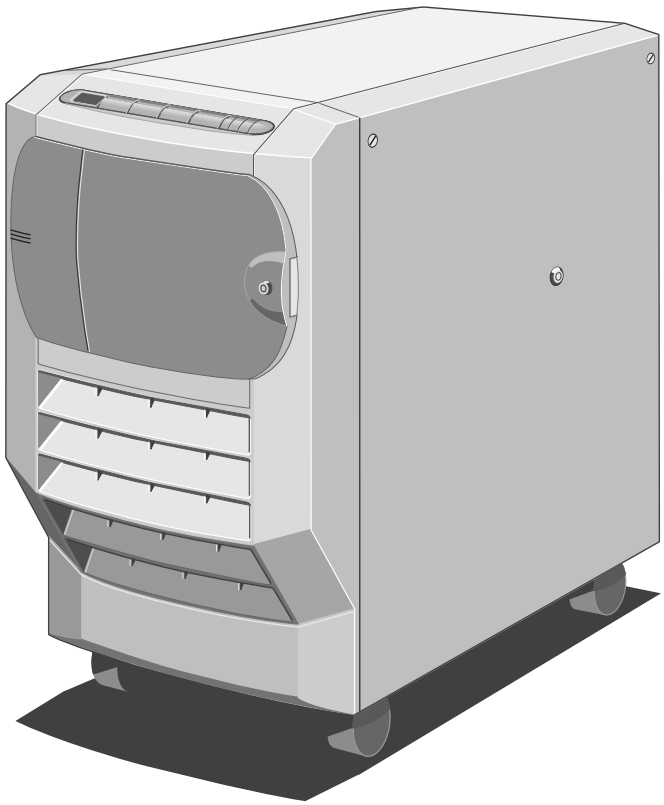
OWNER'S HANDBOOK

Shogun



apricot

MITSUBISHI ELECTRIC

OWNER'S HANDBOOK

Published by:
Apricot Computers Limited
3500 Parkside
Birmingham Business Park
B37 7YS

MITSUBISHI ELECTRIC

Printed in the United Kingdom

Safety and Regulatory Notices

Read the separate *Power Connection Guide* before using the computer for the first time. Information in the *Owner's Handbook* relating to connection to the AC power supply may not apply outside the United Kingdom.

The computer uses a safety ground and must be earthed. The system unit AC power cord is its "disconnect device". Ensure that the system unit is positioned close to the AC power outlet, and that the plug is easily accessible.

The power supply automatically sets itself to the appropriate voltage; there is no voltage selector switch. However, it is advisable to avoid subjecting the power supply to voltages outside the ranges 85-132V and 180-264V.

To prevent fire and electric shock, do not expose any part of the computer to rain or moisture.

Turn off the computer and unplug all power cords before moving the system unit, cleaning the computer or removing the side panels. An exception to this is removing the side panels before hot-plugging a hard disk drive.

When positioning the system unit, monitor and keyboard, take into account any local or national regulations relating to ergonomic requirements.

The CD-ROM drive contains a laser system which is harmful to the eyes, and is classified as a CLASS 1 LASER PRODUCT according to IEC825 Radiation Safety of Laser Products (Equipment Classification: Requirements & User's Guide). Do not attempt to disassemble the CD-ROM drive; if a fault occurs, call an authorized maintainer. Use the CD-ROM drive only as described in this manual; failure to do so may result in exposure to hazardous radiation.

Warning:

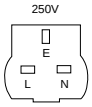
This product contains a replaceable lithium battery. Do not use a metal or other conductive implement to remove the battery. If a short-circuit is accidentally made between its positive and negative terminals, the battery may explode. Replace a discharged battery with one of the same type; another type may explode or ignite. Dispose of a discharged battery promptly and in accordance with the manufacturer's instructions. Do not recharge, disassemble or incinerate. Keep away from children. If in any doubt, contact your supplier or an authorized maintainer.

Power cord requirements

The power cord packed with the computer complies with the safety standards applicable in the country in which it is first sold. Use only this power cord; do not substitute a power cord from any other equipment.

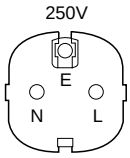
If you wish to use the computer in another country, you must ensure that you use a power cord and plug which complies with the safety standards of that country.

BS1363A



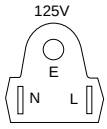
United Kingdom

SHUCO



Austria, Belgium, Finland,
France, Germany, Holland,
Italy, Norway, Sweden

NEMA 5-15P



Taiwan, Thailand

The power cord fittings must bear the certification mark of the agency responsible for evaluation. Refer to your authorized supplier if you ever need additional or alternative power cables.

UK plug wiring instructions

IMPORTANT: Power Cable Connections

This equipment is supplied with a mains lead that has a non-removable moulded plug. If the socket outlets are not suitable for the plug supplied with this appliance, it should be cut off and an appropriate three-pin plug fitted.

Note: The plug severed from the mains lead must be destroyed, as a plug with the bared flexible cord is hazardous if engaged in a live socket outlet.

The following wiring information should be employed when adding the replacement plug.

The wires in the mains lead are coloured in accordance with the following code:

Green and Yellow	Earth
Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter **E**, or by the earth symbol ⏚ or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter **N** or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter **L** or coloured red.

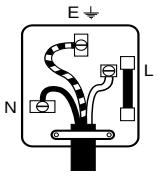
Use a fuse approved to BS1362, i.e. one which carries the ASTA or ♡ mark. Only replace the fuse with one of the same type and rating.

Always replace the fuse cover, never use the plug with the fuse cover omitted.

Replace with same colour fuse cover only. Replacement fuse covers may be obtained from your dealer.

WARNING: THIS APPLIANCE MUST BE EARTHED

This diagram shows the wiring inside the moulded plug. Use it as a guideline if you need to re-fit a plug of a similar type to the mains lead.

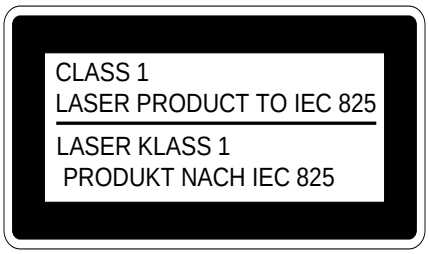


German Acoustic Noise Regulation

Sound power level is less than 70 dB(A) according to DIN 45635 Part 19 (ISO 7779).

Die Deutsche Akustische Lärm-Regulierung

Der Grad der Klangstärke ist weniger als 70 dB (A) je nach DIN 45635 Teil 19 (ISO 7779).



The CD-ROM drive is classified as a CLASS 1 LASER PRODUCT. The CLASS 1 LASER PRODUCT label is located on the under side of the system unit.

Refer to the labels on the rear of the computer to establish which of the following warnings apply.

FCC Class A

Warning - this equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class A limits may be attached to this computer. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception requiring the operator to take whatever steps are necessary to correct the interference.

FCC Class B

Warning - this equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference with radio and TV reception.

Radio and television interference

The computer described in this manual generates and uses radio frequency energy for its operation. If it is not installed and used properly, in strict accordance with the manual, it may cause interference with radio and television reception.

The computer has been tested and found to comply with the RF emission limits for an FCC Class B computing device which is intended to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference with radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Move the computer away from the receiver being interfered with.
- Turn the computer with respect to the receiver.
- Turn the receiver with respect to the computer.
- Plug the computer into an outlet that is on a different branch circuit from the receiver.
- Disconnect and remove any I/O cables that are not being used.
- Unplug and remove any expansion cards that are not being used, and replace the relevant blanking plates.
- Make sure that the computer is plugged into a grounded outlet.

If you need additional help, consult your supplier. You may find the following booklet helpful: How to Identify and Resolve Radio-TV Interference Problems. This booklet is available from the US Government Printing Office: Washington DC 20402 - Stock No. 004-000-000345-4.

DOC Class A

The computer described in this manual complies with: Canadian DOC radio interference regulations CRCc 1374 governing Class A digital devices.

DOC Class B

The computer described in this manual complies with: Canadian DOC radio interference regulations CRCc 1374 governing Class B digital devices.

CONTENTS

1 INTRODUCTION

Your Apricot is a high-performance, reliable and upgradeable network server. It is designed for use in large and complex networks in which speed, large storage capacity and robustness are essential.

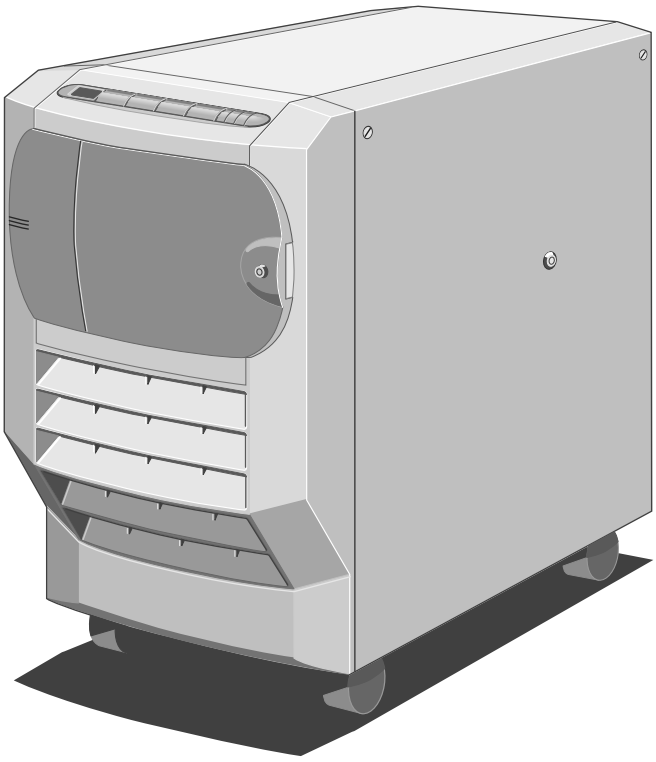


Figure 1-1 Shogun System Unit

This chapter gives you an overview of the system and its features. It also explains briefly how the information in the Owner's Handbook is organized.

System Overview and Features

Your Apricot is a fully symmetrical multiprocessor system that can be expanded and adapted according to your needs. The system will support:

- One to four 100-MHz Pentium processors, via single or dual processor cards.
- 768 Mbytes of Error Checking and Correcting (EEC) memory via two memory cards.
- 20 multi-Gbyte hard disk drives. These drives are connected to a semi-rigid backplane, thus minimising the connector stress that drive vibration can cause.

Other features include:

- Multi-processor Bus. The system is equipped with a chipset that controls a multiplexed 64-bit bus and achieves a peak transfer rate of 267 Mbytes per second at 33 MHz. It also provides an integrated 1.2 Mbyte cache and an intelligent PCI bridge.

- Fault resilience, rather than just fault tolerance, provided by RAID technology (RAID = Redundant Arrays of Independent Disks). This supports automatic intelligent system reconfiguration after failure and hot swapping of hard disk drives.

- Systems Management Controller (SMC), which monitors the system and reports any problems. It allows remote diagnostics and maintenance without requiring a working main CPU or rebooting the system into diagnostics mode. There is also the System Management Application (SMA) which is the software interface between you and the controller. You can run the SMA via a direct serial link to another PC, via a modem link to a computer at another site or over the network itself.

- PCI Peer Bus Architecture, which achieves a 128 Mbytes/second peak transfer rate through each of two 32-bit PCI buses. This is the main I/O bus in the system. There are 4 slots, two of which are shared with EISA slots.

- EISA Bus, which provides compatibility for lower performance add-in cards. There are 6 slots, two of which are shared with PCI slots.

- 1000-watt Uninterruptible Power Supply. This is a robust unit with a removable battery pack, external battery isolation switch and standby power for the SMC.

- Network environments. The server will run all the major network environments such as Novell NetWare, UnixWare, Windows NT and SCO UNIX & MPX.

- One 3.5-inch 1.44-Mbyte floppy disk drive.

- One 5.25-inch CD-ROM drive.

- 102-key extended PS/2 keyboard.

- 2-Button PS/2 mouse.

Structure of the Owner's Handbook

The information in the Owner's Handbook is divided into the following parts:

Operating Your System - This section explains the use of the Front Panel Controls. It also contains information about back panel functions and ports, security aspects and the System Configuration Utility.

Upgrading Your System - This section shows you how to install additional memory, processors, expansion cards and hard disk drives.

Service Information - This section contains detailed information for an authorized engineer about what to do if something goes wrong with the system. Instructions for removing the motherboard and the SMC board, replacing faulty hard disk drives and drive modules, removal and refitting of cooling fans, removal and refitting of the UPS and the associated battery pack are included.

Technical Information - This section contains pin-out details as well as information about memory, electronics and circuitry.

Appendix - The Appendix contains information about antistatic precautions.

Glossary - The glossary defines important concepts and terms specific to the server and its features.

2 OPERATING YOUR SYSTEM

This section identifies the different parts of your system, explains what you should do when using the system for the first time and shows you how to carry out tasks which are part of normal operation.

