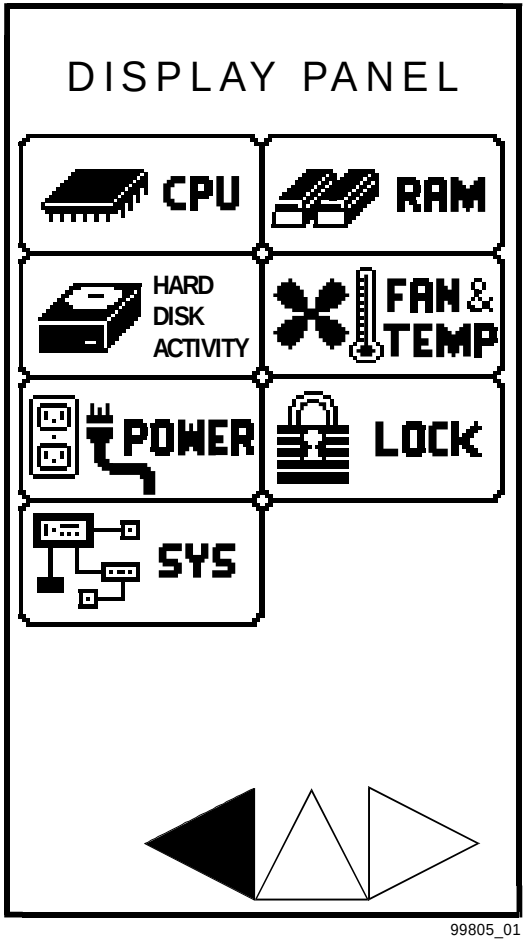
Caution

To ensure data integrity and optimal performance of the server hardware management feature, access and operation of the dLux Command Display should be restricted to qualified personnel.

Main Display

The main display panel contains seven interactive buttons, each representing a specific topic of hardware information (see Figure 5–1).

Figure 5–1. Main Display



If a system problem is detected, the representative button on the main display flashes. The problem can be further isolated by pressing the flashing button and accessing its associated display. The field in which the problem occurred is identified.

Note: *To stop the flashing and silence the alarm:*

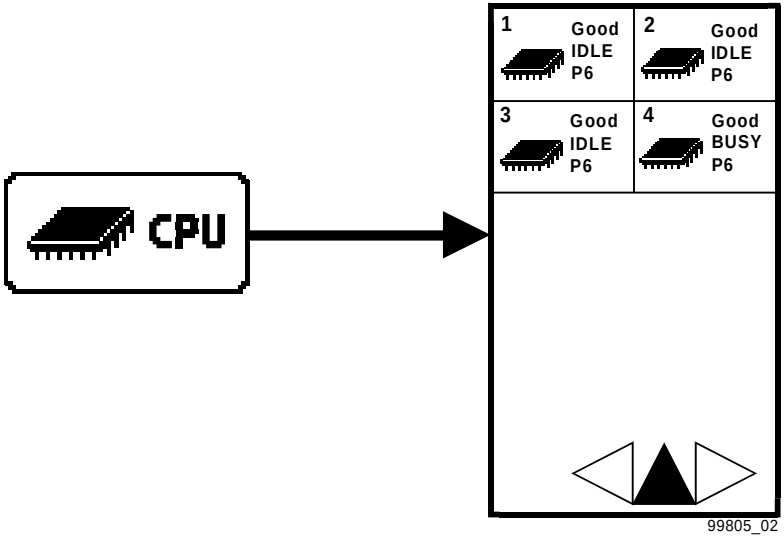
1. *Press the left-pointing arrow ◄ on the main display to access the alarm speaker and ID setup display.*

2. *Press the ALARM SPEAKER ON/OFF button.*

CPU Display

This display is accessed by pressing the CPU button on the main display (see Figure 5–2).

Figure 5–2. CPU Display

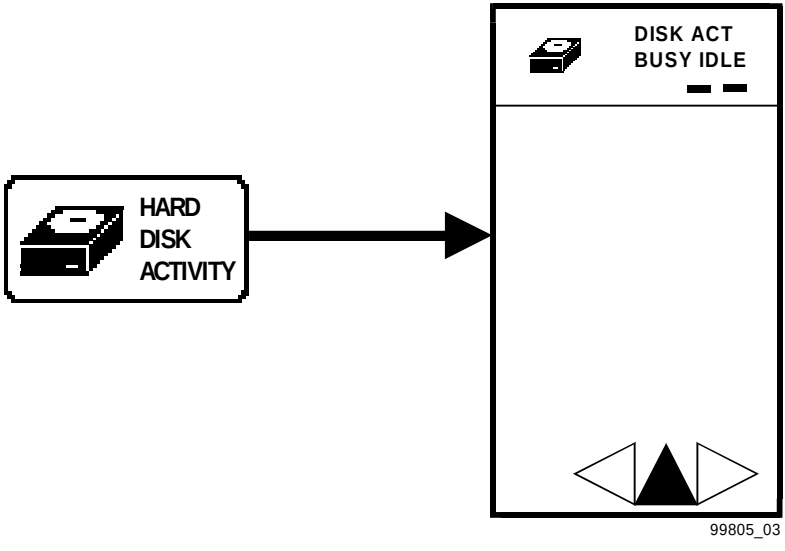


This display shows the number of CPUs installed in the system, along with status (GOOD/FAIL), current activity (BUSY/IDLE), and the processor type (P6).

Disk Activity Display

This display is accessed by pressing the HARD DISK ACTIVITY button on the main display (see Figure 5–3).

Figure 5–3. Disk Activity Display

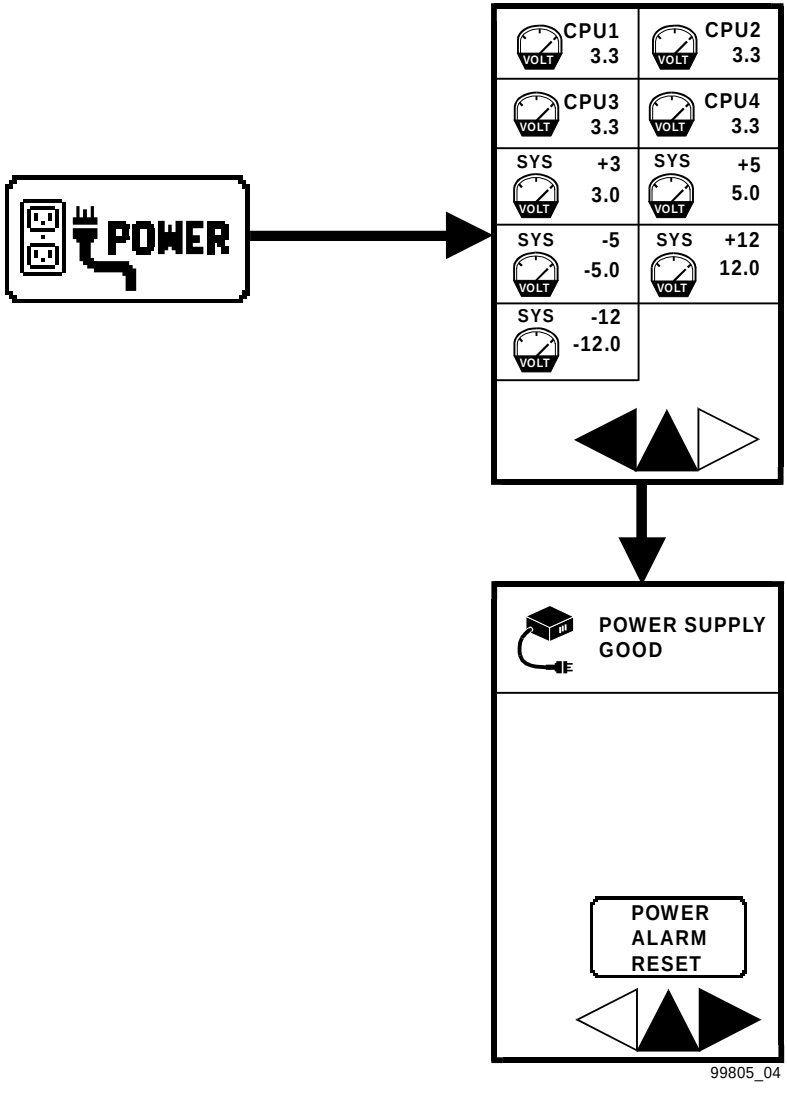


This display shows the drives currently installed, and their activity which is indicated by a double dash (– –) under BUSY or IDLE.

Power Display

This display is accessed by pressing the POWER button on the main display (see Figure 5–4).

Figure 5–4. Power Display



This display shows voltages associated with the system: the voltage applied to each CPU; voltages supplied to the system board; voltages supplied to the peripherals.

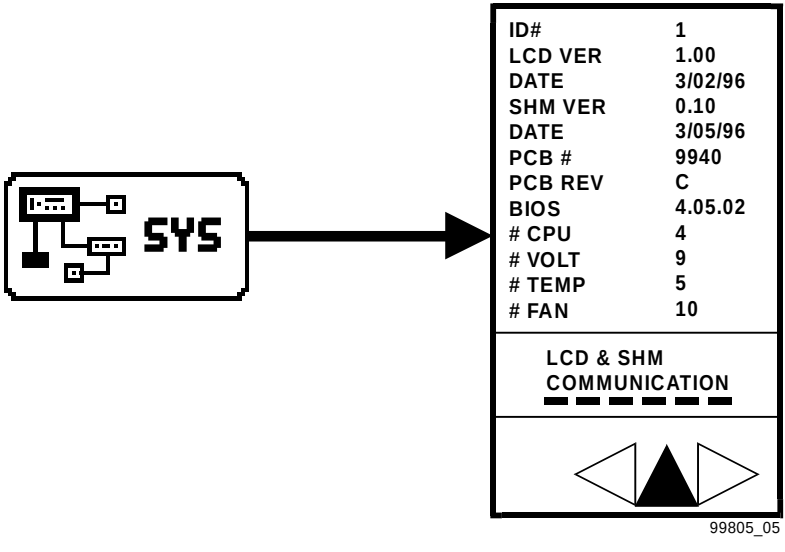
When a voltage is within normal range, the pointer in the voltage meter icon moves laterally back and forth. If an out-of-range voltage occurs, the pointer stops moving, and the voltage reading flashes.

A submenu displays the status (GOOD or FAIL) of the power supplies.

System Display

This display is accessed by pressing the SYS button on the main display (see Figure 5–5).

Figure 5–5. System Display



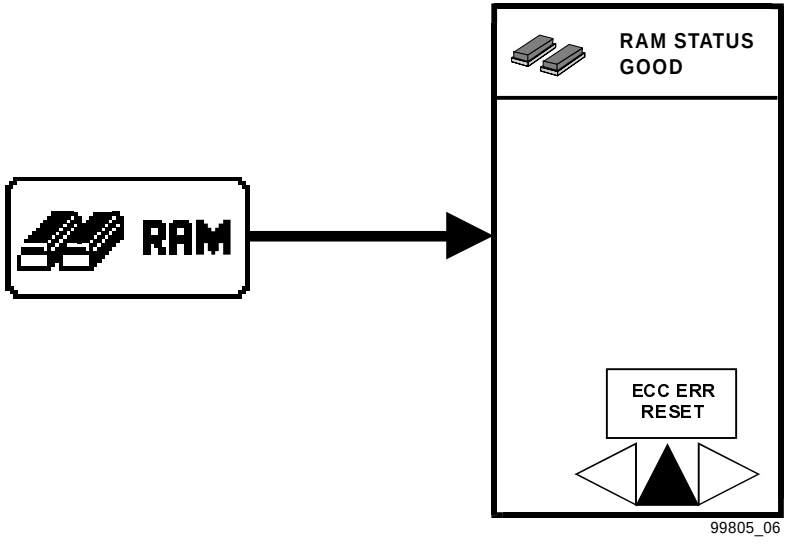
This display shows the version of the currently installed firmware (system BIOS, server hardware management, and LCD firmware). In addition, it shows the number of different hardware devices installed.

Communication between the LCD and SHM is indicated by the continuously changing number of dashes (– – –) beneath the LCD/SHM COMMUNICATION title. Non-communication is indicated by the word NONE in place of the dashes.

RAM Memory Display

This display is accessed by pressing the RAM button on the main display (see Figure 5–6).

Figure 5–6. RAM Memory Display



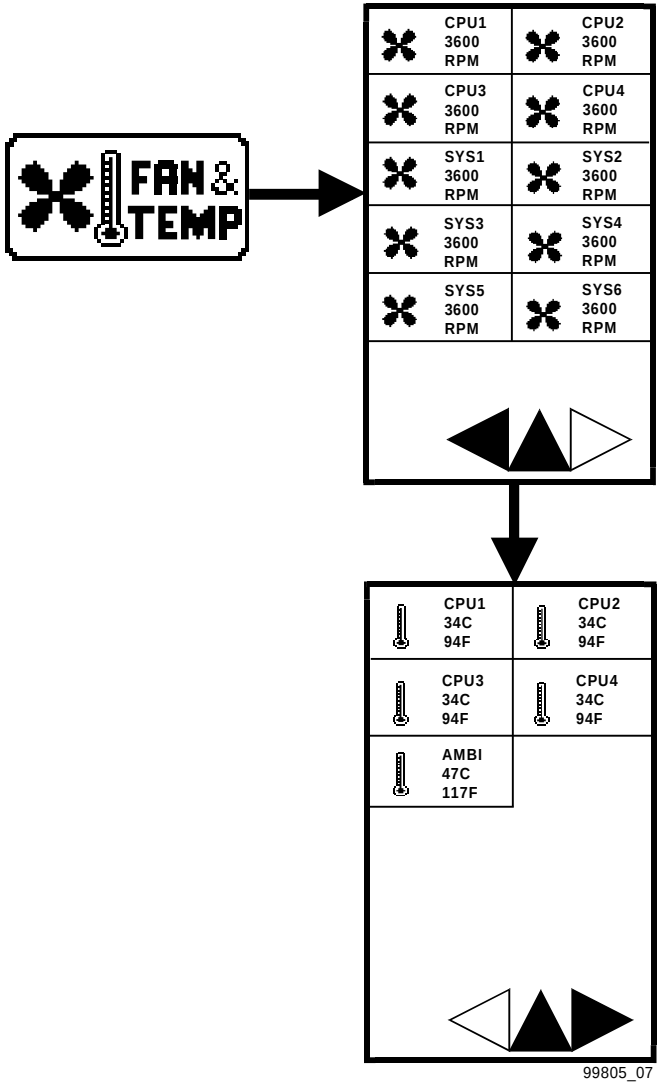
This display shows the current amount of RAM installed, and its status (GOOD/FAIL).

Press the ECC ERR RESET button to reset system memory (see Section 6, “Troubleshooting Your System”).

Fan and Temperature Display

This display is accessed by pressing the FAN & TEMP button on the main display (see Figure 5–7). Note that this button generates two displays.

Figure 5–7. Fan and Temperature Displays



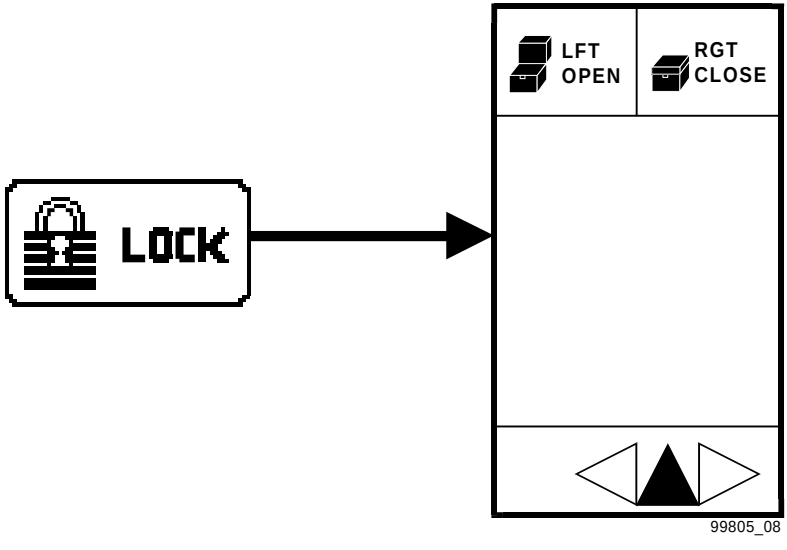
The first display shows activity and speed (RPM) of all installed CPU heatsink fans and tower chassis fans. Normal operation causes the fan icons on the LCD panel to rotate. If a fan's speed is outside operating boundaries, its icon and RPM flash in the display.

The second display shows system temperature: the temperature of each CPU, and the air temperature surrounding the server. A normal temperature reading causes the mercury inside the thermometer icon to rise and fall; a temperature that is out of operating boundaries causes that thermometer icon to stop all motion, and the temperature readout begins to flash.

Lock Display

This display is accessed by pressing the LOCK button on the main display (see Figure 5–8).

Figure 5–8. Lock Display

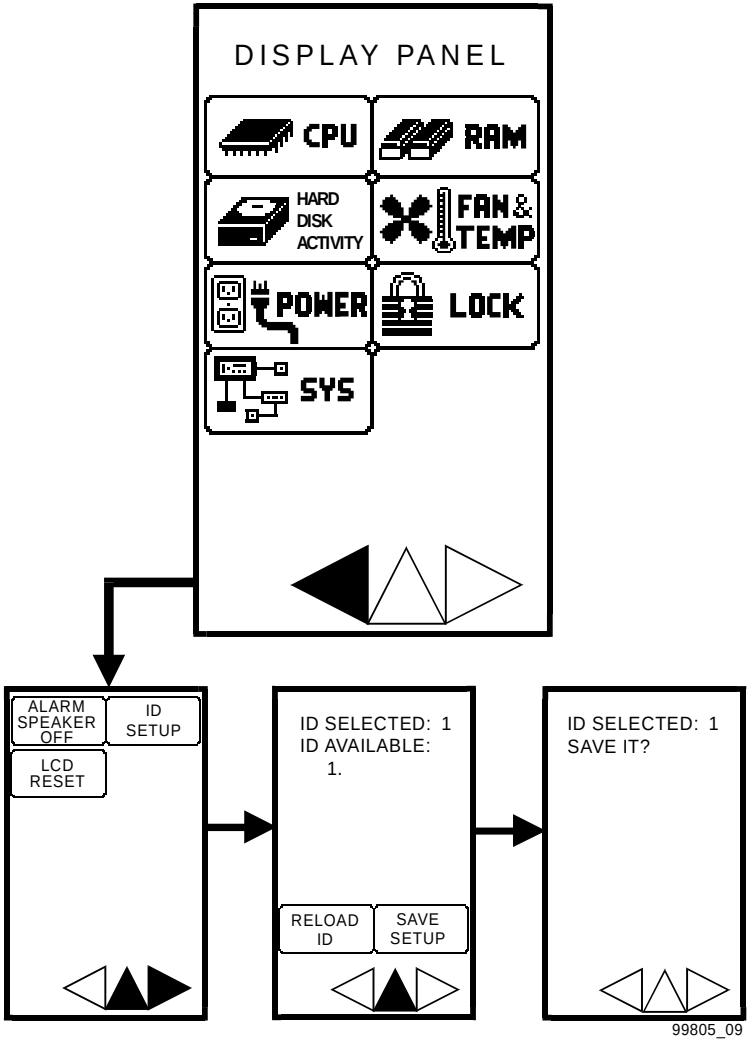


This display shows the status of the side panels (OPEN/CLOSE). A flashing icon indicates that the corresponding panel is open. When a panel is closed, the icon remains fixed.

Alarm Speaker and ID Display

This display is accessed by pressing the left-pointing arrow ◄ on the main display (see Figure 5–9).

Figure 5–9. Alarm Speaker and ID Setup Display



This display allows you to turn the speaker OFF or ON. The default is ON. You can also access the ID setup from this display.

The LCD RESET button restores communication between the LCD panel and the host computer when communication has been interrupted. Loss of communication is apparent when the SYS display shows NONE under LCD & SHM COMMUNICATION. (This display normally shows dashes indicating the amount of communication between the LCD panel and the host computer. For more information see "System Display.")

If pressing the LCD RESET button does not restore communication, reboot the computer.

LCD Panel and Host Computer Communication

In Aquanta QS/6 and QS/6U Series systems, the host is expected to be the system in which the LCD panel is mounted, and is usually assigned ID 1.

The LCD panel's ID (selected in this display) must be the same as the I2C Address selected in the Advanced Setup menu of the BIOS Setup described in Section 4. Since the I2C Address defaults to 1, we recommend that you select ID 1 for your LCD panel.

Note that selecting an ID for the LCD panel does not change the I2C address selected in the BIOS Setup. Similarly, selecting the I2C address in BIOS Setup does not change the ID selected for the LCD panel.

Note: *If the I2C Address and the LCD panel ID do not match, the LCD panel does not operate correctly.*

When the RELOAD ID button is pressed, the ID SELECTED value reverts to the ID last saved using the SAVE SETUP button.

Section 6
Troubleshooting Your System

This section discusses troubleshooting and includes the following subjects:

- Typical startup sequence
- Solving server problems
  - Preliminary checks
  - Troubleshooting an installation problem
  - Common problems
- Error Control Code (ECC)
- POST messages

Note: *In addition to the troubleshooting information in this section, refer to the troubleshooting instructions included in the documentation for your peripherals. If an error occurs within an application, consult the documentation supplied with the software.*

Typical Startup Sequence

When you turn on your server, the system executes the following startup sequence:

1. Your system receives power and lights the Power LED on the front of the system unit. The power supply fan begins to rotate.
2. The system begins the Power-On Self-Test (POST). This test verifies that the system memory, system board, video controller, floppy disk drives, hard disk drives, and peripheral devices are all operational. You can terminate the memory test by pressing the SPACEBAR.

Note: *If the POST detects an error, it displays an error message on the monitor. For information on what to do for POST errors, see "Solving Server Problems," later in this section.*

3. As the POST executes, it displays system values (processor size, memory size, and so forth) and settings on the monitor screen.
4. The keyboard LEDs blink on and off, and the Floppy Disk LED for each floppy disk drive lights briefly.
5. If your system contains an IDE disk drive, the Disk Activity LED lights.
6. If you have a properly configured hard disk drive with a boot partition that contains operating system software, the operating system loading messages appear on the monitor. These messages are followed by the operating system prompt.

When a server experiences problems during startup, it either halts the sequence or generates an error message to indicate that a failure has occurred. The following paragraphs discuss some of the actions you can take to resolve an installation problem.

Solving Server Problems

Your system is designed for simple, trouble-free installation and maintenance. As a rule, your first attempt to power up your equipment will be a successful one. However, systems sometimes have easily remedied problems when they are first installed.

Preliminary Checks

If a server does not power up correctly after you have installed it, you may have any of several minor problems. Problems that occur the first time you turn on a system usually result from installation errors or an incorrect CMOS hardware configuration. Occasionally, the problem is due to a hardware failure.

If your system fails when you first start it, recheck the system by performing the following checks:

- Are the voltage selection switches set to the correct line voltage?
- Is the ac outlet supplying power?
- Are all power cables connected correctly and all power switches turned on?
- If the system is connected to a power strip, is it switched on?
- Are all cable connections secure?
- Are all feature boards and drives installed and configured correctly?
- Are the configuration values listed in the BIOS Setup utility correct? For information on the BIOS Setup utility, see Section 4, “Configuring Your System.”
- Have you used the SCU to define your system’s EISA and ISA feature board configuration? For information on the SCU, see Section 4, “Configuring Your System.”

Note: *If you have an ETH100-ESA EISA Ethernet board installed, make sure to configure it as an alternate rather than primary; it may not work optimally if it is configured as primary.*

- Did you follow the instructions correctly for loading your software?

If all these items are correct and the problem recurs, or if you experience a problem that makes it impossible to answer these questions, you will have to do further troubleshooting, as described later in this section.

Troubleshooting an Installation Problem

If you have an installation failure that cannot be solved by the measures just discussed, you need to study the problem more closely. Your goal should be to eliminate possible causes until you can determine what is causing the problem.

To perform a basic troubleshooting procedure,

1. If you have not already done so, turn off the system unit and the monitor.
2. If you have not already done so, disconnect any serial or parallel devices (printers, modems, and so forth) from the system unit.
3. Make sure the monitor and keyboard are correctly connected to the system unit.
4. Make sure that the system unit is connected to a properly grounded power outlet. Also verify that the voltage selection switches are set to the correct voltage.
5. Turn on the monitor and make sure the brightness and contrast controls are turned up at least two-thirds of the way. If you are not sure how to set the brightness and contrast controls, see the documentation that comes with your monitor.
6. Make sure there is no floppy disk in the floppy disk drive.
7. Turn on the system unit.
8. Observe the system's startup sequence. Your system should complete each of the steps described in "Typical Startup Sequence," earlier in this section. If the system does not complete a step, the component activated during that step may be faulty. For example, if the Floppy Disk LED does not light, you may have a bad floppy disk drive. For more on how to resolve problems of this sort, see "Common Problems," later in this section. When you have fixed the problem, return to step 1.

9. If the system issues any error messages during the startup sequence, take the appropriate corrective action. For suggestions, see "Common Problems," later in this section. When you have fixed the problem, return to step 1.

Note: *If the system message does not tell you enough to isolate the problem, contact your Unisys Customer Service Engineer (CSE).*

10. If you isolate the problem to a specific device (for example, a keyboard or monitor) and that device came with repair instructions, try to fix the device in question. If you fix the problem, return to step 1.

11. If you plan to store your operating system on a hard disk drive, partition and format the hard disk drive appropriately. For instructions, see the operating system manuals. Load the operating system from the drive.

12. Select each hard disk drive or hard disk drive partition in turn to verify that all drives and partitions can be accessed. If you cannot access the drives, the drives may be incorrectly partitioned or configured. For more information, see your operating system documentation.

13. If you were experiencing problems with a particular program, try running that program. If the problem recurs, see the software documentation for instructions on setting up program parameters. You can also try disabling cache memory and BIOS shadowing. For more information on disabling cache memory and BIOS shadowing, see the BIOS Setup utility discussion in Section 4, "Configuring Your System."

When your system passes all of the steps just described, you can consider the basic troubleshooting process complete. Be sure to turn off your system and reconnect any devices that you disconnected during your troubleshooting effort.

Common Problems

For an idea of how to solve problems that can occur during installation and operation, see Table 6–1. This table lists common problems and suggests solutions. Try each solution in the order indicated in the table. Each time you implement one of these solutions, test it using the procedure described in "Troubleshooting an Installation Problem," earlier in this section. If you still cannot correct the problem, contact your Unisys CSE for help.

Note: *Faulty devices can cause problems that are difficult to isolate. An effective approach is to replace each suspected device, one at a time, with a working, identical device and retest the system. If the problem disappears after you replace a device, you have isolated the problem. To find out which devices you can replace, see "Components You Can Replace," in Section 7. Should the problem persist, contact your Unisys CSE.*

Table 6–1. Troubleshooting Guide

Problem	Solution
The system will not power on.	– Check the power cable and make certain it is connected to an ac power source. – Make certain the voltage selection switches reflect the correct power source.
The system does not display the date and time correctly or at all.	– Start the BIOS Setup utility and correct the date and time settings. – The backup battery may need to be replaced. – Contact your Unisys Customer Support Center.

continued

Table 6–1. Troubleshooting Guide (cont.)

Problem	Solution
The system will not boot after the POST is completed.	– If the hard disk drive is not formatted, boot from a bootable floppy disk, then format the hard disk drive. – Press F1 to retry booting the system. – Start the BIOS Setup utility and check the hard disk drive configuration (IDE drive only).
The floppy disk LED lights but I can't access files.	– Remove the floppy disk, and reload it into the drive. – Run a disk verification utility to check the floppy disk's integrity. – Try the floppy disk on another system. Recopy the file, if necessary.
I cannot read files from or write files to the hard disk or floppy disk.	– Remove the write-protect tab or switch from the disk. – Check to ensure the drive LED lights when you issue the write command. If it doesn't, try another drive letter. – If the floppy disk is not formatted, format it.
Insufficient space on the drive.	– Remove files from the disk or write to another device. – Compress the file and try again, or write to another disk.

continued

Table 6–1. Troubleshooting Guide (cont.)

Problem	Solution
The monitor will not power up.	– Check the power cord and make sure it is connected to a working ac outlet or the system's ac-out socket on the power supply.
The monitor's power light is on but nothing displays on the screen.	– Adjust the monitor's brightness and contrast knobs until you can see the display. – Make sure the system is turned on. – Check the video cable and ensure it is connected to the correct port. – Check the video cable's connector and repair it, if necessary. – Check whether there are electronic devices such as televisions, phones, radios, or fluorescent lights placed too close to the system?
The characters on the screen are dim.	– Adjust the monitor's brightness and contrast knobs until you can see the display clearly.
The color monitor displays the Windows application in black and white.	– Press ALT+F4 to exit from the Windows program, then reset the system.
Characters on the screen are garbage.	– Check the video cable for bent pins or broken wires. – Call your Unisys Customer Support Center.
The keyboard will not function.	– Check if the Keyboard Inhibit switch is on. – Make sure the keyboard cable is fully seated.

continued

Table 6–1. Troubleshooting Guide (cont.)

Problem	Solution
The printer will not power up.	– Check the power cord and ac outlet. – Make sure the printer's power switch in the ON position.
The printer will not print.	– Press the printer's online switch and make certain the online LED lights. – Check the printer's data cable and make certain it is connected to the correct port. – Check the printer's data cable for bent pins or broken wires. – Call your Unisys Customer Support Center.
The printer prints garbage.	– Check the printer's data cable and make certain it is connected properly and not damaged. – Make certain you are using the proper data cable.
A serial printer does not work.	– If you have a serial printer, start the BIOS Setup utility and check the serial ports' parameters. They should reflect the printer's settings.

continued

Table 6–1. Troubleshooting Guide (cont.)