Front View

The following illustration shows a front view of the server with the drive bay door open:

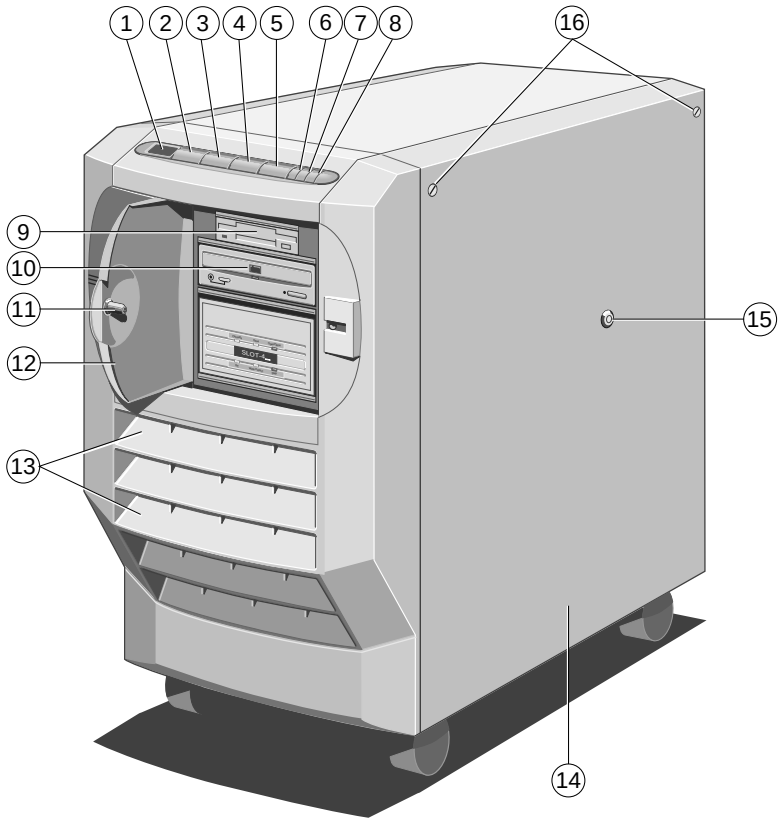


Figure 2-1 Front View

1.	Diagnostic Codes LCD	9.	3.5” Floppy Drive
2.	POWER ON Button	10.	5.25” CD ROM Drive
3.	CONTROL Button	11.	Drive Bay Door Keylock
4.	STANDBY Button	12.	Drive Bay Door
5.	RESET Button	13.	Air Intake Vents
6.	Infrared Sensor	14.	Removable Side Panel
7.	UPS LED	15.	Side Panel Keylock
8.	Power LED	16.	Side Panel Floating Fasteners

The following paragraphs explain each item on the front of the machine:

- **Diagnostic Codes LCD** - Displays diagnostic codes that indicate errors or normal stages in the boot process (see the separate document *Diagnostic Codes Reference Guide*).
- **POWER ON button** - Pressing this button switches the machine from Standby mode to On mode.
- **STANDBY button** - Holding this button down powers down the server from On mode to Standby mode. This button also has special functions in conjunction with other buttons (see *Special Button Functions* later in this chapter).
- **CONTROL button** - Pressing this button silences alarms which sound because of internal errors. It also has special functions in conjunction with other buttons (see "Special Button Functions" later in this chapter).
- **RESET button** - Performs a hard reboot of the system. This button also has special functions in conjunction with other buttons (see "Special Button Functions" later in this chapter).
- **POWER LED** - Indicates whether the server is On or is in Standby mode.
- **UPS LED** - Indicates whether the system is receiving power from the battery pack or from the mains electricity supply. It also indicates the status of the battery pack.
- **Lockable drive bay door** - Provides security against unauthorized access to the removable media drives. The key to this door serves as the token used to control the built-in security subsystem (see "Security" later in this chapter).
- **Air Intake Vents** - Openings in the front bezel through which the system draws air in order to prevent overheating. These must not be blocked or restricted in any way.
- **Removable Side Panel** - Provides protection for the internal components and security against unauthorized access to the interior of the server.

Rear Panel

The rear panel contains the various ports and connectors as shown in the following illustration:

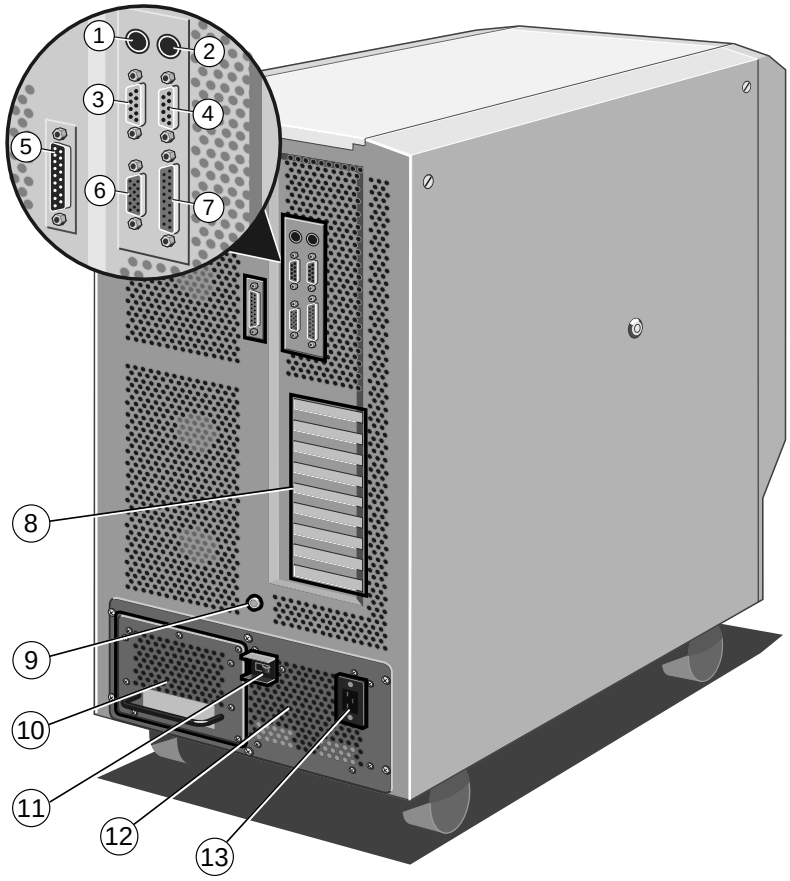


Figure 2-2 Rear Panel

1.	Keyboard Connector (PS/2)	8.	Expansion Slot Openings
2.	Mouse Connector (PS/2)	9.	Stud for Antistatic Strap
3.	Serial Port COM2	10.	Removable UPS Battery Pack
4.	Serial Port COM1	11.	UPS External Circuit Breaker
5.	SMC Modem Port	12.	Uninterruptible Power Supply
6.	Video Connector	13.	Mains Power Socket
7.	Parallel Port		

Machine Interior

The interior of the server consists of the following main areas:

- Hard Disk Subsystem
- Removable Media Drive Bay
- Motherboard
- Systems Management Controller Board
- Uninterruptible Power Supply
- Cooling Fans

To gain access to the interior of the machine, you must remove the side panels. Chapter 3, *Upgrading Your System*, contains side panel removal instructions.

Hard Disk Subsystem

The hard disk subsystem is the area in which the hard disks are located. It occupies the lower portion of the disk drive chamber. It will accommodate up to 20 hard disk drives.

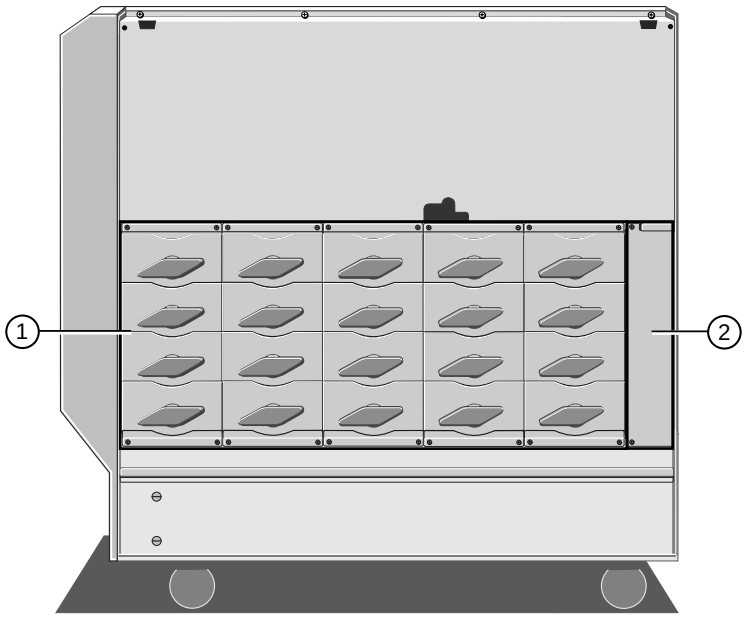


Figure 2-3 View of hard disk subsystem

1.	Disk Subsystem	2.	Cooling Fan Assembly

Removable Media Drive Bay

The removable media drive bay is the area which contains drives such as floppy, CD ROM and tape backup. The bay will accommodate up to four half-height 5.25-inch drives. Your system will contain at least one 3.5-inch 1.44-Mbyte floppy disk drive.

User access to the drive bay is through the lockable drive bay door on the front bezel. The lock on the door is fitted with a sensor which, when security is enabled, sounds an alarm if the door is opened without using the key to unlock it.

Motherboard

The motherboard contains the various disk controllers and other electronics necessary to control the server's functions. It contains the memory and processing slots as well as PCI and EISA expansion slots.

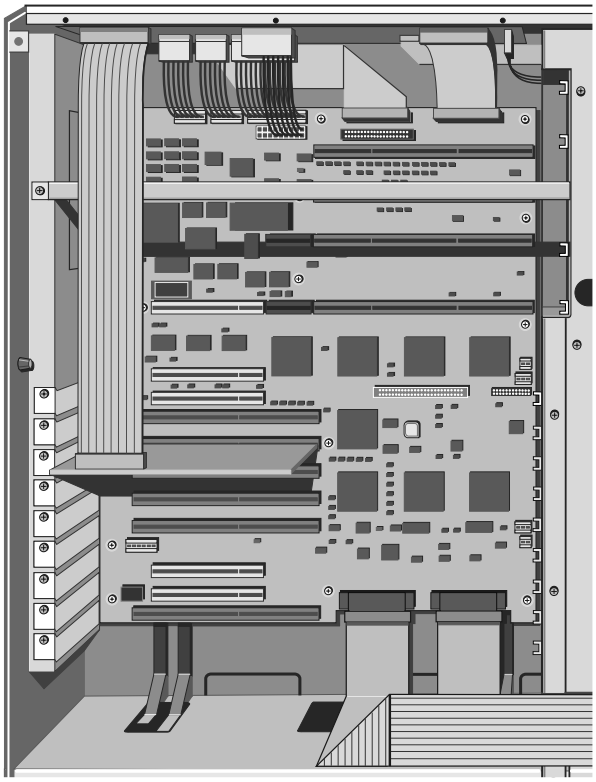


Figure 2-4 Motherboard

Uninterruptible Power Supply

This power supply is designed to keep your system powered up for a limited period of time after a power failure. It is equipped with an on-line removable battery pack and will give you enough time to shutdown the network and the server without losing valuable data. The power supply, including the battery pack, occupies the entire lower level of the server chassis.

The UPS will maintain power to the system for a minimum of 4 minutes in a fully-laden system, i.e. equipped with 20 hard disk drives. This time will be longer in a system equipped with fewer drives.

Note

In the event that the mains power fails, the LCD will display a countdown of the number of seconds remaining until the battery pack is fully discharged. The ***Event Manager User's Guide*** *contains more details about this feature.*

Cooling Fans

Your Apricot is equipped with six large cooling fans, three on each side of the machine. These will prevent overheating by maintaining an appropriate temperature inside the system.

In addition there are two cooling fans within the UPS unit.

Caution

You must maintain at least 15 cm space around the server for ventilation. Otherwise damage could result from overheating.

Setting Up Your System for the First Time

After you have unpacked the server, rolled it into position and used the jacking mechanism on the front castors to immobilize it (see the separate document *Getting Started*), use the following steps to set up the system:

1. Connect the monitor, keyboard, mouse and mains power cables to the sockets on the server's backplane.
2. Establish the appropriate link which will enable you to run the System Management Application (SMA), such as:
   - Direct link to another PC. In this case, use the supplied serial-to-PC cable to connect the SMC modem port to the serial port on the separate diagnostic computer.
   - Modem link to a computer at another location. Use the supplied serial-to-modem cable to connect the SMC port to the modem.
   - You can also run the SMA over the network itself.
3. Switch the mains socket on. The Uninterruptible Power Supply LED should display steady green (battery fully charged) or flash green (battery pack is charging). If the LED is flashing, it will take a maximum of 36 hours to charge the batteries from full discharge. The system is now in Standby mode.
4. Press the POWER ON button to switch the machine on.

Using the Front Panel

This section describes the functions of the front panel during normal operation.

Note

Do not place any weight, either by leaning or by placing objects, on the fascia surrounding the front panel. Otherwise you may inadvertently press one or more of the front panel buttons.

Figure 2-5 Front Panel Controls

1.	Diagnostic LCD	5.	Reset Button
2.	Power On Button	6.	Infrared Sensor
3.	Control Button	7.	UPS LED
4.	Standby Button	8.	Power LED

Buttons

- POWER ON - Press this button to switch the system on from Standby mode. The Power LED will light up and the system will initiate its boot sequence. Diagnostic codes, expressed as hexadecimal numbers, will appear as a matter of course on the LCD screen on the Front Panel (see the separate document *Diagnostic Codes Reference Guide* for details). The screen will display the SCSI ID

number for each of the SCSI devices installed in your system. What happens after this depends on how your Apricot has been configured, i.e. which operating system or other software may be installed. Check with your supplier if you need more details.

- STANDBY - After you have instructed all network users to close their applications down and log off the network, hold this button down for a specific period of time before the system initiates a shutdown sequence to Standby mode. The system will display the code **1200** on the LCD and sound a tone. Continue to hold down the STANDBY button until the tone stops, at which time the shutdown sequence begins. In Standby mode, the mains electricity supply keeps the battery pack fully charged, but there is no DC power supplied to the system. Use the System Management Application (SMA) to specify, in seconds, how long you must hold down the button before the shutdown sequence begins (see the *SMA User's Guide*). The default is 3 seconds.

  Press STANDBY and CONTROL simultaneously to cancel the current shutdown sequence.

Note

It is good practice to warn anyone who may be accessing the system remotely, i.e. using the SMA from a remote computer via the modem port, before you press the STANDBY button.

- CONTROL - Press this button to silence alarms and clear LCD display codes that are produced because of internal errors and power failures (but not security alarms).

  Pressing CONTROL at the end of firmware initialization forces the System Management Controller (SMC) to execute the code of the EPROM instead of the Flash ROM, even if the version in the Flash is newer than that of the EPROM. This allows you to boot from EPROM if there is something wrong with the Flash code.

- RESET - Press this button to initiate a hardware reset, but only if it is absolutely necessary. The LCD will display **1400**. You must hold the button down until the accompanying tone stops sounding. Use the System Management Application (SMA) to specify how long, in seconds, the reset tone will sound (see the *SMA User's Guide*). The default is 3 seconds.

  Press RESET and CONTROL simultaneously to cancel the current reset sequence.

Special Button Functions

Caution

Do not use these functions unless there is serious problem with the system and it is absolutely necessary.

Pressing STANDBY, CONTROL and RESET simultaneously while the front drive bay door is **unlocked** switches the system into a mode in which these three buttons have special functions. The LCD displays 8888 to indicate this mode. The following paragraphs describe the special function of each button.

- STANDBY or RESET - Pressing **either** of these buttons initiates a memory dump to the central processing unit by activating and then deactivating the Non-Maskable Interrupt (NMI) signal via the diagnostic processor. The effect of this action will depend on the operating system. You can then use the appropriate function of the network operating system to examine the contents of the dump.

- CONTROL - Pressing this button initializes the modem, which is connected to the SMC modem port on the back panel of the server. If the modem initialization is successful, the LCD displays the code 0000. If the initialization is unsuccessful, the LCD displays 0F4D or 0F4E.

- STANDBY + RESET - Pressing these buttons simultaneously clears the LCD and then releasing them executes an independent SMC reset. This would only be necessary if a major problem or error had occurred in the system, which is unlikely.

If you do not press any buttons for ten seconds, the system returns to normal mode.

UPS and Power LEDs

The UPS and Power LEDs indicate the state of the system as follows:

UPS LED

- When this LED shows steady green, it means that the system is powered by mains electricity and the batteries are fully charged.

- Flashing green means that system is powered by mains electricity and the batteries are in the process of charging. This will usually be the case after the system has been without mains electricity, i.e. disconnecting the plug or a power failure.

- Steady amber indicates that the system is drawing its power off the batteries, i.e. there is no mains electricity. As soon as mains electricity fails, an alarm sounds.

- Flashing amber indicates that the battery pack is about to fail.
- Off shows that the batteries are disconnected because the circuit breaker switch on the back of the machine is in the Off position or the system is disconnected from the mains.

Power LED

- Steady green means that the system is on.

Security

Your Apricot is equipped with a security system to help prevent unauthorized persons tampering with the front panel buttons and gaining access to the interior of the system.

Security is enabled within the System Management Application (see the *SMA User's Guide*, the *Event Manager User's Guide* or the on-line help within the SMA software). Once security is enabled, the key to the removable drive bay door at the front of the machine serves as the security token:

- If the door is closed and has been locked with the key, the screen is blanked, the keyboard is disabled, the security alarm is activated and will sound if there is a violation.
- Unlocking the door unblanks the screen, enables the keyboard and deactivates the security alarm.

Note

When security is enabled and the door locked, you can use the KeyLOC infrared card to unblank the screen and enable the keyboard temporarily. The card will also silence a security alarm. Use the card again to blank the screen and disable the keyboard.

The following actions are security violations and will set off the alarm when the drive bay door is closed and locked and security is enabled:

- Forcible opening (i.e. without the key) of the removable drive bay door.
- Removal, with or without the key, of one or both of the side panels.
- Pressing the STANDBY, CONTROL or RESET buttons individually or in any combination.

To silence the alarm, use the key to unlock the drive bay door. If the door is already unlocked when the alarm sounds, first lock and then unlock the door.

Alternatively, use the KeyLOC card to silence the alarm.

Automatic Failure Recovery

As with any computer system, your server may develop a hardware or software fault, which, for example, may only manifest itself intermittently, that causes the system to hang. If this happens, the server is capable of resetting itself automatically. This is particularly useful if the server is unattended some or all of the time.

Whether the server is able to rebuild the complete network environment, together with application programs, after an automatic reset depends on the operating system. The SMA contains several variables which govern the behaviour of automatic failure recovery:

- Machine Status
- Watchdog Timeout
- Watchdog Timer Reboot Count
- Watchdog Timer Timeout Action

You can make settings for these variables to enable, disable or modify their effects. The on-line Help system within the SMA contains details of all of these variables and how to make the appropriate settings.

Using the System Configuration Utility

The System Configuration Utility (SCU) automates the configuration process for your computer's hardware and the boards (ISA, EISA, Plug-n-Play and PCI) or options that you add to the system. You must run the SCU each time you change your computer's configuration. Running the SCU is optional for Plug-n-Play and PCI add-in boards. The SCU does the following:

- Maintains system parameters and stores these in non-volatile RAM.
- Presents the option settings that specify those parameters.
- Assigns all necessary system resources, which guarantees that there will be no conflicts or contention issues between adapter cards.
- Presents settings for many other functions, such as security passwords, that are necessary or desirable.

Note

Although there is a separate BIOS Setup utility, only use the SCU to configure your system, as BIOS Setup is not accessible to a remote computer.

To run the SCU:

Locally, press F2 to run the Flash Disk Utility during the hardware boot sequence but before the operating system loads; remotely, run the Flash Disk Utility via the SMA. You also can use the SMA to instruct the system to load the SCU automatically (see the *SMA User's Guide*). The Flash Disk Utility menu then appears on the screen.

1. Select "Run Configuration Utility" from the Flash Disk Utility menu.
2. At this point a further submenu appears. Choose one of the options according to the following guidelines:

   – Choose "Run SCU" as the preferred option.

   – Since the SCU is limited to 640K base memory, there may not be enough memory to load it plus all the configuration (.CFG) files associated with the motherboard and the expansion cards installed in your system. Your system will inform you if there is insufficent memory. If this should happen, which is unlikely, choose one of the other options in the submenu as an alternative. "Run SCU (Motherboard)" excludes the expansion card configuration files, thereby freeing memory. "Run SCU (EISA/PCI)" does the same, but this time excludes the motherboard configuration file to free memory.

The following menu then appears:

How to use the SCU

The Help text will provide most of the instructions you will need to use the SCU. The following paragraphs briefly explain the general techniques for navigating your way through the utility.

Using menus and selection screens

- To select an option from a menu or selection screen, use the UP or DOWN ARROW key to move the highlight to the option and press the ENTER key. For example, use this procedure for Steps 1-6 on the Main Menu.

Note

The fact that the Main Menu options are listed as numbered steps does not necessarily imply that you must select them in numerical order every time you run the SCU. However, if you have made changes to the existing configuration, you must select ***Step 4: Save Configuration*** *before you will be able to select* ***Step 5: View Switch/Jumper Settings****.*

- In addition to the menu options, most screens display defined keys at the bottom of the screen, e.g. [Select=ENTER], or [Utilities=F9]. Press a defined key to initiate its corresponding action.

- Some screens contain vertical scroll bars on the right-hand edge, which indicate that there is more information than one screen can accommodate. You can use UP or DOWN ARROW to scroll through the information. If you need to scroll quickly through a series of screens, use PAGE UP or PAGE DOWN.

- When you select **Step 5: View Switch/Jumper Settings**, the screen will display information for one board at a time. Press PAGE DOWN to advance to the next board. If all the information for a single board cannot be accommodated on one screen, pressing PAGE DOWN will first scroll through to the end of the information for that board and then pressing it again will advance to the next board. PAGE UP does the same in reverse.

- Some screens contain toggle options, e.g. the screen for [Utilities=F9] from the Main Menu. To turn a toggle option on or off, move the highlight to the option and press the SPACEBAR. A tick mark in the square brackets indicates that the option is in force.

- You can also use the mouse to select options, activate defined keys and use scroll bars. Just point with the mouse cursor on the item and click with the left mouse button. Clicking anywhere with the right mouse button returns to the previous screen or, if you are at the Main Menu, exits from the SCU. You must confirm your exit by pressing ENTER or by clicking YES with the left mouse button.

When you have returned to the main menu, a tick mark to the left of the option indicates that you have completed that step.

How to use SCU Help

There are two ways to access SCU Help:

- Select **Step 1: About System Configuration**, from the Main Menu. This option displays information about the SCU.
- Press F1 at any time, which will give you specific information about the current screen or dialog box.

Use the following procedures to navigate your way around the Help screens:

- Press F3 on any Help screen to display a list of Help topics. Then select, with the cursor or the mouse, one of the topics which appears in white text.
- If a word or phrase appears white in the midst of the normal blue text on a Help screen, you can select it to display a further Help screen about that topic.
- Press F2 to redisplay the previous Help topic shown. Press F2 repeatedly to reverse along your route through the Help screens.
- Press ESC to exit from Help.

Note

On a monochrome monitor, a help topic word or phrase looks the same as the surrounding text and is not identifiable by its appearance, in contrast to a colour monitor. To identify a help topic, use the arrow keys to move the cursor through the help text. The cursor will highlight only help topics.

Passwords

The purpose of the passwords is to prevent unauthorized persons from using the computer and from changing the system configuration settings. There are two different passwords which govern the kind of access you have to the SCU program. You can choose to set either one or both passwords:

- **Administrative** - This password gives you full access to all the configuration settings including the ability to change them.
- **User** - This password gives you viewing access to the settings, but you are not allowed to change them.

You can set both of these passwords within the SCU along with the other system parameters. A password can be up to 7 alphanumeric characters in length.

The first time you run the SCU there will be no passwords in force. When you select Step 2 or Step 3 from the Main Menu, which are the only options in the SCU which are password-protected, the system will display the **First-Time Admin Password** prompt box. This is an alternative method to setting the Administrative password within the SCU along with other parameters. When you see this box, do one of the following:

- Press ESC to bypass the box if you don't want to set any passwords. You now have full access to the configuration settings, including the ability to change them. As long as you do not set a password, the **First-Time Admin Password** prompt box will appear every time you run the SCU.
- Type in an administrative password. Then press TAB (not ENTER) to move the cursor to the confirm field and then type the password again. Now press ENTER to confirm. Your administrative password is now set.

Note

There is no such prompt box for the User Password. The only way to set this password is within the SCU along with other system parameters.

The existence of a password imposes the following requirements or restrictions:

- You must enter the password, when the system prompts you, to complete the boot process and load the operating system. If both passwords are set, entering either one achieves this same objective.
- When you run the SCU, you must enter a password at the prompt after selecting Step 2 or Step 3 from the Main Menu. If only one password is set, either Administrative or User, entering it gives you full access to the configuration settings. If both passwords are set, only the Administrative allows you to change settings. The User password restricts you just to viewing access.
- You will not be able to boot the system from a remote workstation.

Password Clear Switch

There is a Password Clear Switch on the motherboard of your Apricot. If you set this switch to On, the passwords will be cleared (i.e. removed) every time you boot or reset the system. Unless there is a specific reason for clearing the passwords in this way, ensure that the switch is set to Off at all times. See Chapter 5, *Technical Information*, to find out where this switch is located and how to set it.

The Flash Memory

The Flash is a special portion of read-only memory (ROM). It differs from conventional ROM in that its contents can be updated, but it still preserves its information when system power is off. The following components of your server contain their own portions of Flash memory:

- The motherboard - This Flash stores the BIOS information for the motherboard.
- The System Management Controller - This Flash stores the BIOS and firmware which control the SMC and the Front Panel.
- The System Management Interface Card (SMIC) - This is the main Flash, also referred to as a Flash Disk. It contains bootable DOS, its own BIOS and a Flash Disk Utility program which affects the other portions of Flash memory. The Flash Disk Utility also runs the System Configuration Utility (SCU).

Your access to the Flash is via a RAMdrive. This enables you to treat the Flash almost as if it were a disk drive. The RAMdrive and the Flash Disk each have a capacity of 2 Mbytes. Because the Flash Disk contains the operating system files, the server can boot from it if the normal system hard disk boot process fails. You can also copy files to the Flash Disk, e.g. hardware component configuration (.CFG) files which the SCU uses.

The Flash Disk Utility

The reason that the RAMdrive is necessary is because the Flash Disk is write-protected and, therefore, you cannot copy anything directly to it. The purpose of the Flash Disk Utility is to enable updates to the information held in any portion of Flash memory, such as new BIOS versions or hardware information stored in the SCU.

To run the Flash Disk Utility locally, press F2 during the hardware boot sequence but before the operating system loads. This instructs the server to boot from the Flash Disk and load the utility. The screen then displays a menu with the following options:

- **Option 1, Receive File** - This option copies a file from the server to the workstation which is running the SMA. If you are not using the SMA and are running the utility locally, the file is copied from the Flash to a floppy disk. After you select 1 from the menu, select the file you want to copy and press the ENTER key.
- **Option 2, Transfer File** - This option is the opposite of Receive File, i.e. it copies a file from the SMA workstation to the server or, if you are running the utility locally, from a floppy disk to the Flash.
- **Option 3, Run Configuration Utility** - Select this option to run the SCU (see "Using the System Configuration Utility", earlier in this chapter).

- **Option 4, Upgrade Motherboard BIOS** - This option enables you to upgrade the motherboard's BIOS with a new version of BIOS information. This information is in the form of a binary file. When you select this option, you have the choice of either copying the binary file to the RAMdrive and updating the BIOS in one operation or, if the correct binary file is already copied, just performing the update.

- **Options 5-7**, i.e. **Upgrade Secondary BIOS**, **Upgrade SMIC BIOS** and **Upgrade SMC Firmware**, are similar to option 4.

- **Option 8, Upgrade Flash Disk** - This option copies the contents of the RAMdrive to the Flash Disk, thereby making the Flash identical to the RAMdrive.

- **Option 9, Reset Flash Disk for Upgrade** - This option does the opposite to option 8, i.e. copies the contents of the Flash to the RAMdrive, thereby making the RAMdrive identical to the Flash.