Problem	Solution
A drive is not recognized by the system.	– If the drive is an IDE or floppy drive, start the BIOS Setup utility and enter the appropriate parameters for the device. If it is a SCSI drive, make sure it is properly terminated and has a valid SCSI ID number. – If the drive is not formatted, format the drive. – Check drive jumpers and cable connections.
Memory errors were detected during the power-up sequence.	– Start the BIOS Setup utility and check the memory configuration. – Check the SIMMs for proper installation. – Replace SIMMs, as necessary.
A new CPU is not recognized by the system during power-up.	– Check the installation. The CPU should be recognized automatically if installed correctly. – Call your Unisys Customer Support Center.
A feature board is not recognized by the system.	– Check the address configuration of the feature board and ensure it does not conflict with another board in the system. – If the board is an EISA or ISA board, configure the board using the instructions provided in the *EISA Configuration Utility* program. – Check the board and ensure that it is seated firmly in the slot. **Note:** If you have an ETH100-ESA EISA Ethernet board installed, make sure to configure it as an alternate rather than primary; it will not work if it is configured as primary. – Call your Unisys Customer Support Center.
The RAM button on the LCD panel is blinking.	– See “Error Control Code (ECC).”

Error Control Code (ECC)

ECC is a powerful feature designed to detect memory errors as they occur and correct them without interrupting system operation.

You can encounter two types of memory errors:

- *Correctable Errors*. Correctable errors occur when a single bit out of 64 bits has failed. In this condition, the LCD panel will indicate a memory problem, and the system will continue to function.
- *Noncorrectable Errors*. Noncorrectable errors occur when more than one bit (out of 64 bits) has failed. In this condition, the LCD panel will indicate a memory problem. The system will stop operation and may report a parity error.

Note: *Although the system does not perform parity checks on memory, the operating system may report noncorrectable errors as parity errors.*

When an error occurs, an alarm sounds and the LCD panel flashes. The location of the failed SIMMs bank is identified on the monitor.

To troubleshoot a memory fault,

1. Press the System Reset switch as shown in Figure 2–3. One of two things will occur:
   - If the error does not recur, the system has encountered a soft error and no further action is required. For future reference, keep a record of which bank was flagged. A recurring soft error can indicate a faulty SIMM.
   - If the error recurs and the same bank is flagged, at least one of the two SIMMs in that bank is faulty. You need to troubleshoot the SIMMs, as described below:
2. Turn off the power and unplug the system.
3. Remove the memory board, as described in Section 7.
4. Remove one of the SIMMs from the flagged bank and install it into a bank containing the same capacity SIMM. Install the SIMM you removed from the unflagged bank into the flagged bank.

5. Replace the memory board and turn on the system. There are three possible results:
   - If the *original* bank is flagged again, the SIMM you did not swap is faulty.
   - If the bank where the swapped SIMM now resides is flagged, the SIMM you swapped is faulty.
   - If the original bank is flagged again and the bank where the swapped SIMM now resides is also flagged, then *both* SIMMs that were originally flagged in the bank are faulty.
6. Turn off the power and unplug the system.
7. Install a new SIMM, replace the side panel, and restart the system.

POST Messages

Every time you turn on a system, the BIOS executes a Power-On Self-Test (POST). This test verifies that the unit is able to perform basic functions related to the system board, base system memory, video controller, floppy disk drives, hard disk drives, drive controllers, and peripheral devices. The system emits one beep through the speaker before the POST is complete. If the POST detects an error, the system attempts to display an error message on the monitor.

If the system generates error messages during the POST, the following information can help to determine whether you should try to fix the problem yourself or contact your Customer Support Center.

Table 6–2 lists the POST messages associated with system errors. Each message is accompanied by a list of possible solutions. Some POST messages are associated with configuration errors or conflicts in the BIOS Setup utility. For these messages, the action “Run the BIOS Setup Utility” appears in the “Solution” column. When you encounter a message of this sort, try to resolve the error by running the BIOS Setup utility and correcting all configuration problems. If changing the configuration does not help, replace the hardware component mentioned in the message and run the System Configuration Utility (SCU).

Table 6–2. POST Messages

Message	Solution
[xxx] Base Memory, [xxx] Expansion	– This informational message requires no action.
Checking RAM on disk controller...	– Run the BIOS Setup utility and correct the configuration, as needed.
Checksum error on extended CMOS	– Run the BIOS Setup utility. – Replace the backup battery.
Decreasing available memory	– Make certain the SIMMs are properly inserted into their sockets. – Run the diagnostic program and replace the faulty SIMM.
Floppy disk drive 0 seek to track 0 failed	– Make certain the floppy disk drive is correctly configured in the BIOS Setup utility. – Check the floppy disk drive cable for a proper connection. – If the error continues, have the floppy disk drive checked or replaced.
Floppy disk drive reset failed	– Make certain the floppy disk drive is correctly configured in the BIOS Setup utility. – Check the floppy disk drive cable for proper connection. – If the error continues, have the floppy disk drive checked or replaced.

continued

Table 6–2. POST Messages (cont.)

Message	Solution
Floppy disk read failed -- strike F1 to retry boot	– If you are booting from a floppy disk, make certain it is a bootable floppy disk. – Check your drive or controller using the BIOS Setup utility. – Press F1 to reboot.
Gate A20 Failure	– Check the switch at the bottom of the XT keyboard and make sure that it is pointing to AT. If the message persists, replace the keyboard.
Hard disk controller failure	– Make sure that the hard disk cable is secured, and that the correct drive type is selected.
Hard disk failure	– Make certain the hard disk interface cable is connected properly. – Check the BIOS Setup utility hard disk drive configuration and correct it, if necessary. – Perform a low-level format on the designated drive.
Hard disk failure -- strike F1 to retry boot	– Press F1 to reboot. – Have the hard disk drive checked and replaced, if necessary.
Invalid configuration information	– Check the BIOS Setup utility and make sure your system's configuration is properly set. – Check and replace the battery backup, if necessary.

continued

Table 6–2. POST Messages (cont.)

Message	Solution
Keyboard clock line failure	– Check the keyboard cable. – Replace the keyboard.
Keyboard controller failure	– Check the keyboard cable. – Replace the keyboard or keyboard chip.
Keyboard data line failure	– Check that the keyboard is in AT mode. – Check the keyboard cable. – Replace the keyboard or keyboard chip.
Keyboard stuck key failure	– Check the keys, making certain none are stuck. – Replace the keyboard.
Memory address line failure at [xxx]...	– Make certain all SIMMs are properly seated. – Replace the SIMM in which the memory failure occurred.
Memory high address line failure at [xxx]...	– Make certain all SIMMs are properly seated. – Replace the SIMM in which the memory failure occurred.
Memory parity failure at [xxx-xxx]	– Run the BIOS Setup utility. – Replace the SIMM in which the parity failure occurred.

continued

Table 6–2. POST Messages (cont.)

Message	Solution
Memory test terminated by keystroke	– You pressed the Spacebar during the memory test at power up. You may ignore the error, or restart the system.
Memory write/read failure at [xxx]...	– Run the BIOS Setup utility. – Run the diagnostic program and replace the SIMM in which the write/read failure occurred.
No boot device available -- strike F1 to retry boot	– Start the BIOS Setup utility and correct the floppy disk drive configuration, if necessary. – Make certain the floppy disk is bootable. – Try another bootable floppy disk. – Check the floppy disk drive and its cable, and replace, if necessary.
No boot sector on hard disk -- strike F1 to retry boot	– Check the boot file on the hard disk drive and replace it if necessary. – Format the disk. – Press F1 to reboot. If the message persists, format the hard disk as follows: FORMAT C:/S
Not a boot floppy disk - press F1 to retry boot	– If there's no bootable file on the boot disk, make sure you have the correct disk inserted in the drive and that the boot disk contains the right file. – If your system's configuration does not match the floppy drive on the system, run the BIOS Setup utility to configure the correct drive.

continued

Table 6–2. POST Messages (cont.)

Message	Solution
Optional ROM bad Checksum = [xxx]	– Contact your Unisys Customer Support Center.
Shutdown failure	– Contact your Unisys Customer Support Center.
Strike the F1 key to continue	– Insert a bootable DOS floppy disk into the floppy drive. Press F1 to continue the boot.
Time of day clock stopped	– Replace the backup battery.
Timer Chip counter 2 failed	– Contact your Unisys Customer Support Center.
Timer interrupt controller bad	– Contact your Unisys Customer Support Center.
Unexpected interrupt in protected mode	– Contact your Unisys Customer Support Center.

Section 7
Upgrading Your System

This section tells you how to install the equipment upgrades available for your system. Section 7 discusses the following topics:

- Components you can replace
- Avoiding electrostatic discharge
- Removing and replacing the system unit side panels
- Removing and replacing a CPU
- Removing and replacing a VRM
- Setting CPU clock speed
- Installing RAM memory
- Removing and replacing a power supply
- Adding feature boards
- Adding internal drives
- Installing a drive in a RAID Cage
- Installing and removing a RAID Cage
- RAID SCSI cabling
- Setting RAID Cage Jumpers
- SCSI configuration for non-SCA drives

As you read Section 7, consider the following points:

- Your server may not include every component covered in this section. Feel free to skip material that does not apply to your system.
- Remember to treat any directional references as though you are looking at the front of the equipment. In other words, “left” means “toward the left side as viewed from the front of the device.”
- When using screws to secure components, leave the screws loose until all screws are in place. Once all the screws are positioned, tighten each one. This technique prevents misalignment of the screw holes and brackets.

Components You Can Replace

Your system includes the following components and devices that a technically qualified user can replace:

- CPUs and VRMs
- Memory board
- Memory board modules (SIMMs)
- Feature boards (video, SCSI, and so forth)
- Hard disk, floppy disk, CD-ROM, and tape drives

Some of the components in your system are *not* customer-replaceable. If you isolate a hardware failure in one of these components, call your Unisys Customer Support Center for assistance:

- Power supply
- System board
- System unit LEDs and switches

Avoiding Electrostatic Discharge

Whenever you remove the system unit side panels to upgrade your server, your system faces the risk of damage through Electrostatic Discharge (ESD). This risk is also present for some of your new components from the time you unpack them to the time you complete the installation. To minimize this risk, *be sure* to comply with all of the following precautions.

Caution

Damage from electrostatic discharge can result from such everyday activities as walking on rugs during periods of low humidity. The best precaution is to treat all electronic assemblies as though they contain static-sensitive components.

- Keep static-sensitive components (for example, SIMMs) in their packages until you are ready to install them.
- Before removing a component from its package, sit down and hold the package in one hand and touch the system unit frame with the other. Then, take the component out and install it immediately. Do *not* stand up or shuffle your feet until you finish installing the component.
- Handle components by their edges; avoid touching their leads, connectors, or contact points.
- If you need to remove a component from the system, be sure to store it in antistatic packaging right away.

Removing the System Unit Side Panels

Before you upgrade your system, you need to remove the system unit side panels.

WARNING

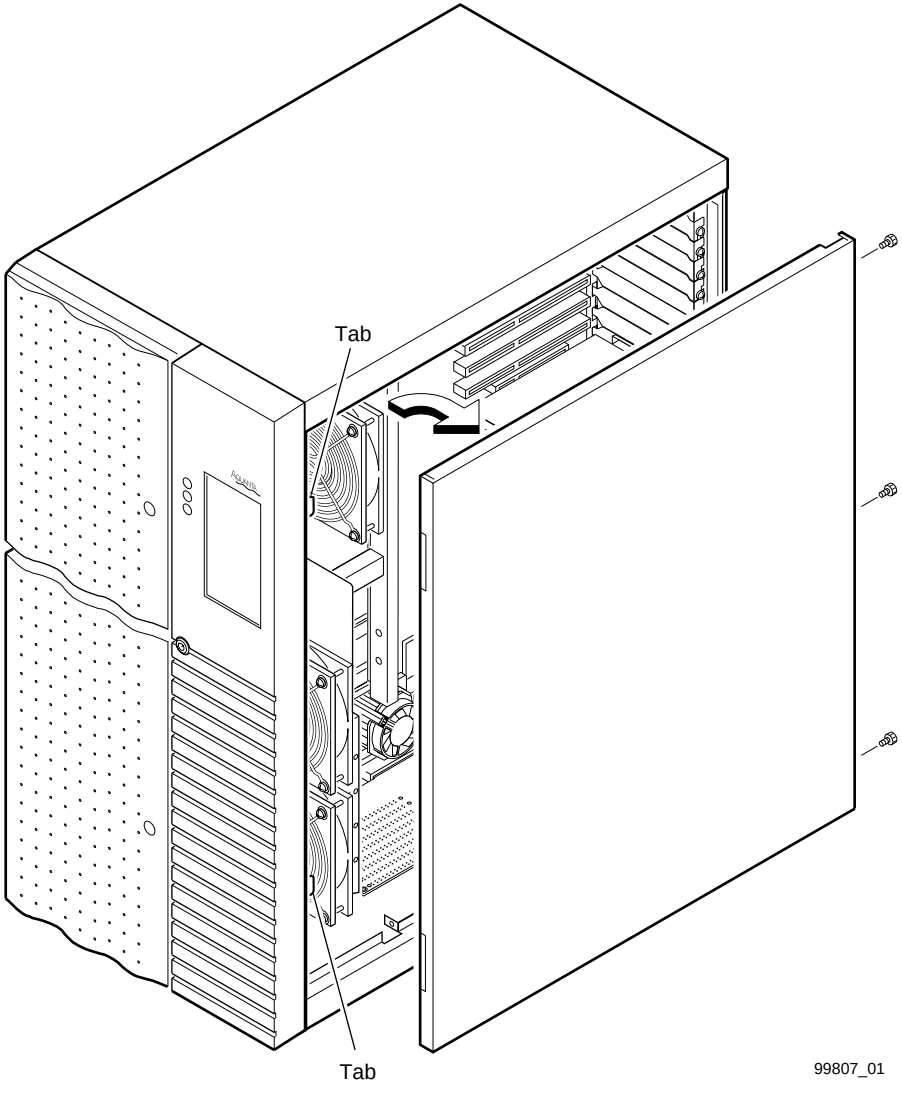
Do not run the system unit with the panels off. Operating without panels is a safety hazard and exposes the system unit to the risk of short circuits and overheating.

To remove the system unit side panels,

1. Turn off the system and unplug it from the wall. Also disconnect all other cables from the system unit.
2. Use the keys provided with your system to unlock the left or right side panel. The keylocks for the panels are located on the rear of the system unit.
3. Unscrew the three thumbscrews located on the left or right rear of the system, depending on which side panel you are removing (see Figure 7–1). The thumbscrews may be hard to unscrew; twist them fairly hard to remove.
4. Slide the panel back and away from the system unit disengaging the door from the tabs.

Once you remove the panel, be sure to observe the ESD precautions described earlier in this section.

Figure 7–1. Removing and Replacing System Unit Side Panels



Replacing the System Unit Side Panels

Before closing the system, make certain all connectors and boards are properly installed, and all cables are securely tucked in.

To replace the side panel:

1. Align the side panel with the ledges on the chassis.
2. Slide the panel toward the front of the unit.
3. Secure the panel with the thumbscrews removed when opening the system.
4. Reconnect power to the system.

Removing and Replacing a CPU

> **Caution**
>
> Before handling the CPU, make sure you are properly grounded to protect the board components from static electricity.

1. Turn off the system and unplug the power cord from the wall.
2. Open the system unit as described in "Removing the System Unit Side Panels" earlier in this section. Be sure to observe the ESD precautions outlined in "Avoiding Electrostatic Discharge," earlier in this section.
3. If replacing an existing CPU, unlatch the bracket securing the fan/heat sink; gently swing out and lift up the socket locking lever; remove the old CPU.

Note: *Install CPUs as designated on the motherboard: place the first CPU chip in socket 1, the second in socket 2, the third in socket 3, and the fourth in socket 4.*

See Figure 2–6 for the location of these sockets on the system board. Each installed CPU must have a VRM installed (see the following procedure).

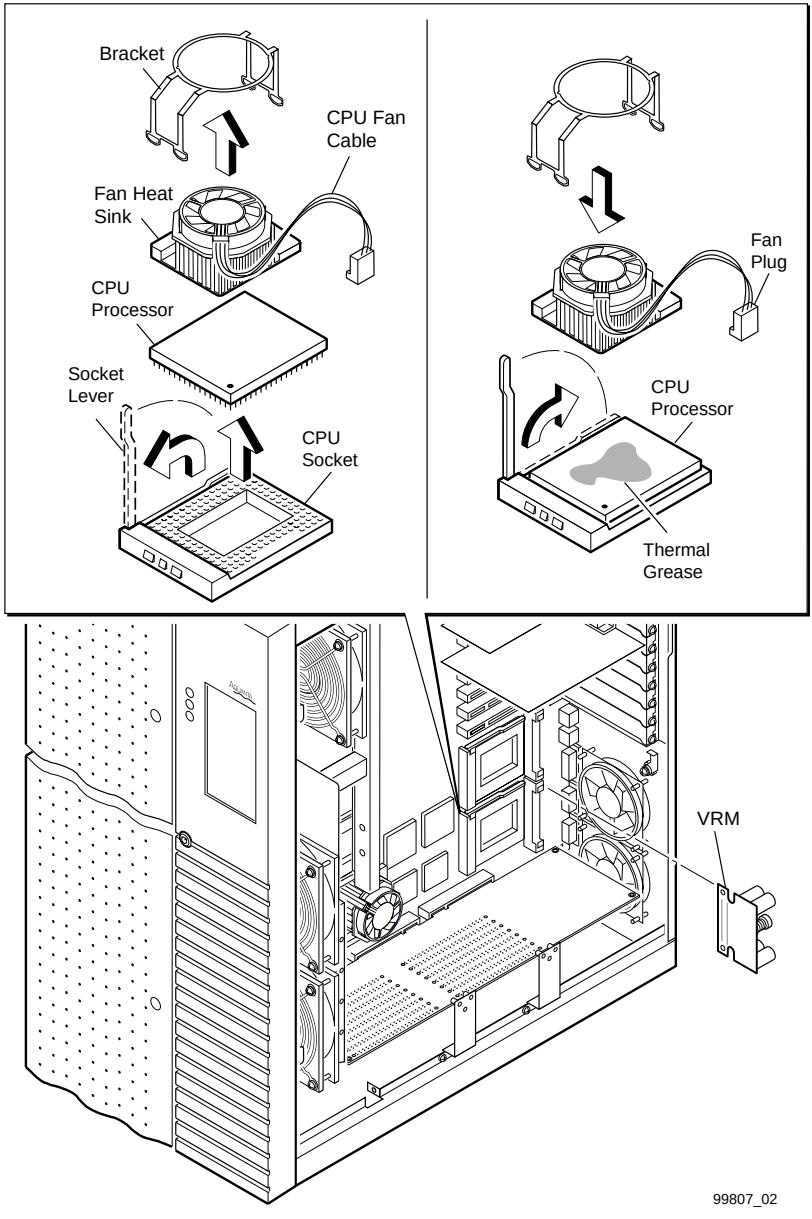
4. Install the new CPU into the socket, making sure that pin 1 on both the CPU and socket are aligned (see Figure 7–2).

Note: *Pin 1 is marked with a dot.*

5. Secure the CPU by lowering the locking lever until it latches into place.
6. Apply a layer of thermal grease to the top of the Pentium Pro chip to ensure proper contact and heat dissipation.
7. Place the new fan/heat sink assembly squarely on top of the CPU and move it around slightly to spread the thermal grease over the surface of the CPU.
8. Secure the fan/heat sink assembly with its accompanying bracket.
9. Connect the fan plug into the fan connector for the CPU just installed. (See Figure 2–6 for the location of fan connectors on the system board.)
10. If you have finished installing all the hardware that goes inside the system unit, complete steps described in "Replacing the System Unit Side Panels."
11. Run the System Configuration Utility (SCU) to update your server configuration.

    The system should automatically recognize the CPU during the Power-On Self -Test.

Figure 7–2. Installing a Processor and Voltage Regulator Module



Removing and Replacing a VRM

Caution

Before handling the VRM, make sure you are properly grounded to protect the board components from static electricity.

1. Turn off the system and unplug the power cord from the wall.
2. Open the system unit as described in "Removing the System Unit Side Panels" earlier in this section. Be sure to observe the ESD precautions outlined in "Avoiding Electrostatic Discharge."
3. If replacing an existing VRM, depress the tabs at each end of the VRM socket until the VRM board is released; remove the old VRM.
4. Hold the new Voltage Regulator Module (VRM) over the VRM socket, making sure the pins on both the VRM and socket are aligned. (Both VRM and socket are keyed to prevent improper connection.)
5. Gently insert the VRM into the socket until it locks into place (see Figure 7–2).
6. If you have finished installing all the hardware that goes inside the system unit, complete steps described in "Replacing the System Unit Side Panels."

Selecting CPU Clock Speed

The CPU clock speed is determined by the bus clock speed, the CPU speed, and a multiplier (see Table 7–3). The CPU bus clock speed is selected with the JP12 jumper on the system board, and the multiplier is selected with the JP11 jumper also on the system board.

Figure 2–6 shows the location of these jumpers.

Selecting the Bus Clock Speed

The bus clock speed is selected by the JP12 jumper on the system board.

> **Caution**
>
> Do not mix processors with different speeds on the same system board. Installing processors with different speeds will destroy the lower-speed CPU, create erroneous data before it fails, and cause other problems.

Table 7–1 shows the available settings for selecting bus clock speed.

Table 7–1. JP12 Bus Clock Speeds

Connected Jumpers	Bus Clock Speed
1-2	60 MHz
2-3	66 MHz

Setting the CPU Clock Multiplier

Table 7–2 shows available multiplier options and the JP11 jumper settings necessary to select them.

Table 7–2. JP11 CPU Clock Multipliers

Jumper Connection			Multiplier Selected
1-2	3-4	5-6	
Open	Open	Open	2x
Jumpered	Open	Open	2.5x
Open	Jumpered	Open	3x
Jumpered	Jumpered	Open	3.5x
Open	Open	Jumpered	4x
Jumpered	Open	Jumpered	4.5x
Open	Jumpered	Jumpered	5x
Jumpered	Jumpered	Jumpered	5.5x

Calculating the CPU Clock Speed

Table 7–3 shows the CPU clock speed arrived at by combining the bus clock speed and multiplier.

Table 7–3. CPU Clock Speed

60-MHz Bus Clock		66-MHz Bus Clock	
Multiplier	**CPU Speed**	**Multiplier**	**CPU Speed**
2	120 MHz	2	133 MHz
2.5	150 MHz	2.5	166 MHz
3	180 MHz	3	200 MHz

Installing RAM Memory

Your system can support up to 1 gigabyte (GB) of ECC (Error Control Code) memory.

Caution

Since the SIMM sockets in your system are tin plated, you must use tin-plated SIMMs when upgrading your system memory. If you use gold-plated SIMMs, your system may be damaged.

When planning your SIMM configuration, be sure to consider the following issues:

1. Use only Unisys-approved SIMMs. All SIMMs must support 60 ns or faster access times. Contact your Unisys sales representative for a list of approved SIMMs.
2. The system unit includes four memory banks (A through D) shown later in Figure 7–4. Each memory bank includes four 72-pin SIMM sockets each of which is capable of holding one 72-pin SIMM.

3. Your RAM card must be physically mapped to show the location of the memory banks as shown later in Figure 7–4.

Memory Interleaving

Memory interleaving improves memory access speeds: the higher the interleave, the better the performance.

To achieve optimal performance, observe these rules when installing memory:

- Always select a 4:1 interleave type – fill either four rows or eight rows with the same type and speed of SIMMs.
- Fill rows with the same type of SIMMs with a speed of 60 ns. Always start with row 1 (the first row in bank A), and proceed to fill all increasing rows. Do not skip rows.

Note: *Unisys highly recommends that you use either 8 or 16 SIMMs at a time (4:1 interleave). Any other SIMMs combination will degrade system performance.*

The memory interleaving used by your system is automatically selected based on the number of rows which have SIMMs installed, and the type of SIMMs installed.

- 4:1 interleaving uses either four or eight rows. Always run your system at this level.
- 2:1 interleaving uses either two or six rows.
- 1:1 interleaving uses any odd number of rows. 1:1 interleaving is used when any one row uses SIMMs with different memory sizes.

Note: *Each row consists of two SIMM sockets horizontally aligned. In Figure 7-4, banks A through D contain two rows each.*

Tables 7–4 and 7–5 help you to configure your RAM correctly.

Table 7–4. RAM Expansion Chart for 4:1 Interleave Type

Interleave Type	4:1			
SIMM Size	Total Memory Minimum	SIMM Quantity	Total Memory Maximum	SIMM Quantity
1 MB x 36	32 MB	8	64 MB	16
2 MB x 36	64 MB	8	126 MB	16
4 MB x 36	126 MB	8	256 MB	16
8 MB x 36	256 MB	8	512 MB	16
16 MB x 36	512 MB	8	1 GB	16

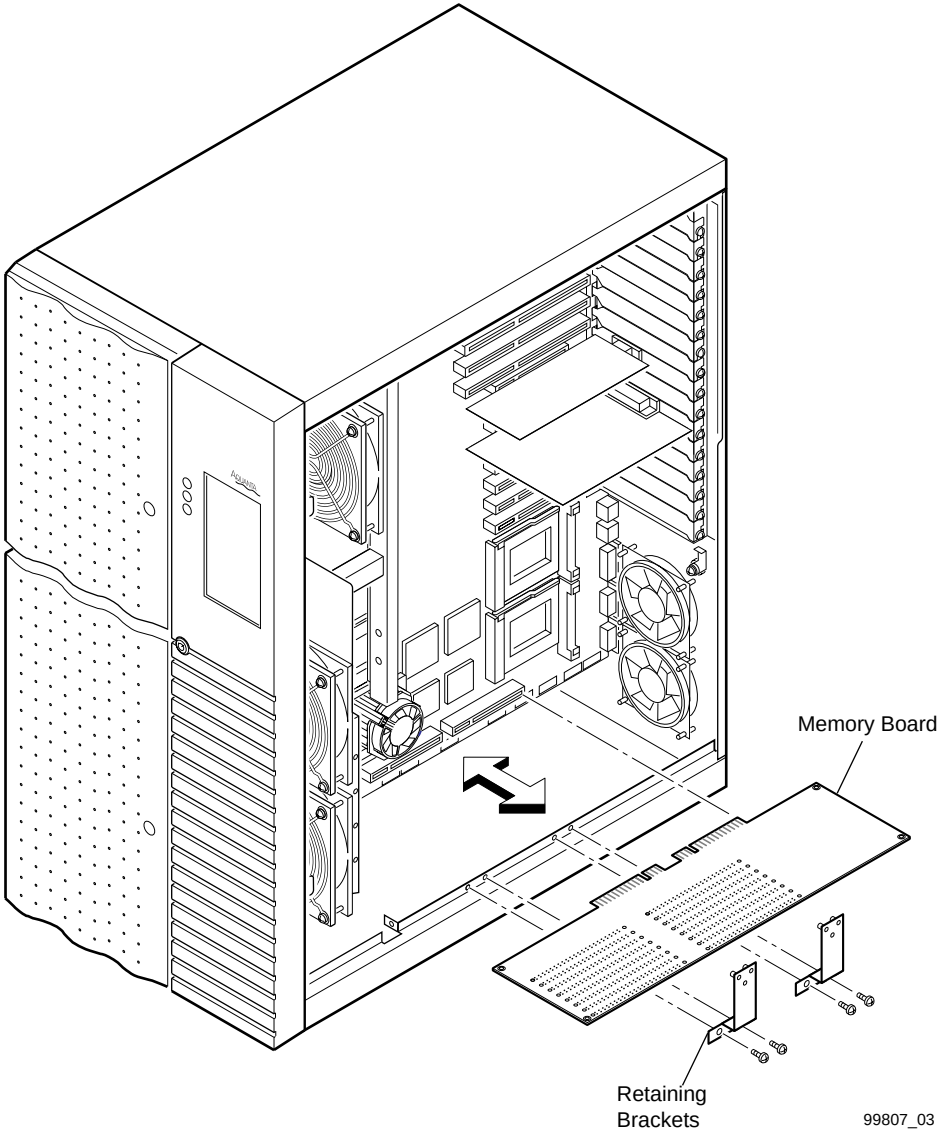
Table 7–5. RAM Expansion Chart for 1:1 and 2:1 Interleave Types

Interleave Type	1:1		2:1	
SIMM Size	Total Memory	SIMM Quantity	Total Memory	SIMM Quantity
1 MB x 36	8 MB	2	16 MB	4
2 MB x 36	16 MB	2	32 MB	4
4 MB x 36	32 MB	2	64 MB	4
8 MB x 36	64 MB	2	126 MB	4
16 MB x 36	126 MB	2	256 MB	4

To install RAM,

1. Turn off the system and unplug it from the wall.
2. Open the system unit as described in “Removing the System Unit Side Panels,” earlier in this section. Be sure to observe the ESD precautions outlined in “Avoiding Electrostatic Discharge,” earlier in this section.
3. Remove the memory module from the system board as shown in Figure 7–3. Lay the memory module on a static-free surface.

Figure 7–3. Removing the Memory Board



4. Install each SIMM as follows:

    a. Hold the SIMM at a 45 degree angle while you insert it into the socket as shown in Figure 7–4. Push the SIMM module into the socket until it is firmly seated.

    b. Tilt the SIMM up to a vertical position until the spring-loaded retaining clips lock the SIMM into place.

5. Reinstall the memory module, making certain it seats firmly into the system board memory slot.

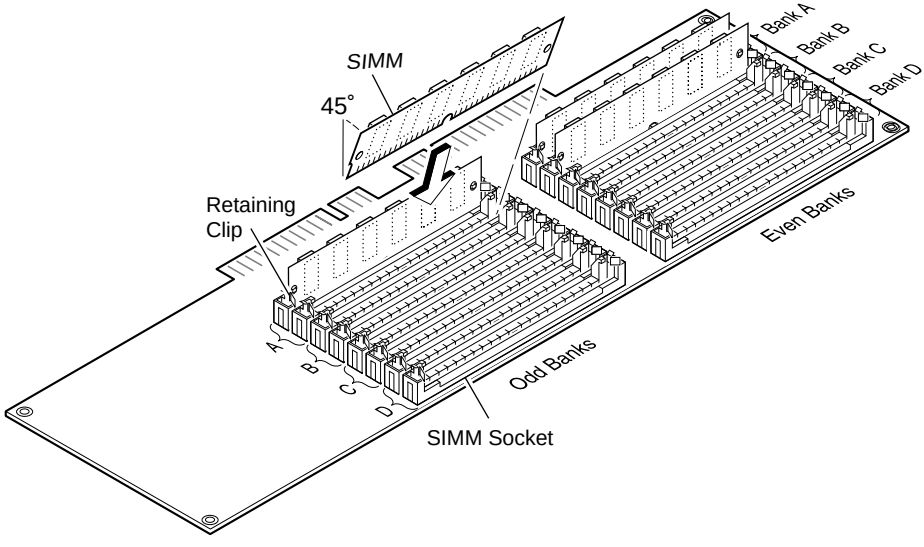
Note: *Insert the memory module so that the SIMMs point down.*

6. If you have finished installing all the hardware that goes inside the system unit, complete steps described in "Replacing the System Unit Side Panels."