- **Option 10, Edit a File** - Use this option to load a file into the Microsoft Edit program for editing.

- **Option 11, Exit** - This option exits from the Flash Disk Utility and passes control back to the SMA.

Caution

Only use Option 8 if you need to update the Flash Disk to reflect the contents of the RAMdrive.. Only use Option 9 if the contents of the RAMdrive have become corrupted. You must be sure of what you are doing before using these options.

3 UPGRADING YOUR SYSTEM

This chapter explains how to add the following items to your system:

- Processor, memory or expansion cards.
- Memory modules to an existing memory card.
- Additional hard disks.

Important Note

Only authorized engineers may have access to the electronics chamber of the server, on the opposite side from the hard disk chamber. The electronics chamber houses the motherboard and expansion slots.

Gaining Access to the Machine Interior

To gain access to the interior of the machine, you must remove the side panels. The following illustration shows the securing screws and key lock which are present on each side panel:

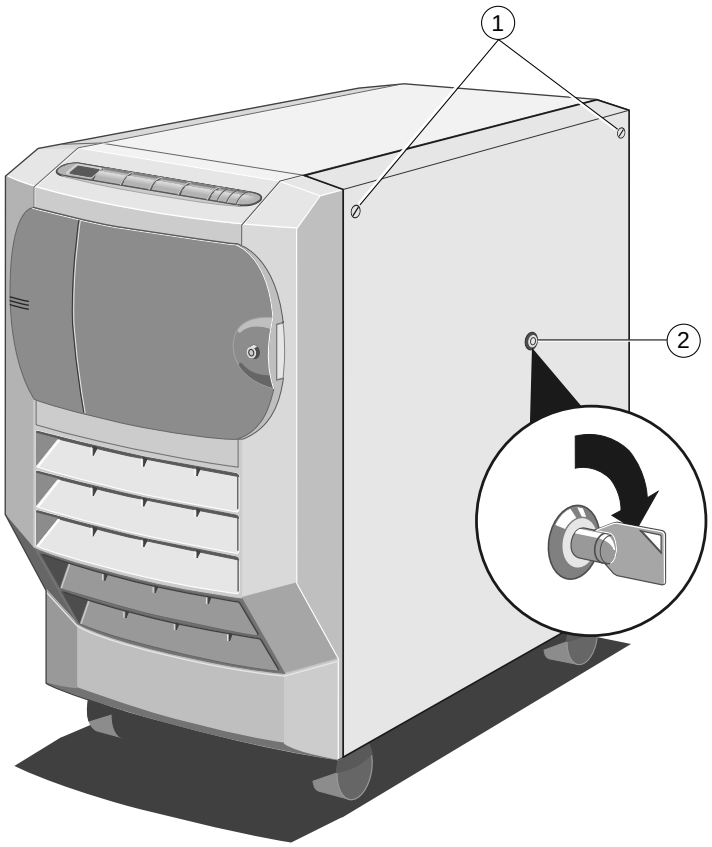


Figure 3-1 Side Panel Keylock and Floating Fasteners

1.	Floating Fasteners	2.	Keylock

To remove the side panel:

1. Switch the machine to Standby mode.

Note

If you are just going to add or hot-swap a hard disk drive, you can do it while the machine is still switched on. In this case, use either the System Management Application (SMA) or the front door key to disable Security and then begin this procedure at Step 4.

2. Isolate the battery by setting the circuit breaker switch on the back panel of the server to Off.
3. Unplug the mains power cable.
4. Loosen the floating fasteners, located at the top left and right corners of the panel, until they move in and out freely. These fasteners are mounted in a spring fitting and should not be separated from the panel.
5. Insert the side panel key into the keylock and turn it ¼ turn clockwise to unlock the panel. Your system is equipped with one pair of side panel keys. Both keys in the pair will unlock both side panels.
6. Lift the side panel outward and upward as shown:

Figure 3-2 Removal of side panel

Refitting the Side Panel

Use the following steps to refit the side panel:

1. Ensure that the lip on the inner surface of the side panel fits over the chassis ridge.
2. Fit the panel snugly into place.
3. Tighten the floating fasteners.
4. Insert the side panel key into the lock and turn it clockwise as far as it will go.
5. Push the lock inward until you feel the resistance of the metalwork.
6. Turn the lock ¼ turn anti-clockwise and remove the key.
7. Use the SMA and the front door key, as appropriate, to ensure that Security is enabled.

Installing CPU and Memory Cards

Important Note

The procedures explained in this section are for authorized engineers only.

There are four slots reserved for memory and CPU cards. They are located on the motherboard towards the top of the electronics chamber. To gain access to the slots, remove the protective metal plate which covers the upper part of the electronics chamber.

1. Remove the securing screws as shown in the following diagram:

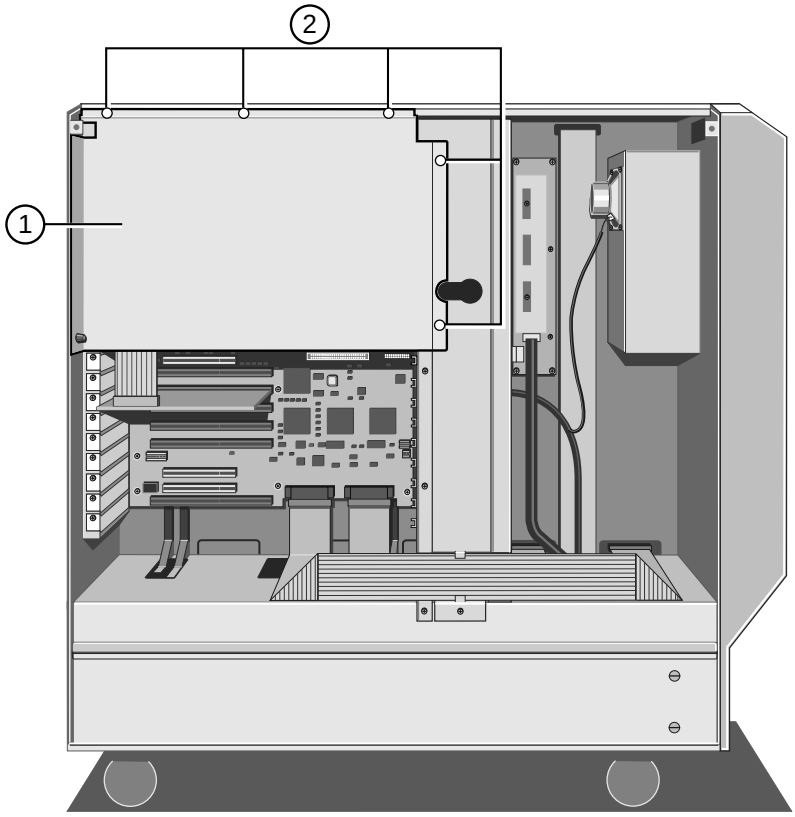


Figure 3-3 Protective Metal Plate

1.	Protective Metal Plate	2.	Securing Screws

2. Lift the metal plate away from the metalwork.

The following diagram shows the positions of the slots:

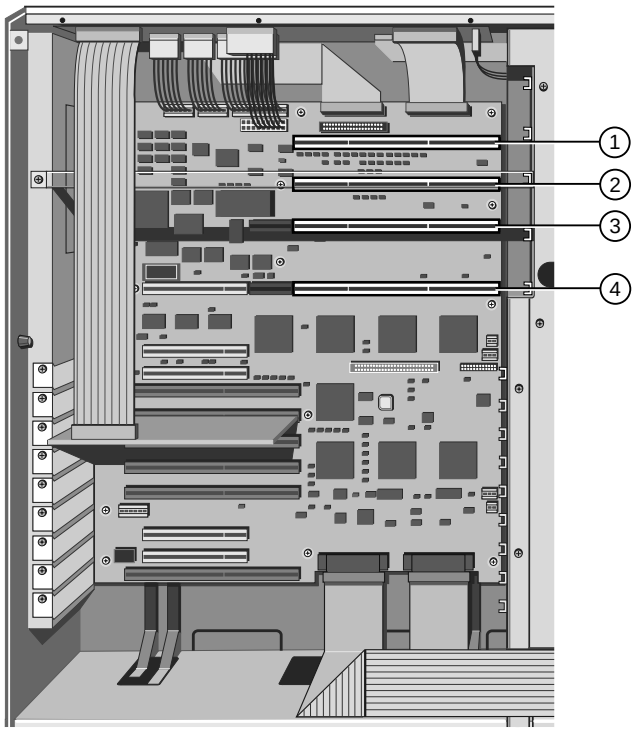


Figure 3-4 Memory and CPU slots

1.	Memory Slot 1	3.	CPU Slot 1
2.	Memory Slot 2	4.	CPU Slot 2

Note

All electronic computer components are sensitive to static electricity. Always take antistatic precautions before handling such components (see the Appendix for more details).

You can fit either one or two of both kinds of cards. The CPU card can contain either single or dual processors and can be fitted in the following configurations:

- One single card
- Two single cards
- One dual card
- Two dual cards

If you have only one CPU card, either single or dual, it should aways be fitted in CPU slot 1. Similarly, if you only have one memory card, it should be fitted in Memory slot 1.

The installation procedure for both kinds of cards is essentially the same:

1. Remove the metal stabilizer strap, which corresponds to the slot in question, from the chassis. There are four of these straps, one for each memory slot and each CPU slot.
2. Insert the card connector strip into the slot with the component side of the card facing down. Ensure that the connector is firmly seated, but do not use excessive force.
3. Insert the tabbed end of the stabilizer strap into its corresponding slot in the cooling fan assembly metalwork. Then fit the strap's groove over the edge of the card and use the screw to fasten the other end to the chassis. The card should now be securely fixed in position.
4. Run the System Configuration Utility (see chapter 2*, Operating Your System*, for instructions).

Upgrading Memory

Important Note

The procedure explained in this section is for authorized engineers only.

The maximum memory capacity of your Apricot is 768 Mbytes, provided by up to two ECC memory cards.

Each memory card contains twelve 36-bit SIMM (Single Inline Memory Module) slots. They are arranged into 3 banks of 4 slots each. The banks are numbered 1, 2 and 3. Each bank has two slots on the left and two on the right as you look at the card. You must populate the banks according to the following rules:

- The banks will accept 2, 4, 8, 16 or 32-Mbyte approved fast-page parity SIMMs.
- For ease of physical access to the modules, always fill bank 1 first and then move to the next one in numerical order.
- You must populate a bank fully, i.e. with four modules. You cannot, for example, just add two modules to a bank and leave the other two slots empty.
- Although you can fit any capacity module in any bank, all SIMMS in a given bank must be identical. For example, you cannot mix 2-Mbyte modules and 4-Mbyte modules within the same bank.
- You can fit modules of different capacities in different banks. For example, if bank 1 has 2-Mbyte modules, you can fit modules of another allowable capacity (i.e. up to 32 Mbytes) into bank 2.

Note

Before attempting to remove or fit a SIMM, be sure to take proper antistatic precautions, such as using an antistatic strap or placing the memory card flat on an antistatic mat (see the Appendix for more details on antistatic precautions).

Removing SIMMs

If you wish to install an upgrade in a bank which is already occupied you must first remove the existing SIMMs. For each SIMM in the bank:

1. Lever the metal clips on each side of the socket gently away from the SIMM using your forefingers.
2. Place your thumbs on the top edge of the SIMM and move it gently towards the **top edge** of the memory card (next to bank 3).

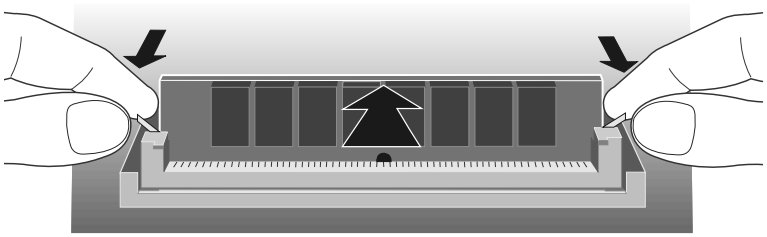


Figure 3-5 Removal of SIMMs

3. When the SIMM has rotated through 20°, taking care to avoid touching any of the components on the SIMM, grip the top corners of the SIMM between thumb and first finger and carefully pull the module out of the socket.

Inserting SIMMs

Important

Fit only correct Apricot-approved SIMMS into your server.

For each socket in the bank:

1. The SIMM will only install in one orientation. There is a cutout at one end of the SIMM next to the connector strip.
2. Hold the SIMM with the cutout towards the **middle** of the card and its metal connector strip nearest the card surface.
3. Position the SIMM above the socket with the SIMM tilted slightly towards the top of the card away from the memory card's connector strip.

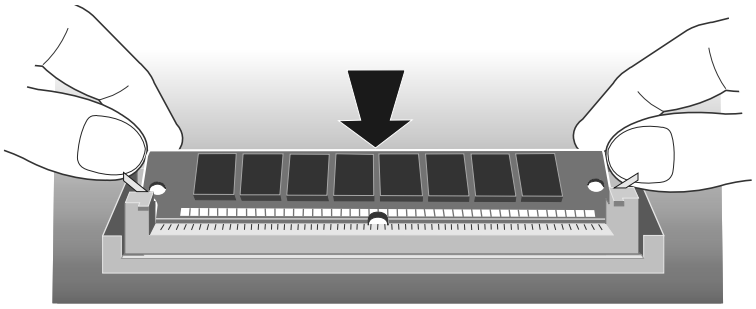


Figure 3-6 Positioning the SIMM

4. Lower the SIMM into the socket and ensure that it is properly seated.

5. Pushing gently on the top corners, rotate the SIMM towards the vertical. It should clip into place by the time it stands upright. Do not use excessive force.

   If the SIMM will not rotate easily, remove it and start again.