When you next turn on the system, you need to run the BIOS Setup utility for the new memory to be recognized. When you do so, confirm the amount of memory installed.

Note: *For details on running the BIOS Setup utility, see Section 4, "Configuring Your System."*

Figure 7–4. Installing SIMMs



Removing and Replacing a Power Supply

Your system includes one or two power supplies with a load share module. All power from the power supplies goes directly to the load share module which then distributes the power to logic (system board) and peripherals.

The power supplies are “redundant,” meaning that you can replace them while maintaining the safety and reliability of your system. If one power supply fails or loses power, the load share module automatically switches over to the working power supply and has it supply power for the system. The load share module also activates the power supply alarm. The POWER ALARM RESET button accessed from the Power LCD display allows you to turn off the alarm without having to turn off the computer.

A system with two power supplies will have two external power cords. Be sure to connect the power cords to two separate outlets, each of which is on an independent electrical circuit. When the cords are connected to different electrical circuits, the system continues operation even if one of the circuit breakers is tripped or shut off.

Note: *In the rare situation that both power supplies have to be replaced, first remove and replace power supply #1, and then repeat the procedures for power supply #2.* ***Do not remove both power supplies and then attempt to replace them at the same time– this may be confusing due to the large number of power connectors.***

Removing a Power Supply

Follow this procedure to remove a power supply:

1. Power down the system and disconnect the power cords from the electrical outlets.
2. Remove the system side panels.
3. Identify the failed unit by the unlighted LED on the load share module. (The unlighted LED represents the connector bank “A” or “B”; check which power supply is connected to the bank.)
4. Unplug the internal power cord from the power supply being removed.
5. Remove five power cable connectors from the load share module connectors. Observe how the cables connected to the load share module – you will need to duplicate these connections in “Replacing a Power Supply.”
6. Remove the four screws that secure the power supply to its bracket, and remove the power supply from its bracket.

The power supply is now removed.

Replacing a Power Supply

Follow this procedure to install a power supply:

1. Seat the power supply in its bracket, and secure with four screws.

Note: *Mount the power supply so that the ac-in receptacle faces out.*

2. Connect the internal power cable to the ac-in receptacle on the power supply.
3. Verify that the voltage selection switch is set for the local power voltage.
4. Connect five power supply cable connectors to the load share module as shown in Figure 7–5.

   All five connectors from a power supply must plug into either the "A" connector sockets (PSA-PWR and PSA-CTL) or "B" connector sockets (PSB-PWR and PSB-CTL) on the load share module.

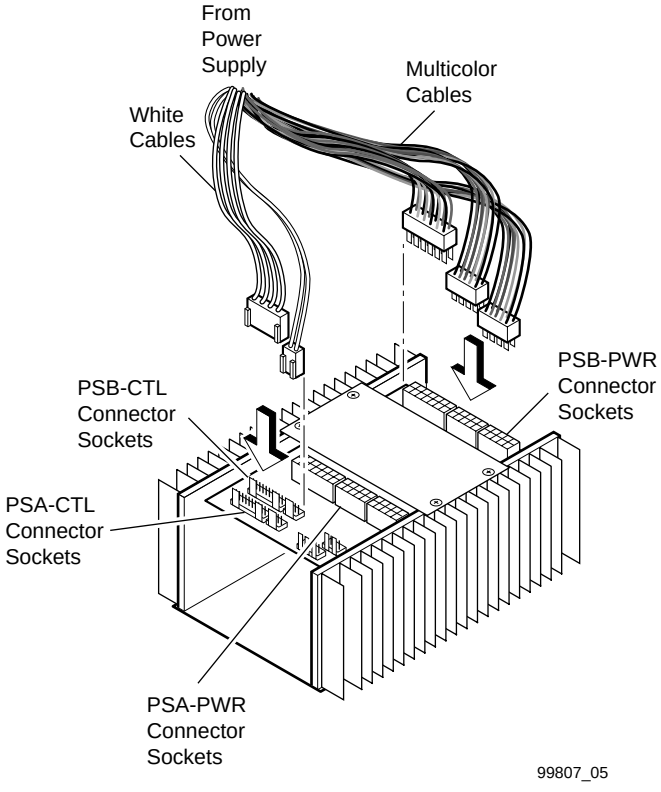
   The PWR bank has three connector sockets which seat the colored-cable connectors, whereas the CTL bank has two keyed connector sockets which seat the white-cable connectors.

   Either power supply can connect to either set of connectors, as long as all five from one power supply connect "A" or "B" on the load share module.

Note: *When replacing a power supply, try to duplicate the previous cable connections.*

5. Replace the system side panels.
6. Connect two power cords to the ac-in receptacles on the rear of the system unit. Power up the system.

Figure 7–5. Connecting the Power Supply to the Load Share Module



Adding Feature Boards

Aquanta QS/6 and QS/6U Series systems have seven EISA feature board slots, one shared EISA/PCI slot, and seven PCI feature board slots. Counting from the top, slots 1 through 8 support EISA boards. In the lower slots, slots 1 through 8 support PCI boards. The PCI expansion slots are divided between two peer-level PCI bridges. Note that your system comes with a preinstalled PCI video feature board and a preinstalled SCSI controller board.

Note: *If you have an ETH100-ESA ISA Ethernet board installed, you must configure it as an alternate rather than as primary.*

Feature boards may include switches and jumpers that need to be set before installation. See the documentation that comes with each feature board for instructions on switch settings, jumper settings, and external cabling requirements.

Address and interrupt assignments must be unique for each feature board. The address settings and interrupt assignments for a feature board depend on which kind of feature board you are installing:

- If you are installing an EISA peripheral board, use the System Configuration Utility (SCU) to change assignments to resolve any conflicts before you use the board. See Section 4 and the *EISA Configuration Utility User's Guide* for information on the SCU.
- If you are installing an ISA board, you need to run the SCU to preset the board configuration before physically installing the board. See Section 4 and the *EISA Configuration Utility User's Guide* for information on the SCU.

To protect feature cards from static electricity:

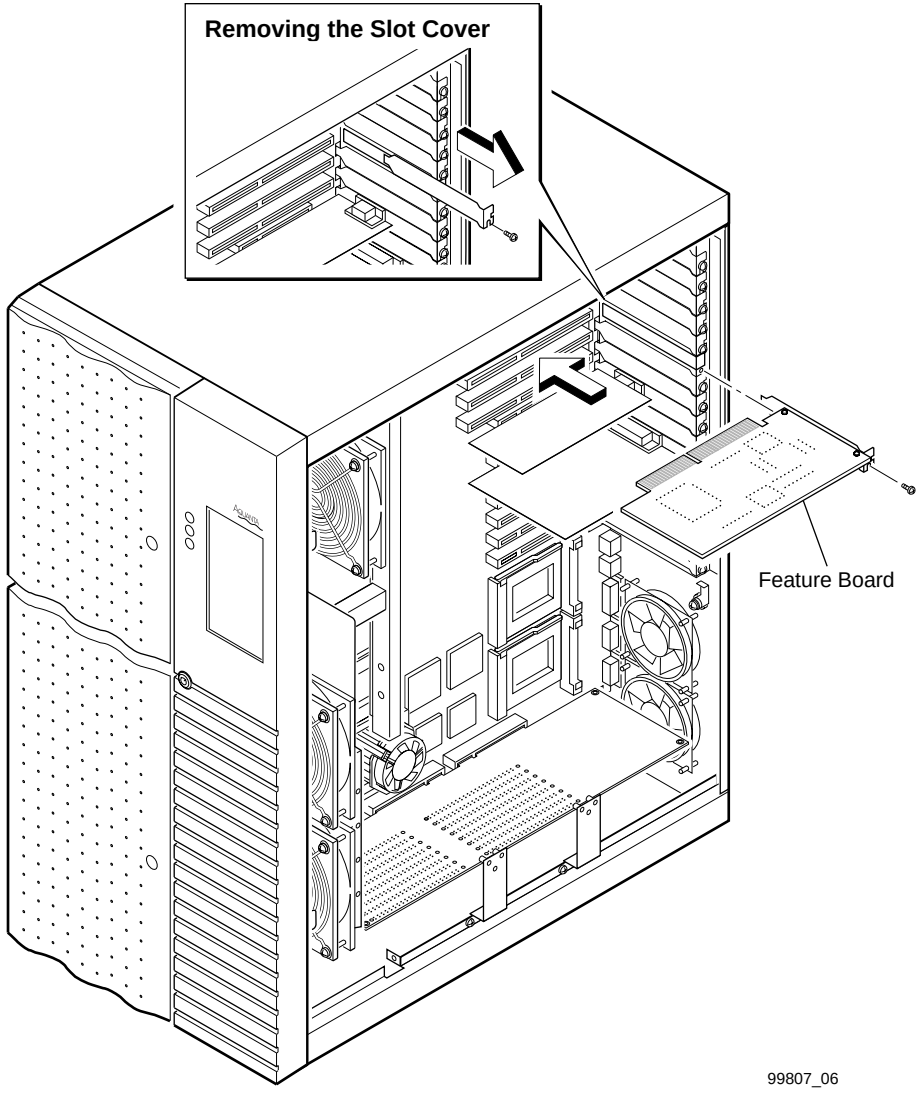
- Always hold peripheral boards by their straight edges.
- Do not rest the board on any static surface such as carpeting or paper.
- Before removing the card from its antistatic bag, discharge static electricity from your body by touching the metal cabinet.

To install a feature board in your system:

1. Turn off the system and unplug the power cord from the wall.
2. Remove the panel on the right side of the system unit, as described in "Removing the System Unit Side Panels," earlier in this section. As you work, observe the ESD precautions outlined in "Avoiding Electrostatic Discharge," earlier in this section.
3. Using a Phillips screwdriver, remove the screw securing the slot cover from an available slot, as shown in Figure 7–6. Save the screw for later use. Slide the cover out and save it in case you ever need to remove the board.
4. Remove the feature board from its packaging. Set any necessary switches and jumpers on the board, according to the documentation provided with the board. Make sure the feature board jumper settings do not conflict with any of the system board jumper settings.
5. Holding the board by its edges, insert the board into the expansion slot, as shown in Figure 7–6. If you are installing a full-size board, make certain it aligns with the board guide at the front of the system chassis. Some boards have a tight fit, so you may need to push fairly hard.
6. Secure the board with the screw you removed in step 3. Check that the board is seated correctly.
7. Repeat steps 3 to 6 for additional feature boards.
8. If you have finished installing all the hardware that goes inside the system unit, complete the steps described in "Replacing the System Unit Side Panels."
9. Power up your system and configure the feature board by using the System Configuration Utility described in Section 4.

   EISA feature boards are supplied with a configuration file. You will use this file to configure the board.

Figure 7–6. Installing a Feature Board



Adding Internal Drives

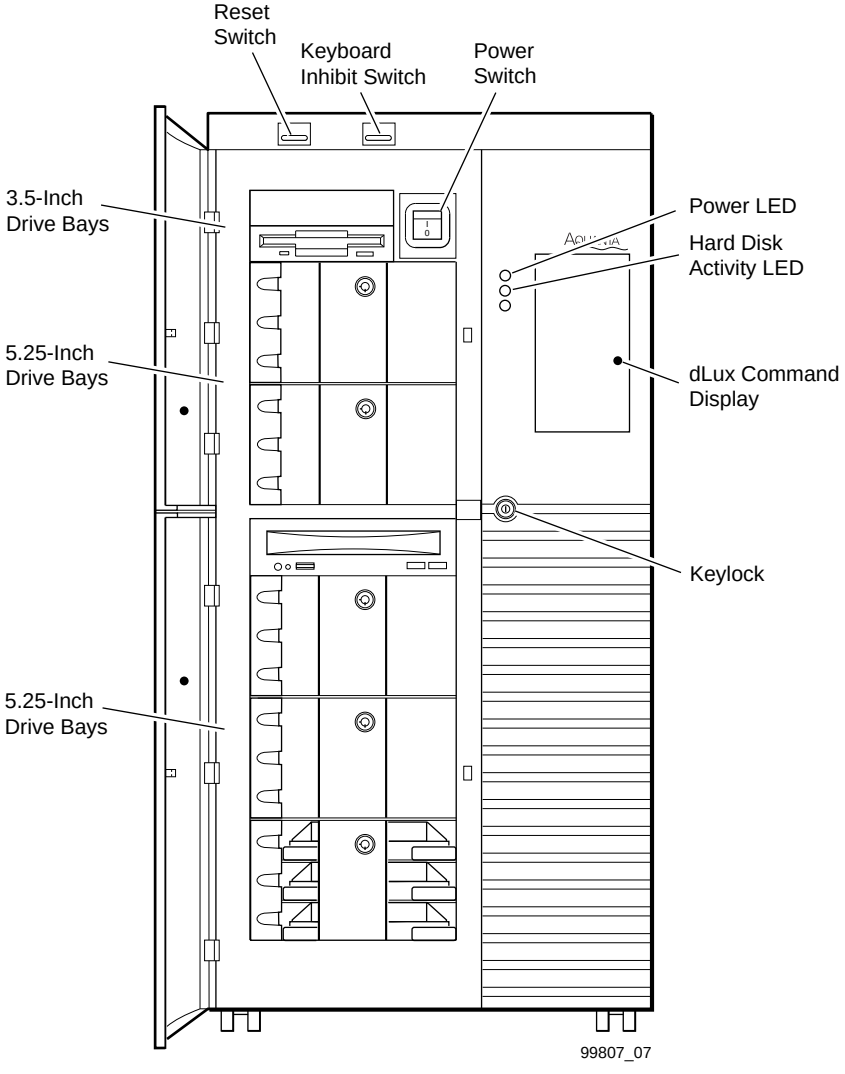
Note: *Before you install SCSI drives, see the discussion "SCSI Configuration," later in this section.*

Your system supports up to thirteen internal drives: two half-height, 3.5-inch drives and eleven half-height, 5.25-inch drives. All drive bays are designed for removable-media devices such as tape and floppy drives. You can install 3.5-inch drives in the top two bays and 5.25-inch drives in the remaining bottom bays. You can also install a 3.5-inch device in a 5.25-inch bay using an adapter bracket.

The following procedures describe how to install drives in your system. Figure 7–7 shows the location of drive bays in an SME system. See Figure 2–1 for an illustration of the drive bays in an SFE system.

Note: *SFE systems have preinstalled RAID compartments as shown previously in Figure 2–1. Refer to "Installing a Drive in a RAID Cage" for instructions on installing drives in the compartments.*

Figure 7–7. Drive Bays in the SME System



Installing a 3.5-Inch Drive

Your system comes with a 3.5-inch floppy disk drive already installed. You can install a second 3.5-inch drive in the top drive bay.

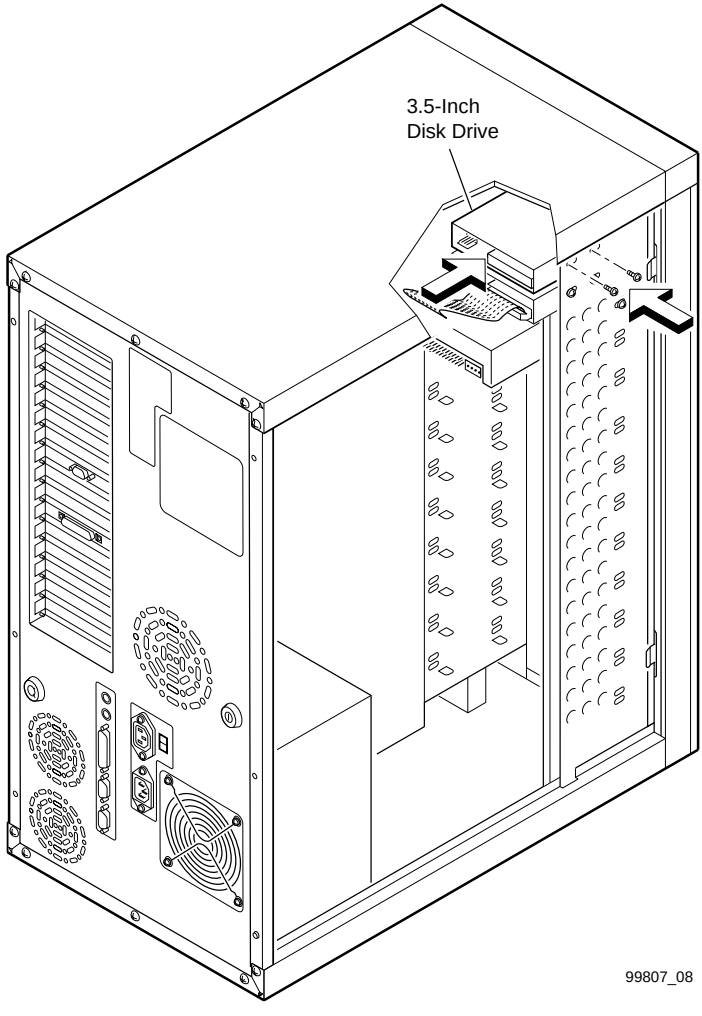
Note: *Before you install SCSI drives, you need to specify a SCSI ID and set the SCSI termination. For information, see the discussion "SCSI Configuration," later in this section, and the documentation that came with your SCSI drive.*

To install a 3.5-inch drive,

1. Remove the side panels of the system unit, as described in "Removing the System Unit Side Panels," earlier in this section.
2. Remove the front filler panel from the drive bay you're going to use. Working from the left side of the system unit, press the locking tabs on the filler panel inward, and pop the filler panel out.
3. Insert the drive into the drive bay, as shown in Figure 7–8.
4. Secure the drive in the bay using four of the screws (two on each side) supplied with the drive. Be sure to use the lower set of screw holes to secure the drive.
5. Connect the power cable and interface cable to the rear of the drive. When connecting the interface cable, be sure to match pin 1 on both connectors. On most standard cables, pin 1 is designated by a colored wire on the cable. In some cases, the connector is specifically keyed to prevent improper connections. Remember these points as you cable the drive:
   - **Power cables** — These cables originate at the power supply. Select any free connector.
   - **IDE cables** — The IDE cable has two connectors.
   - **SCSI cable** — This cable originates at the preinstalled SCSI or RAID SCSI controller board. Route the cable under the system board and attach the drive to a free connector.
6. If you have finished installing all the hardware that goes inside the system unit, complete the steps described in "Replacing the System Unit Side Panels."

When you next turn on the system, be sure to update your drive configuration by running the BIOS Setup utility and specifying appropriate drive parameters. For information on running the BIOS Setup utility, see Section 4, “Configuring Your System.”

Figure 7–8. Installing a 3.5-Inch Drive



Installing a 5.25-inch Drive

You can install up to eleven 5.25-inch drives in the bottom eleven drive bays.

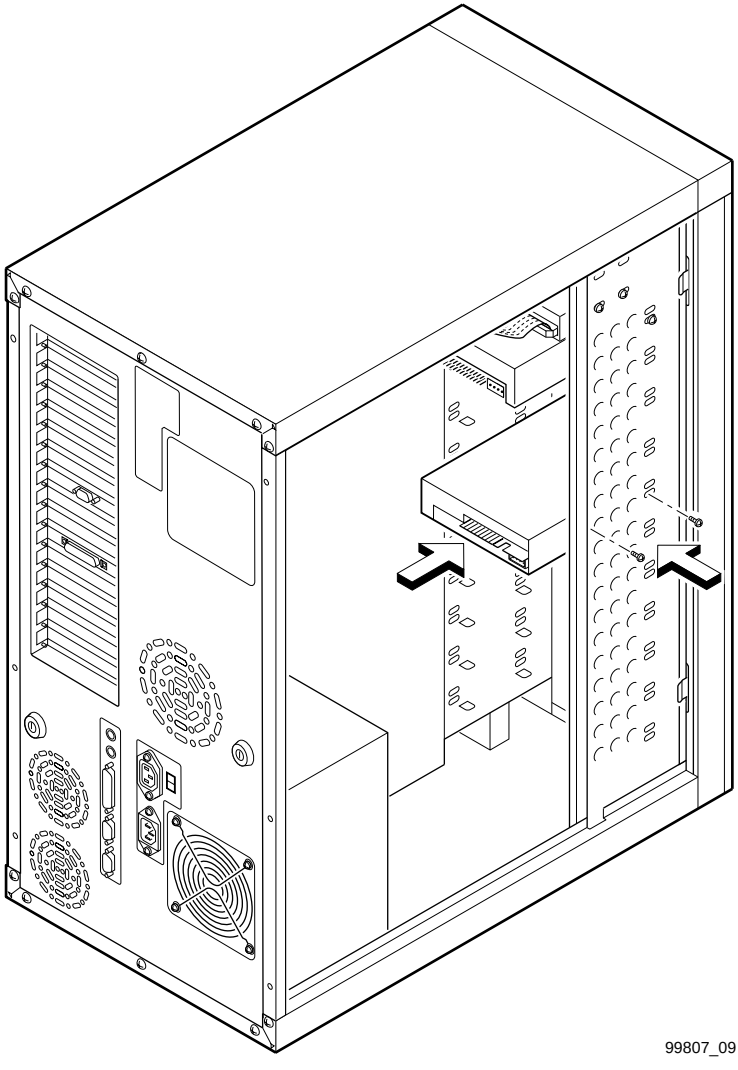
Notes:

- *If you have a RAID system, see the discussion "RAID SCSI Cabling" later in this section.*
- *If you have a non-RAID system, you need to specify a SCSI ID and set the SCSI termination on the drive. For information, see the discussion "SCSI Configuration for Non-SCA Drives," later in this section, and the documentation that came with your SCSI drive.*

To install a 5.25-inch drive:

1. Remove the side panels of the system unit as described in "Removing the System Unit Side Panels," earlier in this section.
2. Remove the filler panel from the drive bay you're going to use. Working from the left side of the system unit, press the locking tabs on the filler panel inward, and pop the filler panel out.
3. Insert the 5.25-inch drive into the drive bay, as shown in Figure 7–9.
4. Secure the drive to the chassis with four screws (two on each side). Be sure to use the lower set of screw holes to secure the drive.

Figure 7–9. Installing a 5.25-inch Drive



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5. Connect the power cable and interface cable to the rear of the drive. When connecting the interface cable, be sure to match pin 1 on both connectors. On most standard cables, pin 1 is designated by a colored wire on the cable. In some cases, the connector is specifically keyed to prevent improper connections.
   Remember these points as you cable your drive:
   - **Power cables** — These cables originate at the power supply. Select any free connector.
   - **IDE cables** — The IDE cable has two connectors.
   - **SCSI cable** — This cable originates at the preinstalled SCSI or RAID SCSI controller board. Route the cable under the system board and attach the drive to a free connector.
6. If you have finished installing all the hardware that goes inside the system unit, complete the steps described in "Replacing the System Unit Side Panels."

When you next turn on the system, be sure to update your drive configuration by running the BIOS Setup utility and specifying the appropriate drive parameters. For more information on running the BIOS Setup utility, see Section 4, "Configuring Your System."

Installing a 3.5-inch Drive in a 5.25-inch Drive Bay

You can add additional 3.5-inch drives in 5.25-inch drive bays using adapter brackets that come with the drives.

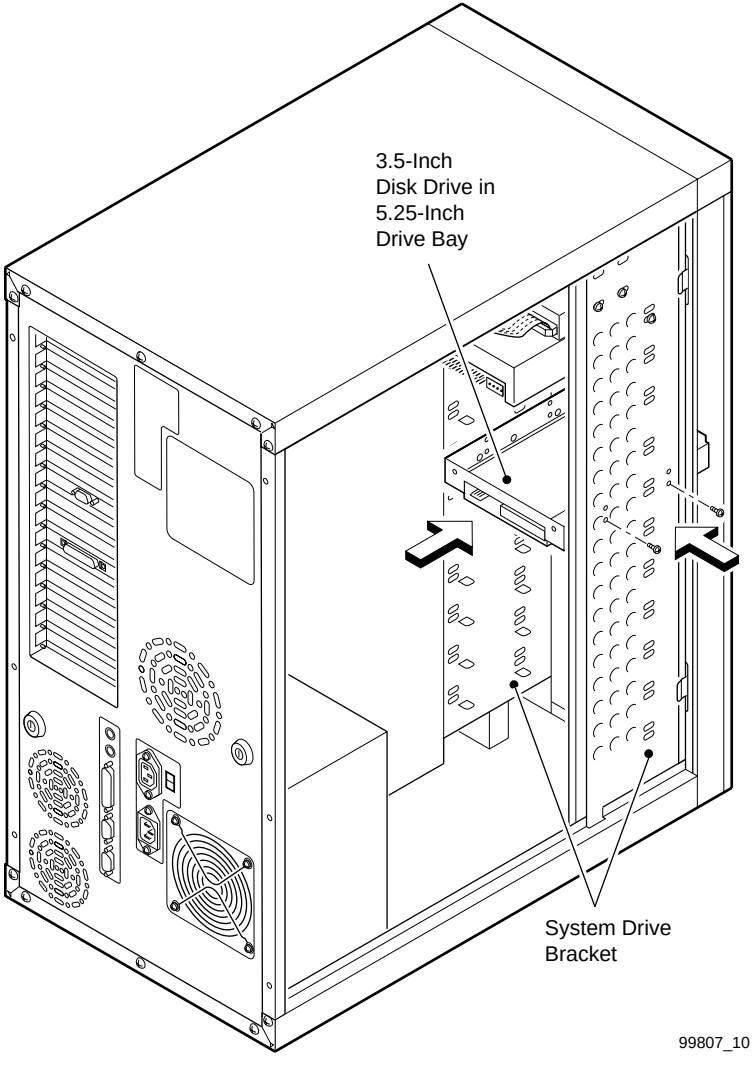
Note: *Before you install SCSI drives you need to specify a SCSI ID and set the SCSI termination. For information, see "SCSI Configuration for Non-SCA Drives" later in this section, and the documentation that came with your SCSI drive.*

To install a 3.5-inch drive in a 5.25-inch drive bay,

1. Remove the side panels of the system unit, as described in "Removing the System Unit Side Panels," earlier in this section.
2. Remove the drive from its packaging. Locate the adapter bracket and screws that came with the drive.
3. If you are installing a removable-media drive, such as a tape or floppy disk drive, remove the filler panel from the drive bay you're going to use. Working from the left side of the system unit, press the locking tabs on the filler panel inward, and pop the filler panel out.
4. Place the 3.5-inch drive into the adapter bracket and secure it using four of the screws that came with the bracket.
5. Insert the drive and the bracket assembly into the 5.25-inch drive bay, as shown in Figure 7–10. Make certain that the bracket is secured to the system drive bracket with four of the screws that came with the drive. Use the lower set of screw holes to secure the drive.

   Note: *The back right screw holes of the upper 5.25-inch drive bays may be obscured by the system fans. If so, secure the bracket with* ***three*** *screws.*

Figure 7–10. Installing a 3.5-inch Drive in a 5.25-inch Drive Bay



6. Connect the power cable and interface cable to the rear of the drive. When connecting the interface cable, be sure to match pin 1 on both connectors. On most standard cables, pin 1 is designated by a colored wire on the cable. In some cases, the connector is specifically keyed to prevent improper connections.

   Remember these points as you cable your drive:

   - **Power cables** — These cables originate at the power supply. Select any free connector.
   - **IDE cables** — The IDE cable has two connectors.
   - **SCSI cable** — This cable originates at the preinstalled SCSI controller board. Route the cable underneath the system board and attach the drive to a free connector.

7. If you have finished installing all the hardware that goes inside the system unit, replace the system unit side panels. Remember to secure the panels using the thumbscrews you removed earlier.

When you next turn on the system, update the drive configuration by running the BIOS Setup utility and specifying the appropriate drive parameters. For more information on running the BIOS Setup utility, see Section 4 “Configuring Your System.”

Installing a Drive in a RAID Cage

If your SFE system comes with an easily configurable RAID subsystem, it supports up to five built-in RAID Cages that can each hold up to three SCSI disk drives.

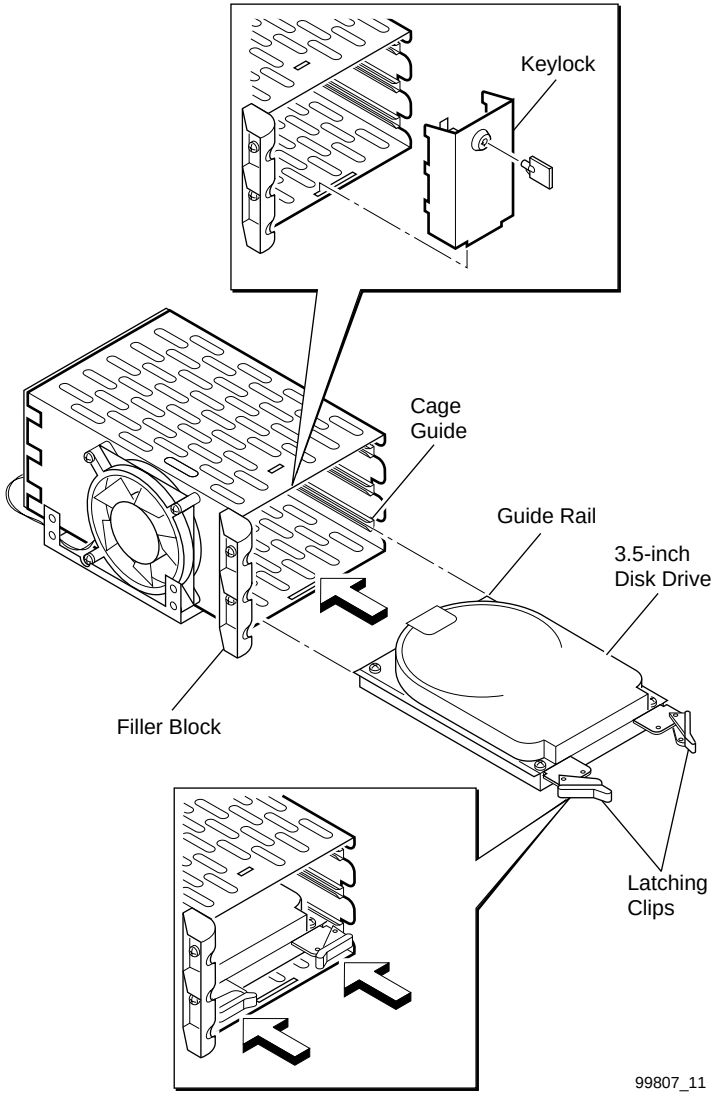
The drives are typically mounted on a rail system, which provides for quick installation and hot swapping.