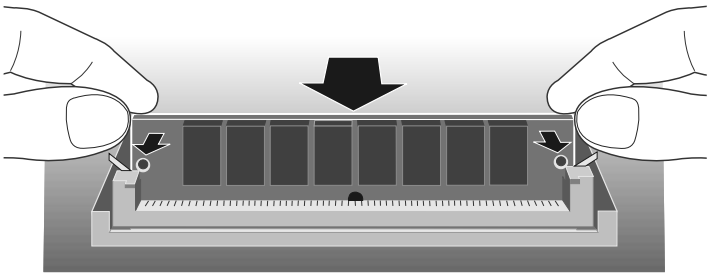


Figure 3-7 Securing the SIMM in place

6. If the SIMM is properly located, it should remain in position held by the securing clips and with a small plastic lug through the holes on either end.

Once you have installed all the SIMMs you can fit the memory card into your system.

Installing and Removing Expansion Cards

Important Note

The procedures explained in this section are for authorized engineers only.

The following illustration shows the positions of the expansion card slots in the electronics chamber:

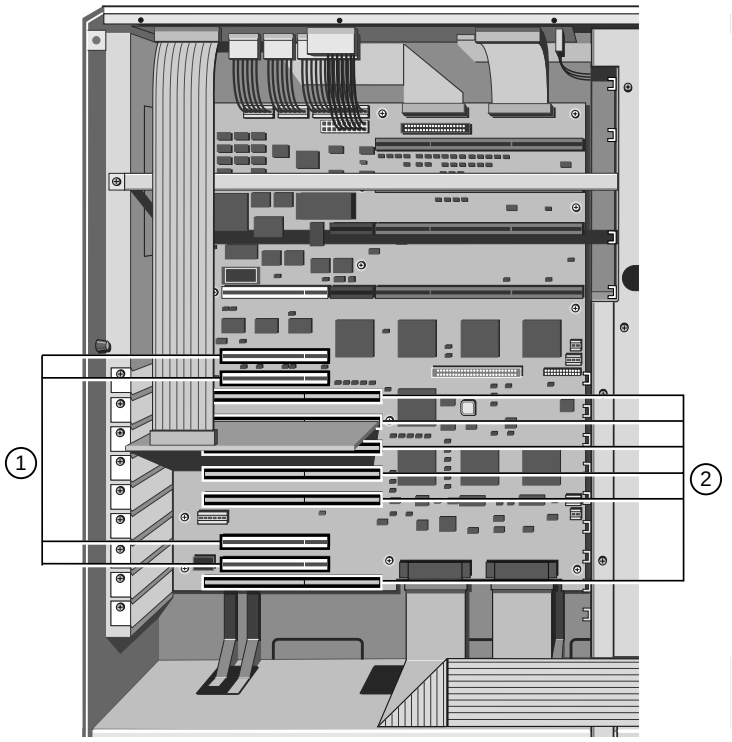


Figure 3-8 PCI and EISA/ISA Expansion Card Slots

1.	PCI Slots	2.	EISA/ISA Slots

Note

Do not remove the System Management Interface Card from EISA slot M2.

Installing

1. Study the expansion board's installation guide and follow its directions. The guide should tell you what kind of slot (i.e. PCI or EISA/ISA) you will use and whether there are any jumpers or switches on the card that you need to configure.
2. Remove the blanking plate from the the rear panel access opening that corresponds to the slot in question.

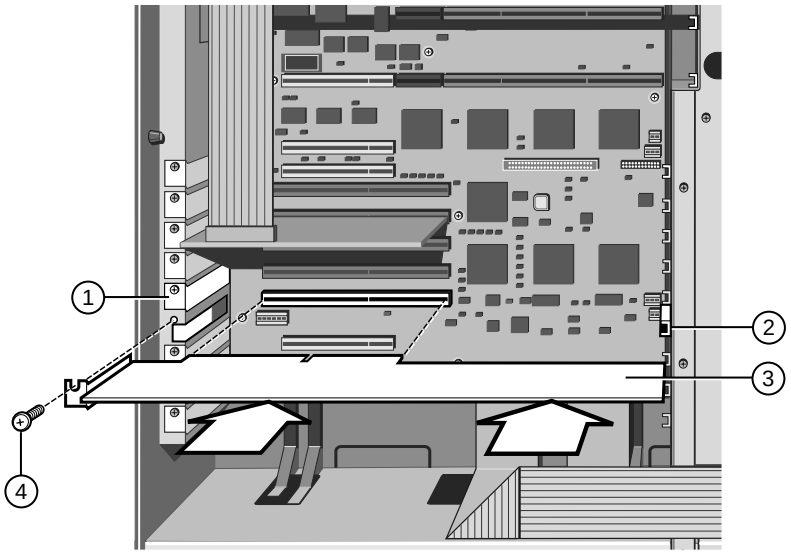


Figure 3-9 Fitting an Expansion Card

1.	Blanking Plate	3.	Expansion Card
2.	Slider Guide	4.	Securing Screw

3. Now fit the expansion card carefully into the slot. You can only install it in one orientation. If your card is full-length, be sure to insert one edge into the slider guide, attached to the cooling fan assembly metalwork, as you fit the card.
4. Ensure that the card is firmly seated in its slot, but do not use excessive force.
5. Fasten the card in place using the blanking plate securing screw.
6. Run the System Configuration Utility (SCU) to complete the installation process.

Removing

1. Unplug all cables connected to the board.
2. Remove the securing screw and pull the board out of the slot, leaving an empty space on the rear panel for the blanking plate again.
3. Secure a blanking plate to cover the access opening.
4. Run the System Configuration Utility to inform the system that you have removed the board.

Fitting Hard Disk Drives

The Disk Subsystem contains all the hard disk drives for the server. The system will accommodate up to 20 drives, all of which are hot pluggable. This means that you can fit a drive without having to power the machine down first.

The disk subsystem is located on the right side of the machine when viewed facing the front panel. The following illustration shows the entire subsystem, with the protective metal plate removed from the upper half of the disk chamber:

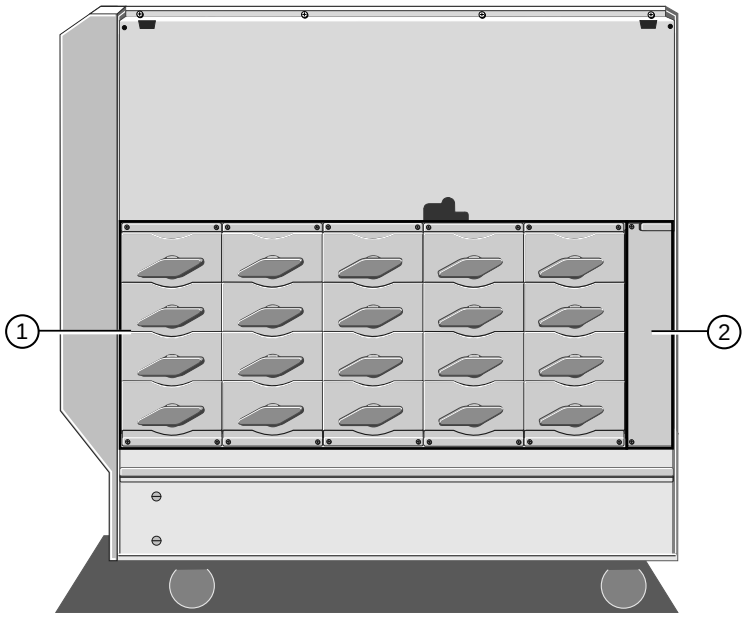


Figure 3-10 Disk Subsystem

1.	Disk Subsystem	2.	Cooling Fan Assemblies

Fitting a Hard Disk Drive

There can be up to five drive modules in the subsystem, each containing up to four drives. Each drive is fastened onto a removable drive tray. To fit a drive:

1. Locate an empty drive tray. It may be wise to keep a written record of which trays are fitted with drives. You can identify a specific drive by observing the labelling scheme as shown in the following illustration:

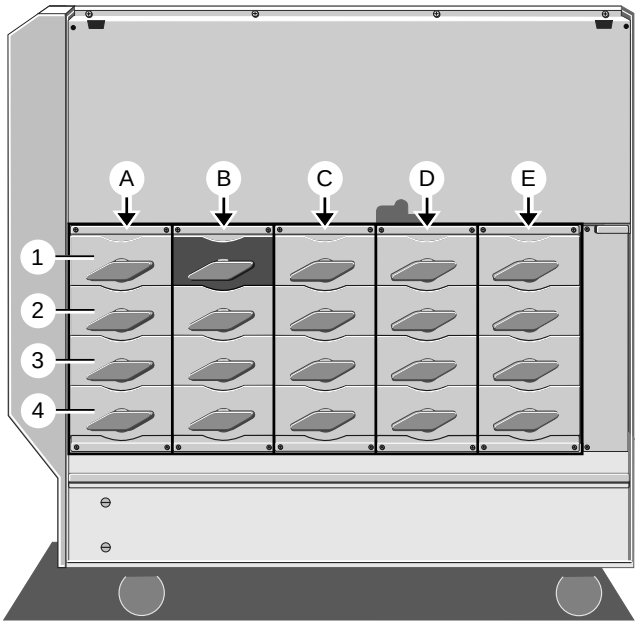


Figure 3-11 Disk Subsystem Labelling Scheme

In addition to the external labelling scheme, each SCSI drive, including the appropriate removable media drives, is assigned a SCSI identification number. The ID scheme for each hard disk drive module, labelled A-E, is the same. The following table indicates these numbers:

Drive	SCSI ID Number
Hard Disk, Position 1	0
Hard Disk, Position 2	1
Hard Disk, Position 3	3
Hard Disk, Position 4	4
CD-ROM Drive	5
1st Tape Backup Drive	2
2nd Tape Backup Drive	6

Your system displays these numbers during Power On Self Test (POST).

2. Turn the hard disk tray release handle anti-clockwise until it stops, which is almost one complete turn. As you turn the handle, the drive tray ejects slightly.

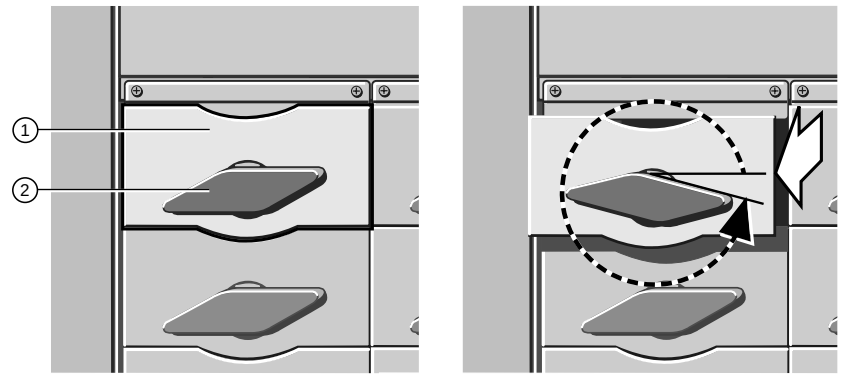


Figure 3-12 Release Handle Rotation

1.	Disk Drive Tray	2.	Disk Tray Release Handle

3. Now grasp the front plate of the drive tray and pull it out carefully until the tray is free of the metalwork.

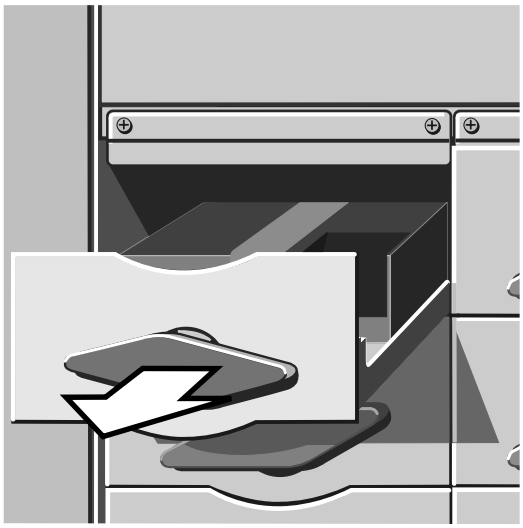


Figure 3-13 Hard Disk Tray Removal

4. Fasten the drive into the tray by means of the four screws on the underside of the tray.

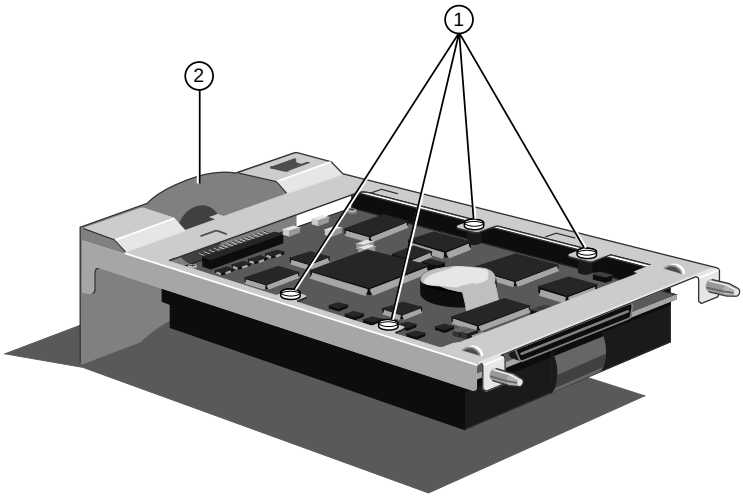


Figure 3-14 Hard Disk Drive Tray Securing Screws

1.	Securing Screws	2.	Disk Drive Tray

5. Insert the tray carefully back into the drive module and push it in until it reaches the point where the hard disk release handle will engage. You must not knock or jolt the hard disk drive.
6. Turn the hard disk release handle clockwise almost one complete turn until the tray metalwork is flush with the drive module. During this procedure the hard disk plugs into the SCSI connector on the drive module backplane.

Note

Since the hard disk drives for your Apricot are exclusively SCSI drives, it is important to note that the SCSI connector on the inside of the drive module backplane contains the device address. This means that, for a given connector, any disk drive that is fitted to that connector will have the same SCSI address.

4 SERVICE INFORMATION

If a problem should develop in your server, the usual on-site procedure for correcting it is to replace the faulty component. The procedures in this chapter should be followed if it becomes necessary to remove or refit a server component.

Note

Only authorized engineers may carry out the procedures described in this chapter. Otherwise your computer's warranty will be void.

There are specific procedures for removing and fitting the following items:

- Hard Disk Drive
- Hard Disk Drive Module
- Front Bezel
- Front Panel
- Removable Media Drives
- System Management Controller Board
- System Management Controller Cooling Fan Assembly
- Cooling Fan and Handguard
- Hard Disk Drive Cooling Fan Assembly
- Hard Disk Drive Module Backplane
- Motherboard Power Distribution Panel
- Motherboard
- Motherboard Cooling Fan Assembly
- Hard Disk Drive Power Distribution Panel
- 5.25-inch Bay Power Distribution Panel
- Loudspeaker
- Uninterruptible Power Supply Unit
- UPS Battery Pack

Your Apricot has been designed so that in most cases you can remove a component without disturbing adjacent items.

The procedures for removing or fitting CPU cards, memory cards and other expansion cards are not presented in this chapter. For these, refer to Chapter 3, *Upgrading Your System.*

Preliminary Service Tasks

Before you can perform a service procedure, you **must** do the following:

1. Refer to the SMA and note down the value of the *TimeOnCharge* variable. This value expresses, in minutes, the remaining charge in the UPS battery pack.
2. Power down the system to Standby mode.
3. Ensure that the battery pack is isolated (the circuit breaker switch on the rear of the server must be in the Off position). Since isolating the battery pack sets the *TimeOnCharge* variable to zero, you will need to reset the variable in the SMA after you have completed your service procedure and set the switch back to the On position.
4. Unplug the power lead from the mains socket.
5. Remove the side panels (see Chapter 3, *Upgrading Your System*, for side panel removal instructions).

Caution

When you have completed your service procedure, always refit the side panels before powering the server up again. The fitted side panels are essential to an effective cool air flow through the machine.

Antistatic Precautions

All electronic components and equipment are sensitive to static electricity. Even small electrostatic charges can render components useless or severely shorten their working life. You should always take preventive measures which generally involve:

- a common earth point
- an earthed bench or bench mat
- an earthed wrist strap

Note

An antistatic earthing stud is provided on the rear panel of the server.

The Appendix contains more details about antistatic precautions.

Equipment Required

You will need the following tools to dismantle the system unit:

- Side panel key
- Phillips (cross-head) screwdriver, magnetized
- Flat blade screwdriver
- Socket set with fitting for M5 head (for bus bar connections to power supply)

Hard Disk Drive

Your Apricot is equipped with SCSI hard disk drives which are hot pluggable, i.e. you can remove or fit them while the system is powered up. Use the following instructions if a specific hard disk needs to be replaced.

Removing

1. Turn the hard disk tray release handle anti-clockwise until it stops, which is almost one complete turn. As you turn the handle, the tray ejects slightly.

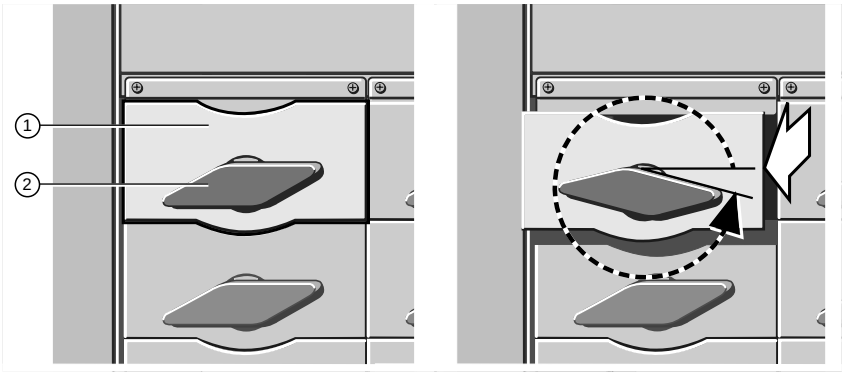


Figure 4-1 Release Handle Rotation

1.	Disk Drive Tray	2.	Disk Tray Release Handle

2. If you are removing the disk while the system is powered up, wait at least 10 seconds to allow the disk to stop rotating and the heads to park before continuing with this procedure.

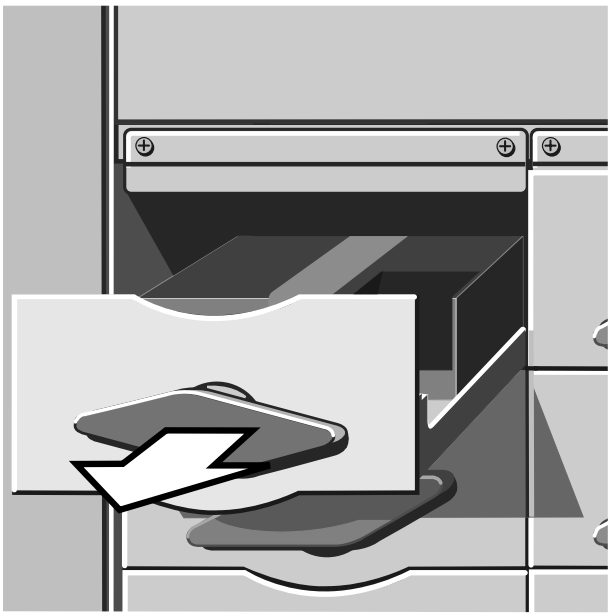


Figure 4-2 Hard Disk Tray Removal

3. Slide the tray out carefully until it is free of the chassis.
4. Turn the tray over and remove the four securing screws on the underside.

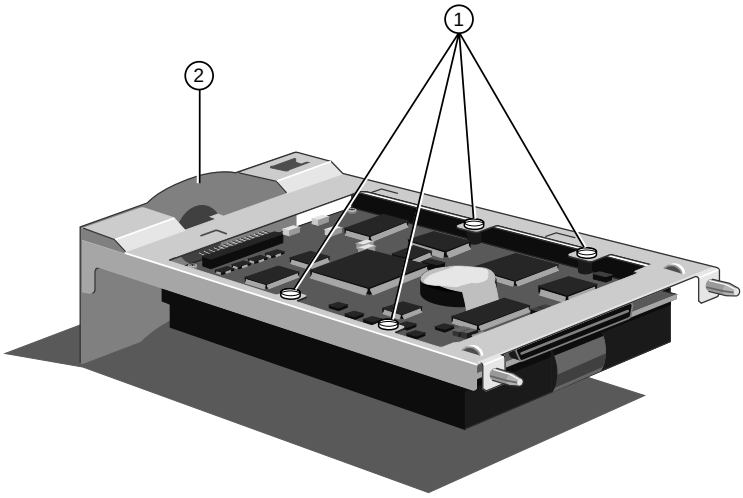


Figure 4-3 Hard Disk Drive Tray Securing Screws

1.	Securing Screws	2.	Disk Drive Tray

5. Remove the tray from the drive.

Fitting

1. Locate an empty drive tray. It may be wise to keep a written record of which trays are fitted with drives. You can identify a specific drive by observing the labelling scheme as shown in the following illustration:

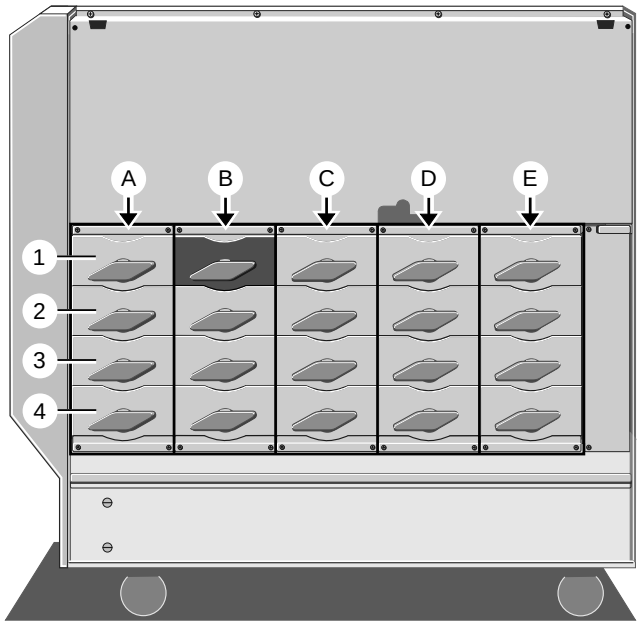


Figure 4-4 Disk Subsystem Labelling Scheme

In addition to the external labelling scheme, each SCSI drive, including the appropriate removable media drives, is assigned a SCSI identification number. The ID scheme for each hard disk drive module, labelled A-E, is the same. The following table indicates these numbers:

Drive	SCSI ID Number
Hard Disk, Position 1	0
Hard Disk, Position 2	1
Hard Disk, Position 3	3
Hard Disk, Position 4	4
CD-ROM Drive	5
1st Tape Backup Drive	2
2nd Tape Backup Drive	6

Your system displays these numbers during Power On Self Test (POST).

2. To remove an empty tray, turn the release handle anti-clockwise until it stops, which is almost one complete turn. As you turn the handle, the tray ejects slightly.

3. Now grasp the front plate of the drive tray and pull it out carefully until the tray is free of the metalwork.
4. Place the drive into the tray, turn the tray over and fasten the drive onto it by means of the four screws as shown:

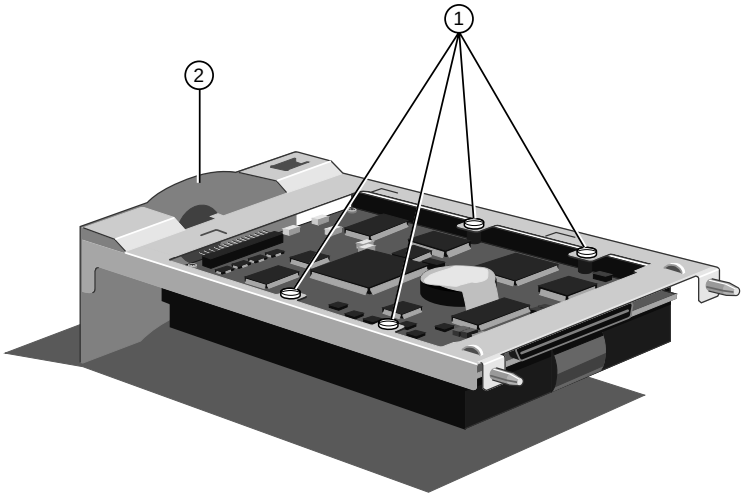


Figure 4-5 Hard Disk Drive Tray Securing Screws

1.	Securing Screws	2.	Disk Drive Tray

5. Ensure that the release handle on the tray is turned anti-clockwise as far as it will go.
6. Insert the tray **carefully** back into the drive module and push it in until it reaches the point where the hard disk release handle will engage. You must not knock or jolt the hard disk drive.
7. Turn the hard disk release handle clockwise almost one complete turn until the tray metalwork is flush with the drive module. During this procedure the hard disk plugs into the SCSI connector on the drive module backplane.

Note

Since the hard disk drives for your Apricot are exclusively SCSI drives, it is important to note that the SCSI connector on the backplane of the drive module contains the device address. This means that, for a given connector, any disk drive that is fitted to that connector will have the same SCSI address.

Hard Disk Drive Module

The hard disk drive module is the removable metal framework which holds up to four hard disk drives. The server's disk subsystem can accommodate up to five of these modules. Removal of a module will usually only be necessary if the circuit boards on the module backplane fail.

Note

*Ensure that **both** side panels are removed before attempting to remove or fit a drive module.*

Removing

1. Remove all hard disk drives which may be fitted to the module in question (see "Hard Disk Drive, Removing", earlier in this chapter).
2. In the electronics chamber, unplug the data ribbon cable from the connector on the back of the module. The connector is visible through an opening in the centre spine.

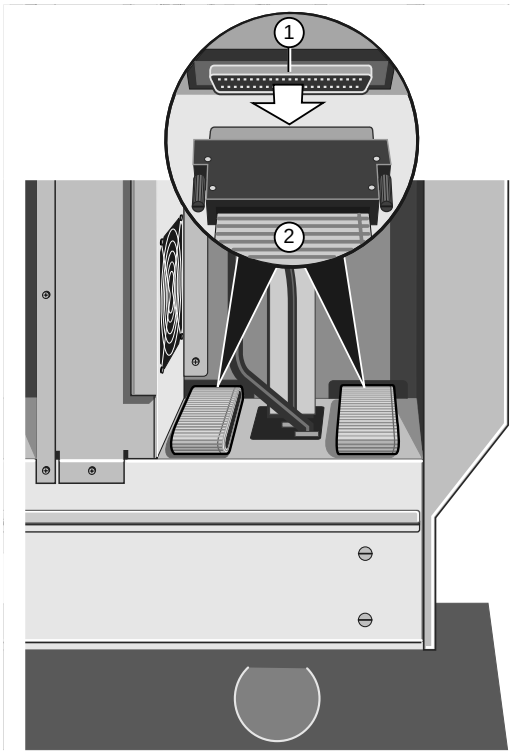


Figure 4-6 Unplugging Ribbon Cable from Module Data Connector

1.	Hard Disk Module Data Connector	2.	Ribbon Cable

Note

One of the connectors, located underneath the cooling fan assembly, is considerably less accessible than the others. If it is too difficult to unplug this connector in the electronics chamber, carry out steps 3 and 4, remembering to feed the ribbon cable carefully through the centre spine opening. Then unplug the connector in the disk chamber.