Note: *Some disk drives and their rail systems are packaged separately. If the rails are not installed, refer to the documentation that came with the disk drive for instructions on how to install the rails.*

To install a hard disk drive in a RAID Cage:

1. Unlock the RAID compartment where you want to install a drive.
2. Starting from drive 0, unlock the drive's latching clips by swinging them out, then align drive rails with drive cage guides.
3. Push the device completely into the slot as shown in Figure 7–11.
4. Once the drive is seated in the cage, close the latching clips until they click into place.
5. Set the SCSI ID on the back of the RAID Cage (JP5).
6. Label the SCSI channel number and SCSI ID number on the front of the drive.

Figure 7–11. Installing a Drive in a RAID Cage



Installing and Removing a RAID Cage

If you need to change your disk drive configuration, you might need to install or remove a RAID Cage. Each RAID Cage supports three 1-inch-high, 3.5-inch, 1-GB or 2-GB SCSI drives. Up to five of these cages can be installed on the system for a total of 15 hot-swappable drive bays. Drives are mounted on a rail system which provides quick and easy installation and hot swapping.

To replace a preinstalled tape drive with a SCSI drive in the RAID configuration, you need to install a RAID Cage to hold the new SCSI drive. Conversely, if you want to install a tape or CD-ROM drive in one of the 5.25-inch drive bays, you first need to remove the RAID compartment that is preinstalled in the bay.

To install a RAID Cage:

1. Remove the side panels of the system unit as described in "Removing the System Unit Side Panels," earlier in this section.
2. Remove two filler panels located in front of the drive bay on the system. Working from the left side of the system unit, press the locking tabs on the filler panel inward, and pop the filler panel out.
3. If the filler block is not already attached, then secure the filler block to the left side of the drive cage with the two screws supplied with the RAID Cage.
4. With the filler block secured, slide the drive cage into the system drive bracket.
5. Secure the drive cage to the system drive bracket with the eight screws (four on each side) supplied with the RAID Cage.

To remove a RAID Cage:

1. Remove the side panels of the system unit as described in "Removing the System Unit Side Panels," earlier in this section.
2. Remove the eight screws (four on each side) that secure the RAID Cage.
3. Slide the drive cage out of the system drive bracket.

For more information, refer to the *RAID Cage Kit Installation Guide.*

RAID SCSI Cabling

The SCSI RAID controller board installed in the SFE system includes three internal SCSI channels: Channel 0, Channel 1, and Channel 2

- Channel 0 supports an internal SCSI connector, to which you can attach one RAID Cage that can contain up to three internal disk drives. This channel also supports an external SCSI connector.
- Channel 1 supports one internal SCSI cable, to which you can attach two RAID Cages that can contain up to six internal disk drives.
- Channel 2 supports another SCSI cable, to which you can attach two RAID Cages that can contain up to six internal disk drives.

Figure 7–12 illustrates the RAID configuration.

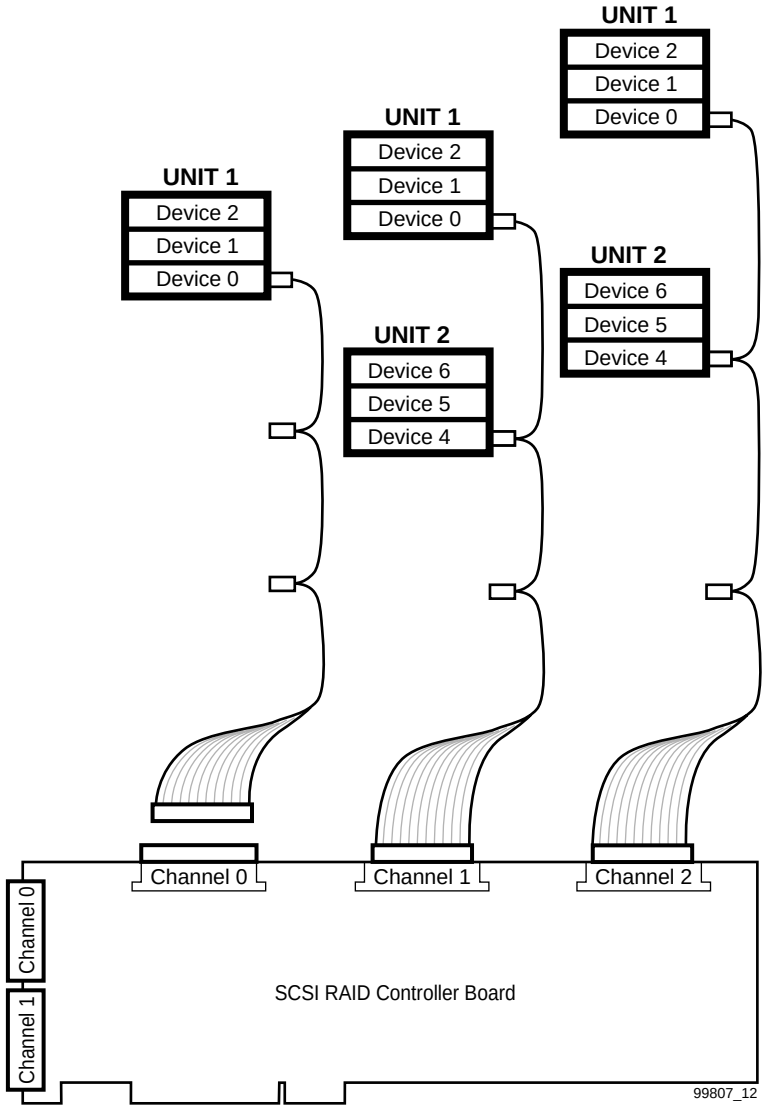
RAID Cages are installed beginning with Channel 2, then Channel 1, and last Channel 0. Up to five RAID Cages can be configured in an SFE system. Each RAID Cage backplane (Unit 1 or 2) must be configured based on its installed location. RAID Cages are connected beginning with the last connector on the interface cable; the last cage is always configured as unit 1.

RAID Cages must be configured as shown in Figure 7–12 and according to the jumper settings specified in Table 7–6.

Table 7–6. Drive Bay Jumper Configuration

Unit Number	Jumper	Setting
1	JP5	OPEN
1	JP20	OPEN
1	JP21	OPEN
1	JP3	1–2
2	JP5	JUMPERED
2	JP20	JUMPERED
2	JP21	JUMPERED
2	JP3	1–2

Figure 7–12. SFE RAID Configuration



Cabling Tape Drives and CD-ROM Drives

Note the following when installing a tape drive or a CD-ROM drive:

- If you install a SCSI tape drive, it must be connected to Channel 0, and it must use SCSI ID 2.
- If you install a SCSI CD-ROM drive, it must be connected to Channel 0, and it must use SCSI ID 3 or 5.

For information on SCSI IDs, see "SCSI Configuration for Non-SCA Drives," later in this section.

Setting RAID Cage Jumpers

Before you proceed with the RAID Cage Kit installation, set the ID jumper JP5, SCSI termination power jumper JP3, and SCSI termination jumpers JP20 and JP21 appropriately. These jumpers are located on the RAID Cage backplane (see Figure 7–13).

Setting ID with JP5

Up to seven devices can be connected to each channel provided by the controller. Each SCSI device is assigned a SCSI ID number (address) from 0 through 6. The active backplane of the RAID Cage automatically assigns the SCSI ID numbers for the drives based on whether the cage is jumpered at JP5 to be Unit 1 or Unit 2. As shown in Table 7–7, the cages assign the ID numbers as follows:

- **Unit 1** -- ID numbers **0**, **1**, and **2.**
- **Unit 2** -- ID numbers **4**, **5**, and **6.**

Note: *Drives are installed in ascending order starting with the bottom bay. The bottom drive bay is ID 0.*

SCSI ID numbers are assigned so the lowest position in the cage receives the lowest SCSI ID. For example, the lowest slot in a cage is either 0 or 4 and the top slot in a cage is either 2 or 6, depending on whether JP5 set the Unit ID to 1 or 2.

Note: *In normal practice, each SCA drive has a drive number label affixed to the front of the drive. The drive number on the label corresponds to the SCSI ID of the device. When installing new or replacement drives, to avoid future confusion you should make sure the label matches the ID you have assigned it.*

SCSI ID number 3 is available for use by other SCSI peripherals such as CD-ROM drives.

Table 7–7. Unit ID (JP5)

Unit ID	JP5 Setting	SCSI IDs Assigned to Drives
1	Open	0, 1, 2
2	Closed	4, 5, 6

If you decide to add more than seven SCSI devices, you will need a second SCSI channel.

SCSI Termination

When terminating SCSI devices, note the following:

- You may need a small pair of needlenose pliers to remove the terminators. Be sure to pull the terminators straight out of the sockets so you do not damage the pins. Store all terminators in a safe place in case you need to use them in the future.
- Use the system map to record which drives are terminated so that when you replace a drive you can tell if it needs to be terminated without looking at the cables.

See the following tables for jumper settings to select a termination option and its power source.

Table 7–8. Termination Type Settings

Termination Type	JP21 High Termination	JP20 Low Termination
Enable termination for entire width of wide-SCSI bus – all 16 data bits terminated.	Open	Open
Enable termination only on high half of bus – high 8 bits terminated.	Open	Jumpered
Disable all termination[1]	Jumpered	Jumpered
Do not use	Jumpered	Open

[1] For this case, you must also open JP3.

Table 7–9. Termination Power (JP3)

Termination Power Setting	JP3 Jumper Setting
Termination Power ENABLED (default) The RAID Cage backplane provides power for termination.	Jumper pins 1 and 2
Termination Power DISABLED The SCSI controller must provide power for the terminators.	Jumper pins 2 and 3

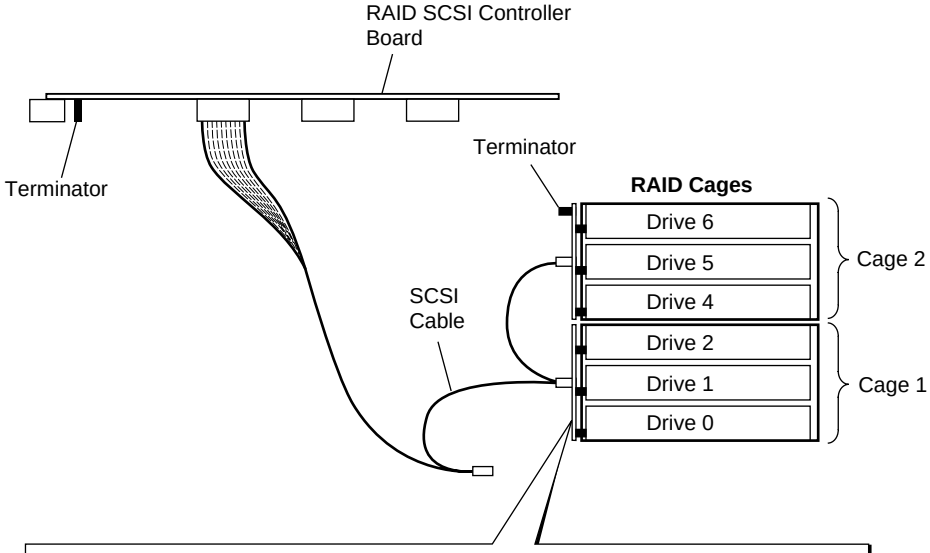
SCSI Termination for RAID Systems

Use the following guidelines for SCSI termination:

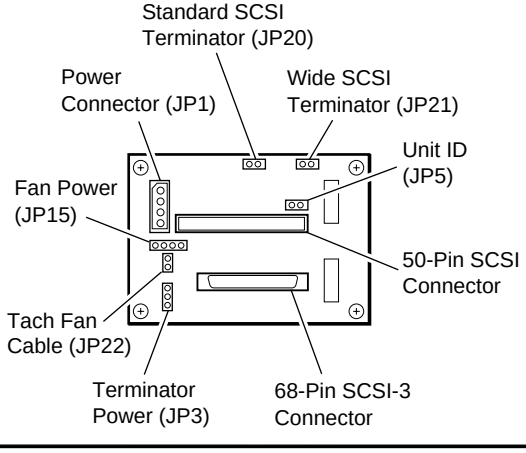
- If you are installing internal devices only, remove all terminators from all drives. The SCSI terminators are preinstalled on the SCSI controller board and on the end of the two internal SCSI cables. RAID Cage termination is illustrated in Figure 7–13.
- If you are installing external drives, remove the Channel-1 terminator from the SCSI controller board and terminate the last drive on the external SCSI string, as shown in Figure 7–13. Remove the terminators from all of the internal drives. The other end of the Channel-1 SCSI string is terminated at the end of the Channel-1 internal cable; you do not need to terminate it. See the RAID controller documentation for the location of the Channel-1 terminator.

Note: *The power for the SCSI terminators is supplied by the SCSI RAID controller board, not by the SCSI drives themselves. Make sure that the drives are jumpered appropriately. For information on the jumpers, see the documentation shipped with the drive.*

Figure 7–13. SFE External SCSI Termination



RAID Cage Backplane Jumper Settings & Termination



Unit	Jumper	Setting
1	JP5	Open
1	JP20	Open
1	JP21	Open
1	JP3	1-2
2	JP5	Jumpered
2	JP20	Jumpered
2	JP21	Open
2	JP3	1-2

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SCSI Configuration for Non-SCA Drives

If you add SCSI drives to your system, you need to plan two aspects of your configuration before you install the drives. The first of these is the SCSI identifier scheme for your system and the second is the SCSI termination scheme. The following discussions describe these SCSI configuration aspects.

Setting SCSI IDs

Each SCSI drive in your configuration requires a unique identifier. This identifier, known as a SCSI ID, allows the system to distinguish one device from the next and route commands accordingly.

When you install a new drive, you need to know which SCSI IDs are already used so you can assign a unique SCSI ID to the new drive. The system map that came with your system lists each of the assigned SCSI IDs. When you add a drive, make sure you write the new SCSI ID on the front of the drive and on the system map. The only other way of determining the SCSI ID is to remove the drive and look at the jumper settings.

You assign SCSI IDs by setting three SCSI ID jumpers or switches on the printed circuit board for each drive. Typically, these components are labeled A0, A1, and A2, or ID0, ID1, and ID2. Refer to the Installation Notes and documentation that come with the drive for additional information.