3. Remove the four securing screws, as shown in the following diagram:

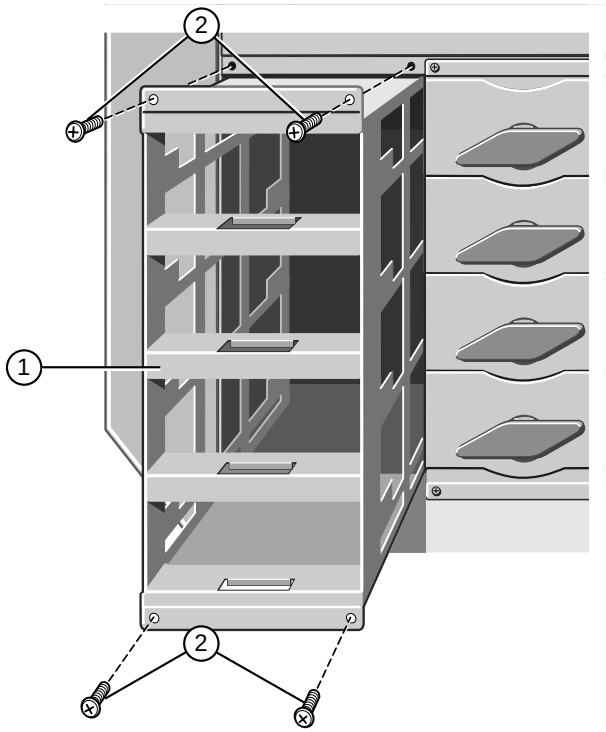


Figure 4-7 Removing Drive Module

1.	Empty Disk Drive Module	2.	Securing Screws

Note

*Module **B** is the Primary Module because it is the one to which the SCSI interface cable from removable media drives (i.e. CD ROM and tape backup). is connected. If you are removing module B, you will need to unplug the SCSI cable just inside the top of the module.*

4. Slide the module gently out. You will feel the backplane power connector unplug from the socket on the centre spine of the server.

Fitting

1. If necessary, remove the knockout panel which covers the drive module data connector opening in the centre spine of the server. You will only need to do this the first time you fit a module in this position.

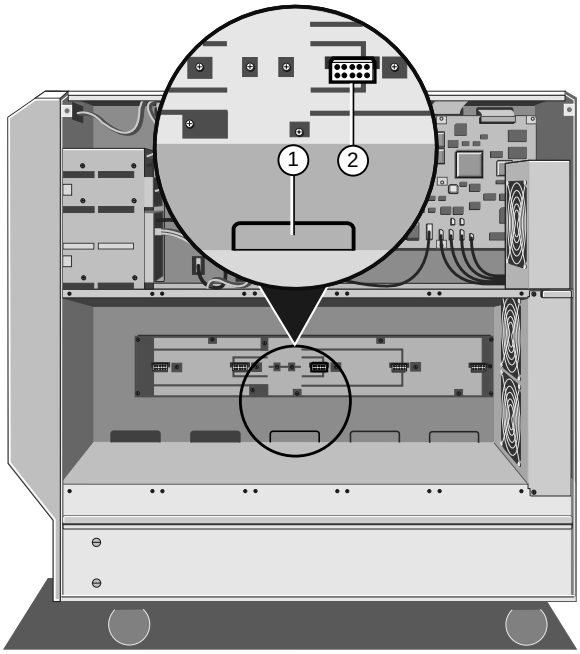


Figure 4-8 Knockout Panel and Power Socket

1.	Knockout Panel	2.	Power Socket

2. Slide the drive module into place as far as it will go, at the same time guiding the data connector through the opening in the centre spine.

3. Now reach inside the module and push on the power circuit board on the backplane to ensure that its connector is seated properly into the power socket on the centre spine. The power circuit board lies in the centre of the backplane in each module as shown in the following diagram:

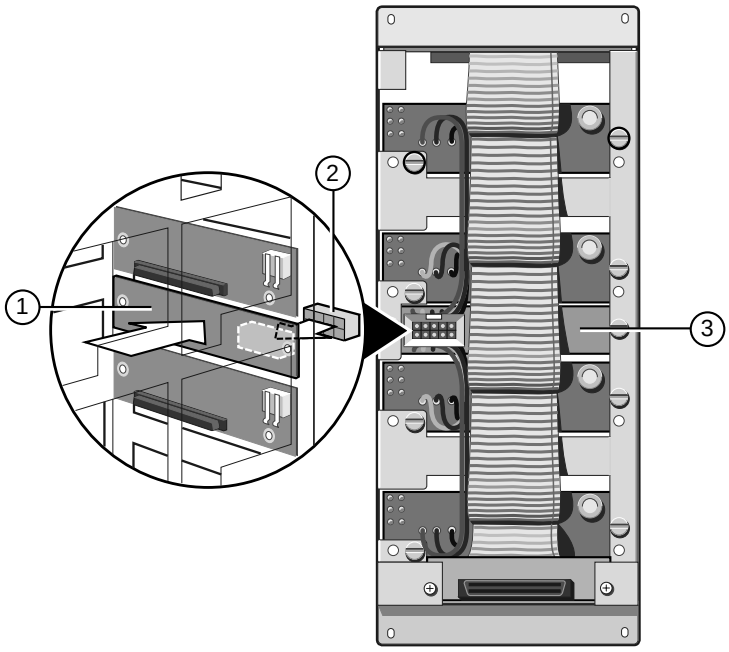


Figure 4-9 Seating Power Connector

1.	Power Circuit Board (from inside module)	3.	Power Circuit Board (from rear of module)
2.	Power Socket on Centre Spine		

4. Now use the four screws to fasten the module to the subsystem metalwork.

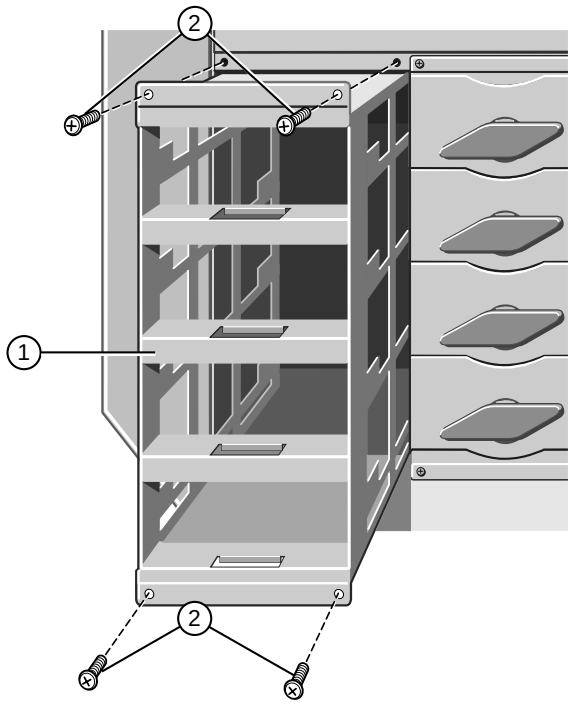


Figure 4-10 Fitting Drive Module

1.	Empty Disk Drive Module	2.	Securing Screws

5. In the electronics chamber, plug the appropriate ribbon cable onto the data connector on the backplane of the drive module:

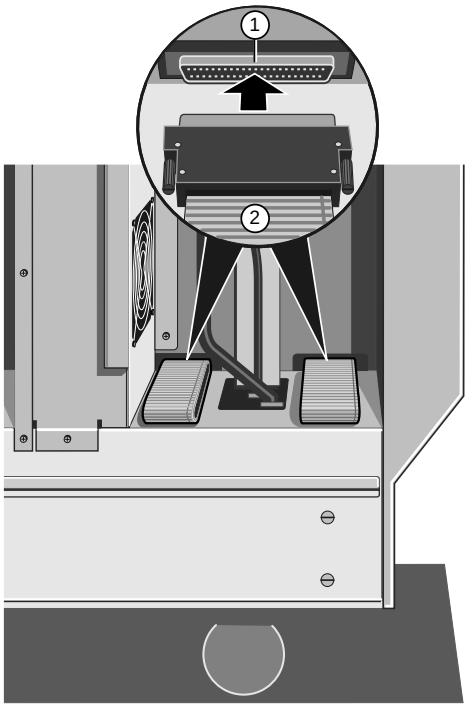


Figure 4-11 Plugging Ribbon Cable to Module Data Connector

1.	Hard Disk Module Data Connector	2.	Ribbon Cable

Reattach the SCSI interface cable for the removeable media drives. The connector for this cable is accessed from the top of the module framework.

Note

The data connector for module B is considerably less accessible than the others because it is directly underneath the cooling fan assembly in the electronics chamber. Before fitting this drive module, it may be wise to improve access to the data connector on the back by first inserting a length of data connector ribbon cable through the opening in the centre spine. Then, plug the connector onto the back and feed any extra cable length back through the opening as you fit the module. Access to the connectors on the other four modules should be sufficient so that you do not have to use this procedure.

Front Bezel

Removing

1. Ensure that the removable media drive bay door is close and locked.
2. On each side of the server, remove the protective metal plates which cover the removable media drives and the electronics chamber.
3. Remove the hard disk drive module closest to the front of the machine (Module A).
4. Remove eight screws, four on each side of the machine, and slide the bezel away from the chassis as shown in the following diagram:

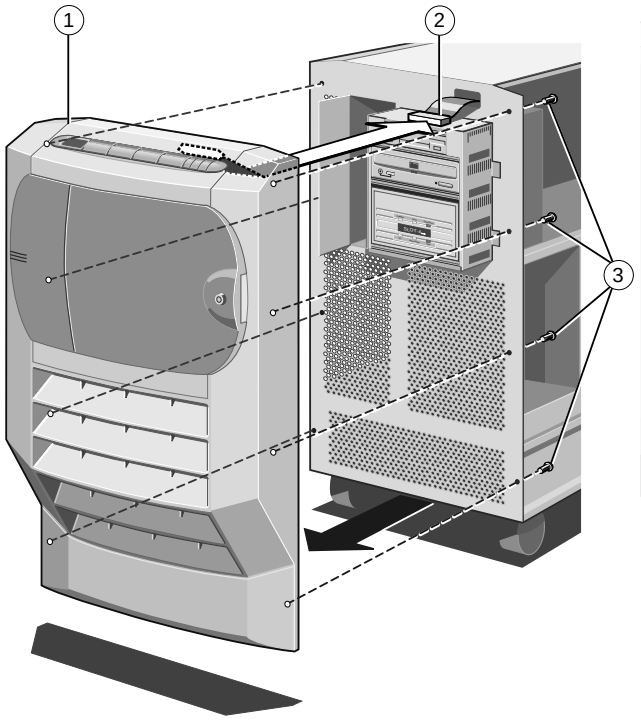


Figure 4-12 Removing Front Bezel

1.	Front Bezel	3.	Securing Screws (x 8)
2.	Front Panel System Controller Connector		

5. The front panel is attached to the bezel and comes away from the chassis at the same time. Since there is a ribbon cable attached to the front panel, remove the bezel with care.

6. Reach behind the bezel and disconnect the ribbon cable from the front panel.

Fitting

1. Ensure that the hard disk drive module closest to the front of the machine (module 1) is removed.
2. Plug the ribbon cable into the connector on the front panel.
3. Fit the bezel onto the chassis and connect the eight screws, four on each side of the server, as shown in the following diagram:

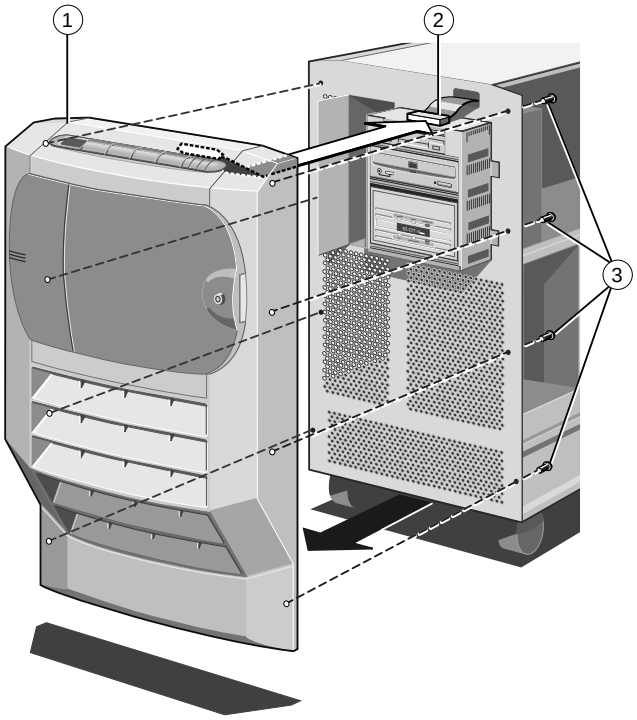


Figure 4-13 Refitting Front Bezel

1.	Front Bezel	3.	Securing Screws (x 8)
2.	Front Panel System Controller Connector		

Front Panel

Removing

1. With the front bezel removed and the ribbon cable disconnected from the front panel, remove the circlip from the top hinge of the removable media drive bay door (which should be closed and locked).