Notes:

- *SCSI IDs* must be *unique for each device on a SCSI channel;* do not *assign the same SCSI ID to two drives on the same channel.*
- *If you have a RAID system, you can assign the same SCSI ID to drives on different channels. For example, you can assign SCSI ID 3 to a drive connected to Channel 0, and SCSI ID 3 to a drive connected to Channel 1.*
- *Make sure you write down the SCSI ID for each drive you install so that you can specify the correct ID if you replace the drive.*

SCSI Termination

In all SCSI configurations, you must make sure that the first and last devices in the SCSI string are terminated or your SCSI drives will not function correctly. Since the SME and SFE use different SCSI controller boards, SCSI termination is different for each system, as explained in the following discussions.

When terminating SCSI devices, note the following:

- You may need a small pair of needlenose pliers to remove the terminators. Be sure to pull the terminators straight out of the sockets so you do not damage the pins. Store all terminators in a safe place in case you need to use them in the future.
- Use the system map to record which drives are terminated so that when you replace a drive you can tell if it needs to be terminated without looking at the cables.

SCSI Termination for SCSI Feature Cards

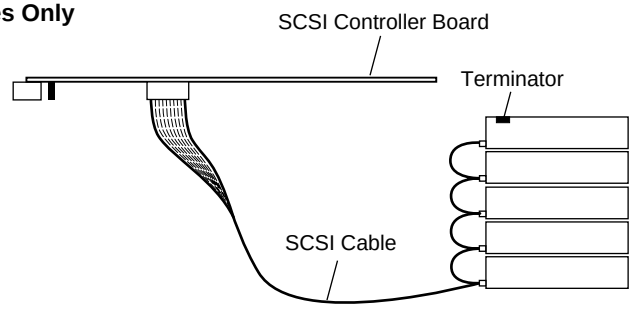
You can install both internal and external SCSI drives in an SME system. When doing so, use the following guidelines for SCSI termination, as shown in Figure 7–14:

- If you are only installing internal drives, terminate the last drive connected to the internal SCSI cable. The other end of the cable is already terminated on the SCSI controller board; you don't need to terminate it.
- If you are only installing external drives, terminate the last drive on the external SCSI string. The other end of the cable is already terminated on the SCSI controller board; you don't need to terminate it.
- If you are installing internal *and* external drives, remove the SCSI terminator from the SCSI controller board and terminate the following:
  - The last internal drive attached to the internal SCSI cable.
  - The last drive on the external SCSI string.

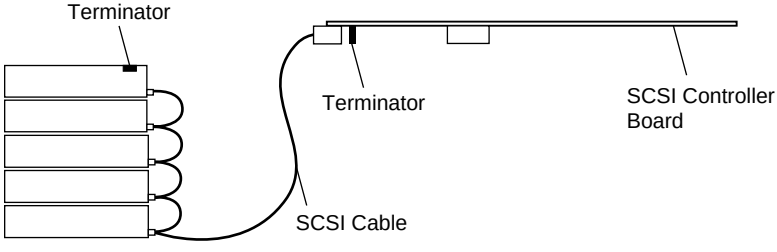
See the documentation shipped with the SCSI controller board to find the location of the terminator.

Figure 7–14. SME SCSI Termination

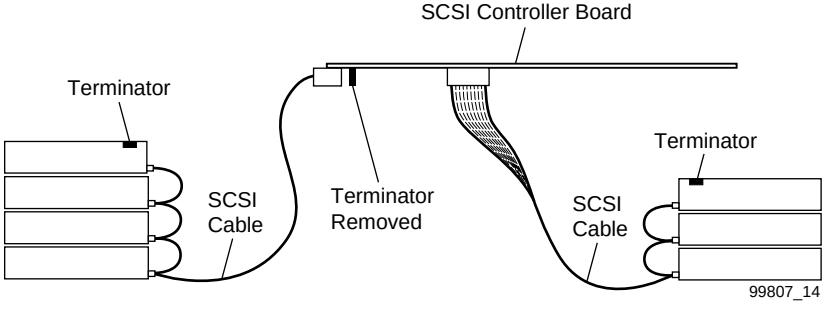
Internal SCSI Drives Only



External SCSI Drives Only



Internal and External SCSI Drives



Appendix A
System Specifications

This appendix provides you with various specifications to keep in mind when choosing a working environment for your system. If your location does not meet these requirements, your workstation can experience problems.

In addition to physical specifications, Appendix A furnishes information on system mapping, interrupt assignments, and DMA channels. Appendix A is organized as follows:

- Environmental specifications
  - Operating environment
  - Nonoperating environment
  - Shipping specifications
- Electrical specifications
- System mapping
  - Memory map
  - I/O address map
  - Interrupt assignments
  - DMA channels

Environmental Specifications

The environmental specifications described below define the limits within which your equipment can operate. They also provide guidelines for inactive workstations. If you need to ship a unit to another site, pay close attention to the shipping specifications.

Note: *The discussion of shipping specifications assumes that you repack your equipment in its original container using the original shipping material.*

Operating Environment

Temperature	+55.4° F to +95° F (+13° C to +35° C)
Thermal change	18° F per hour (10° C per hour), maximum
Relative humidity	10% to 80% noncondensing
Altitude	Sea level to 8,000 ft (2,438.4 m)
Maximum vibration	0.02 in. (0.05 cm) displacement from 5 to 16 Hz; 0.25 G from 16 to 300 Hz with a sweep rate of 0.5 octaves per minute.
Shock	4 G's amplitude with a 10 ms duration, half sine wave.

Nonoperating Environment

Temperature	-40° F to +149° F (-40° C to +65° C)
Thermal change	54° F per hour (30° C per hour), maximum
Relative humidity	0% to 95% noncondensing
Altitude	Sea level to 14,000 ft (4267.2 m)
Maximum vibration	0.1 in. (0.254 cm) displacement from 5 to 12 Hz; 0.75 G from 12 to 300 Hz with a sweep rate of 0.5 octaves per minute.
Shock	20 G's amplitude with a 10 ms duration, half sine wave.

Shipping Specifications

Temperature	-40° F to +149° F (-40° C to +65° C)
Thermal change	108° F per hour (60° C per hour)
Relative humidity	95% maximum
Altitude	Sea level to 14,000 ft (4267.2 m)
Maximum vibration	0.5 G input with a sweep of 5 to 200 to 5 Hz; 0.5 G dwell for 15 minutes at the four maximum resonant frequencies in three axes.
Free-fall drop	Packaged units with a shipping weight of 20 lb (9.1 kg) or less can withstand a drop of 36 in. (91.4 cm).
	Packaged units with a shipping weight of 20 to 40 lb (18.1 kg) or less can withstand a drop of 30 in. (76.2 cm).
	Packaged units with a shipping weight of 40 to 60 lb (27.2 kg) can withstand a drop of 24 in. (61 cm).
	Packaged units with a shipping weight of 60 to 100 lb (45.4 g) can withstand a drop of 18 in. (47.7 cm).

Electrical Specifications

The overall system unit rating is 115/230 volts, 50/60 Hz, 8.0/4.0 amperes. Listed below are electrical specifications reflecting test measurements and ranges.

Note: *Your system is designed to attenuate radio frequency interference to acceptable levels. If you change or modify your system without the expressed approval of Unisys, your system may generate radio interference that could void your authority to operate your equipment.*

110-volt range	Tested at 90–135 volts, 47–63 Hz
220-volt range	Tested at 180–265 volts, 47–63 Hz
Power consumption	650 W, fully loaded and operating
Heat dissipation	2024 Btu/hour (509 kcal/hour)
AC convenience outlet rating	115 volts at 1 amperes 230 volts at 0.5 ampere

System Mapping

The following discussions provide information on system mapping. Among the maps provided are memory maps, I/O address maps, interrupt assignments, and DMA channels.

Memory Map

Table A–1 provides a memory map for your system. This table is arranged in numeric order.

Table A–1. Memory Map

Address	Function
000000–009FFFF	640 KB System Read/Write Memory
0A0000–0BFFFF	Reserved for Graphics Display Buffer
0C0000–0C7FFF	VGA BIOS in Add-On VGA Controller Card
0C8000–0DFFFF	Reserved for Extension ROM BIOS
0E0000–0EFFFF	Reserved on System board
0F0000–0FFFFF	64 KB for System BIOS
100000–RAM	Extended Memory
RAM–FFFE000	Slot Space
FFFE0000–FFFFFFFF	128 KB BIOS
FEE00000–FEE003FF	APIC Local Unit
FEC00000–FECO0010	APIC I/O Unit #1
FEC01000–FEC01010	APIC I/O Unit #2
FEC02000–FEC02010	APIC I/O Unit #3
FEC03000–FEC03010	APIC I/O Unit #4

I/O Address Map

Table A–2 provides an I/O address map for your system. Table A–3 shows the I/O ranges reserved for EISA functionality.

Table A–2. I/O Address Map

Hexadecimal Range	Device
0000–001F	DMA Controller-1
0020–003F	Interrupt Controller-1
0040–005F	System Timer/Counter
0060–006F	Keyboard Controller-1
0700–007F	Real Time Clock, NMI Register
0080–009F	DMA Page Register
00A0–00BF	Interrupt Controller-2
00C0–00DF	DMA Controller-2
00F0	Clear Math Coprocessor Busy
00F1	Reset Math Coprocessor
00F8–00FF	Math Coprocessor
01F0–01F8	Fixed Disk
0200–0207	Reserved for Game Port
026E–026F	Reserved for optional Super I/O Index & Data Registers
0278–027F	Reserved for Parallel Printer Port 2
02F8–02FF	COM 2
0378–037F	Reserved for Parallel Port 1
0398–0399	Reserved for Super I/O index and data registers
03B0–03BF	Monochrome display

continued

Table A–2. I/O Address Map (cont.)

Hexadecimal Range	Device
03BC–03BF	Reserved for printer adapter
03C0–03CF	Reserved for enhanced graphics adapter
03D0–03DF	Reserved for color/graphics monitor adapter
03F0–03F7	Floppy Controller
03F8–03FF	COM1

Note: *Address ranges not specified are not currently occupied, but may be reserved for other add-on peripheral options.*

Table A–3. Reserved EISA I/O Address Map

Hexadecimal Range	Reserved For	Range Reserved For
0000–00FF	EISA/ISA system board I/O devices	System board
0100–03FF	ISA expansion cards	ISA cards
0400– 04FF	EISA system board I/O	System board
0500– 07FF	Alias of ISA range; do not use	
0800– 08FF	EISA system board I/O	System board
0900–0BFF	Alias of ISA range, do not use	
0C00–0CFF	EISA system board I/O	System board
0D00– 0FFF	Alias of ISA range; do not use	
1000–10FF	Slot 1 I/O	EISA slot 1
1100–13FF	Alias of ISA range, do not use	

continued

Table A–3. Reserved EISA I/O Address Map (cont.)

Hexadecimal Range	Reserved For	Range Reserved For
1400–14FF	Slot 1 I/O	EISA slot 1
1500–17FF	Alias of ISA range, do not use	
1800–18FF	Slot 1 I/O	EISA slot 1
1900–1BFF	Alias of ISA range, do not use	
1C00–1CFF	Slot 1 I/O	EISA slot 1
1D00–1FFF	Alias of ISA range, do not use	
x000– x0FF	Slot x I/O	EISA slot x
x100– x3FF	Alias of ISA range; do not use	
x400– x4FF	Slot x I/O	EISA slot x
x500– x7FF	Alias of ISA range; do not use	
x800– x8FF	Slot x I/O	EISA slot x
x900– xBFF	Alias of ISA range; do not use	
xC00– xCFF	Slot x I/O	EISA slot x
xD00– xFFF	Alias of ISA range; do not use	

x = 1 through 8 corresponding to digits 1 through 8 and EISA slots 1 through 8.

Interrupt Assignments

Your system includes two interrupt controllers providing fifteen interrupts, not including IRQ2 which is used to cascade interrupts from the slave interrupt controller. IRQ inputs can be set either as edge-triggered or level-triggered.

Table A–4 lists the normal interrupt assignments for your system. This table is arranged in numerical order.

Note: *Feature boards can share interrupt lines, as long as the boards obey sharing rules (if the interrupts are edge-triggered, only one board can be active at a time; the rest must be high impedance).*

Table A–4. Interrupt Assignments

Number	Function
IRQ0	Time Channel 0
IRQ1	Keyboard (Output Buffer Full)
IRQ2	Interrupt from CTLR 2
IRQ3	Serial Port (Secondary)
IRQ4	Serial Port (Primary)
IRQ5	Parallel Port 2
IRQ6	Diskette Controller
IRQ7	Parallel Port 1
IRQ8	Real-Time Clock Interrupt
IRQ9	Software Redirected to INT 0AH (IRQ2)
IRQ10	Available
IRQ11	Available
IRQ12	PS/2 Mouse
IRQ13	Coprocessor
IRQ14	IDE Fixed Disk Controller
IRQ15	Available

Table A–5. Interrupt Controller I/O Addresses

Interrupt Address	I/O Address	Register Function
IRQ <7:0>	0020h	INT-1 Base Address
IRQ <7:0>	0021h	INT-1 Mask register
IRQ <7:0>	04D0h	INT-1 Edge/Level register
IRQ <15:8>	00A0h	INT-2 Base Address
IRQ <15:8>	00A1h	INT-2 Mask register
IRQ <15:8>	04D1h	INT-2 Edge/Level register

DMA Channels

Your system supports a total of eight DMA channels. Table A–6 lists the DMA channels for your system. This table is arranged in numeric order. DMA channels 0 through 3 are used for 8-bit transfers, while DMA channels 5 through 7 are used for 16-bit DMA transfers.

Table A–6. DMA Channels

DMA Channel	Function
Channel 0	Spare
Channel 1	Spare
Channel 2	Floppy Disk
Channel 3	Spare
Channel 4	Spare
Channel 5	Spare
Channel 6	Spare
Channel 7	Spare

Appendix B
Drive Types

Drive Type	Cylinders	Heads	Precomp	Sectors	Size (MB)
AUTO					
1	306	4	128	17	10
2	615	4	300	17	21
3	615	6	300	17	32
4	940	8	512	17	65
5	940	6	512	17	49
6	615	4	---	17	21
7	462	8	256	17	32
8	733	5	---	17	31
9	900	15	---	17	117
10	820	3	---	17	21
11	855	5	---	17	37
12	855	7	---	17	52
13	306	8	128	17	21
14	733	7	---	17	44
RESERVED					
16	612	4	---	17	21
17	977	5	300	17	42
18	977	7	---	17	59
19	1024	7	512	17	62

Drive Types

Drive Type	Cylinders	Heads	Precomp	Sectors	Size (MB)
20	733	5	300	17	31
21	733	7	300	17	44
22	733	5	300	17	21
23	306	4	---	17	10
24	612	4	305	17	21
25	612	2	300	17	10
26	614	4	---	17	21
27	820	6	---	17	42
28	977	5	---	17	42
29	1218	15	---	36	336
30	1224	15	---	17	159
31	823	10	512	17	71
32	809	6	128	17	42
33	830	7	---	17	50
34	830	10	---	17	72
35	1024	5	---	17	44
36	1024	8	---	17	71
37	615	8	128	17	42
38	1024	8	---	26	109
39	925	9	---	17	72
USER					
NONE					

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