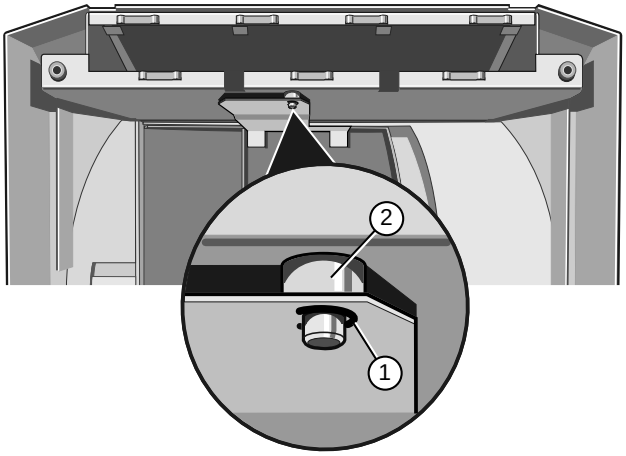


Figure 4-14 Removing the circlip

1.	Circlip	2.	Top Hinge of Drive Bay Door

2. Gently press down on the metal plate to detach it from the hinge as shown:

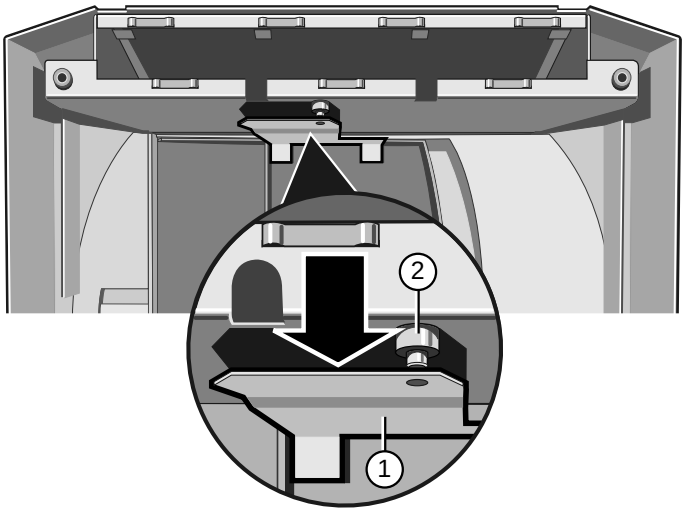


Figure 4-15 Detaching the Hinge

1.	Metal Plate	2.	Hinge

3. Now remove the two screws as shown:

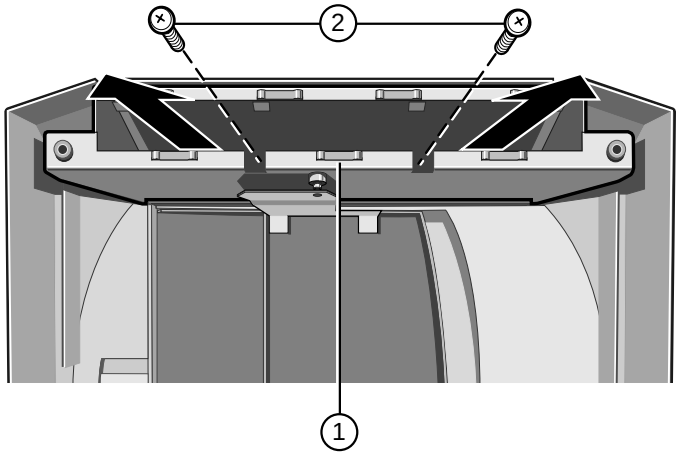


Figure 4-16 Removing Front Panel Supporting Metalwork

1.	Front Panel Supporting Metalwork	2.	Securing Screws

4. Slide the supporting metalwork out of the bezel.

5. Remove the eight screws which fasten the front panel onto the metalwork:

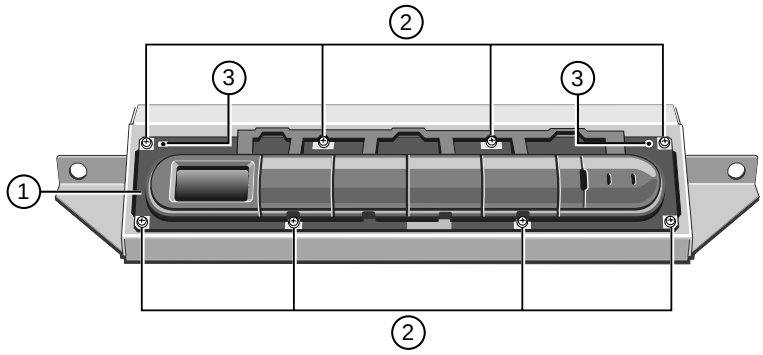


Figure 4-17 Front Panel Securing Screws

1.	Front Panel	3.	Metal Protrusion Holes
2	Securing Screws		

6. Remove the front panel.

Fitting

1. Attach the front panel to the supporting metalwork by means of the eight screws as shown:

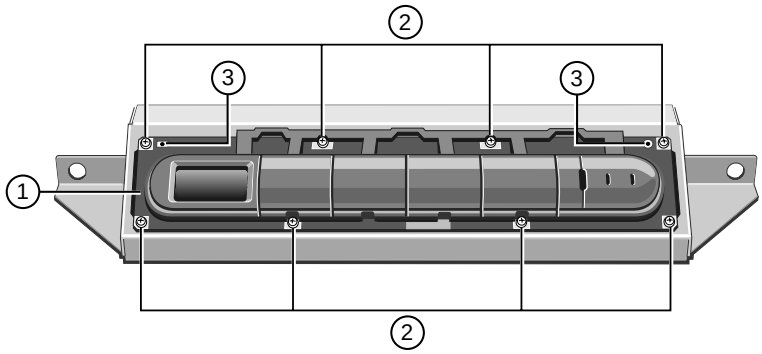


Figure 4-18 Front Panel Securing Screws

1.	Front Panel	3.	Metal Protrusion Holes
2.	Securing Screws		

Note

Be sure to fit the two securing holes, marked (3), over the small metal protrusions in the metalwork.

2. Insert the front panel framework into the bezel as shown:

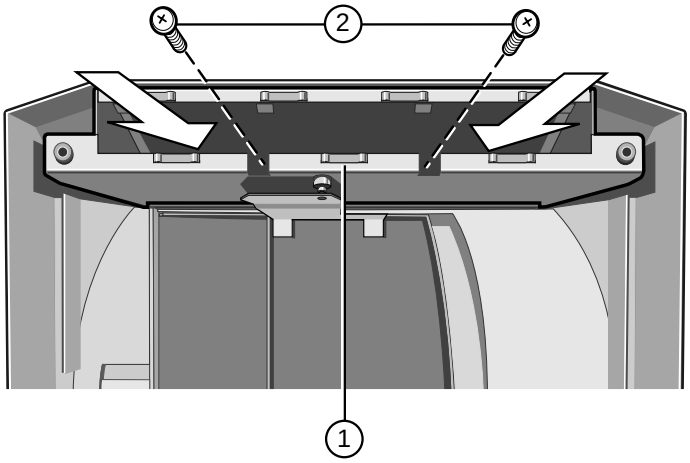


Figure 4-19 Fitting Front Panel Supporting Metalwork

1.	Front Panel Supporting Metalwork	2.	Securing Screws

3. Fasten the framework onto the bezel using the two screws.
4. Attach the top hinge of the removable media drive bay door to the front panel supporting metal work you just fitted.
5. Fit the circlip into the hinge as shown in the following illustration:

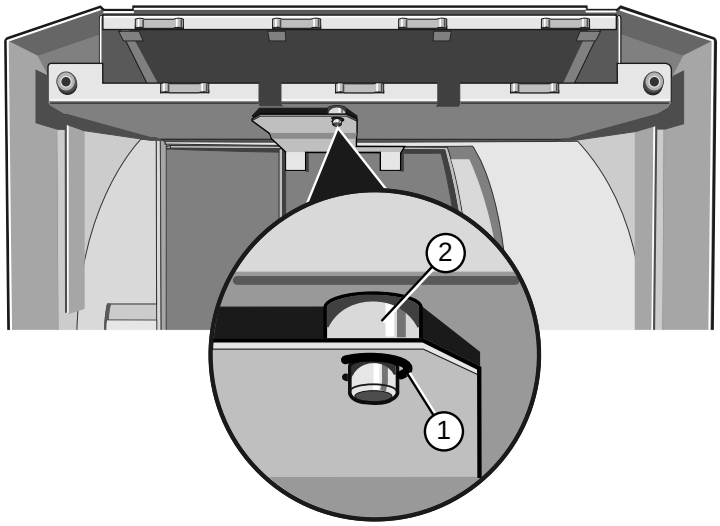


Figure 4-20 Fitting Circlip

1.	Circlip	2.	Top Hinge of Drive Bay Door

Removable Media Drives

To gain access to the removable media drives and the System Management Controller (SMC) you must first remove the protective metal plate which covers this area.

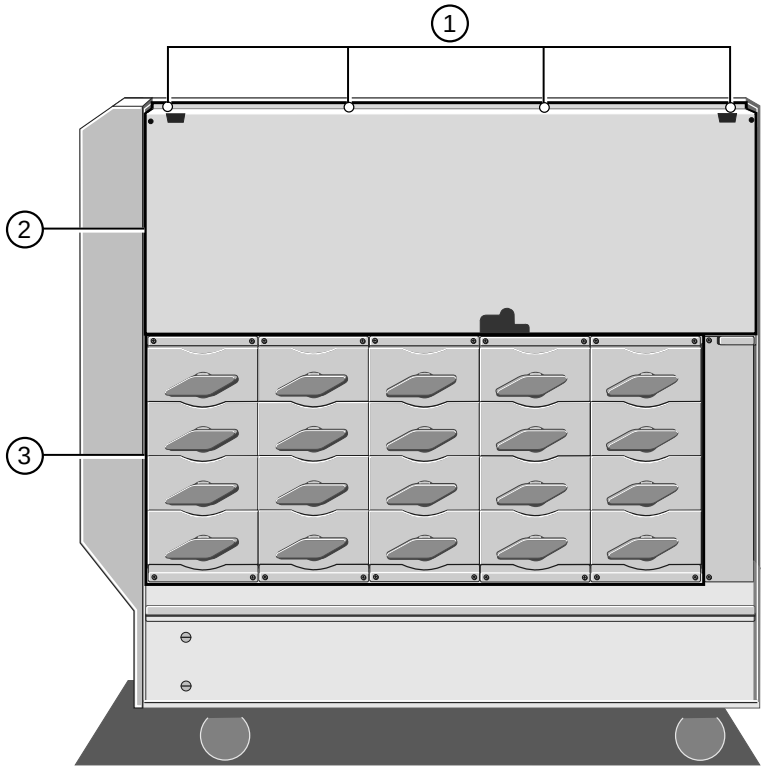


Figure 4-21 Removing Protective Metal Plate

1.	Securing Screws	2.	Hard Disk Subsystem
2.	Protective Metal Plate		

1. Remove the securing screws.
2. Use the finger holes near the top left and right-hand corners to lift the plate away from the server.

Removing

Each drive is attached to a drive tray, which is in turn secured to a drive cage. To remove a tray from the cage:

1. Unplug the data and power cables from the rear of the drive. Unplug the other end of the power cable from its socket on the centre spine.
2. Remove the two drive tray securing screws from the side of the cage. The following diagram shows the screws for three of the drives:

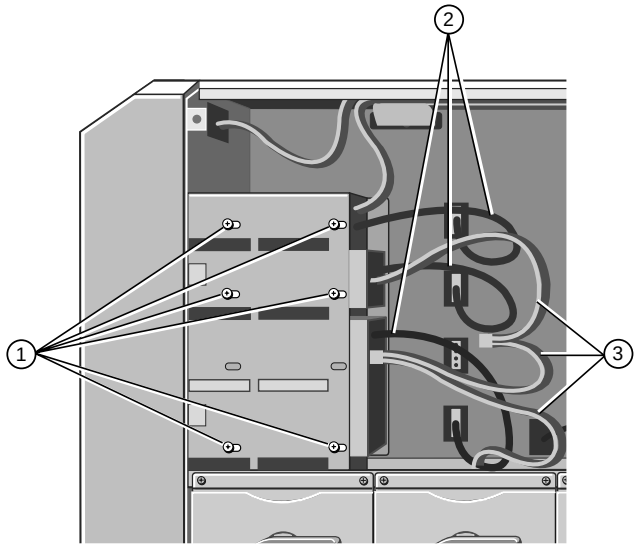


Figure 4-22 Removable Media Drive Bay (Internal)

1.	Drive Tray Securing Screws	3.	Drive Data Cables
2.	Drive Power Cables		

3. Slide the tray carefully toward the rear of the cage until it is free from the metalwork.

4. Turn the tray over and remove four screws from the underside of the tray as shown:

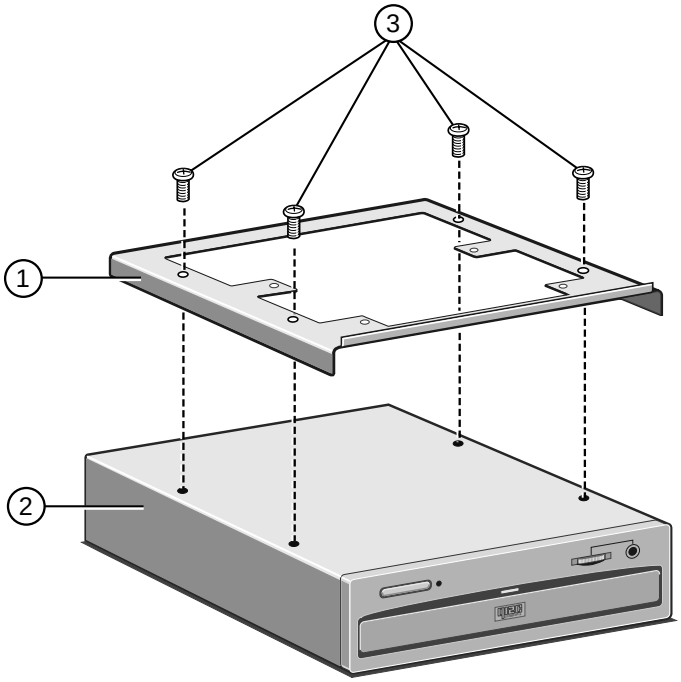


Figure 4-23 Drive Tray Removal

1.	Drive Tray	3.	Securing Screws
2.	Drive Assembly		

5. Lift the tray away from the drive.

Fitting

Your server is equipped with a tray and a blanking plate for each empty drive bay.

1. Remove the blanking plate, if necessary, from the drive tray. The plate is attached via two screws on the underside of the tray.

2. Fasten the drive onto a drive tray using the four securing screws as shown:

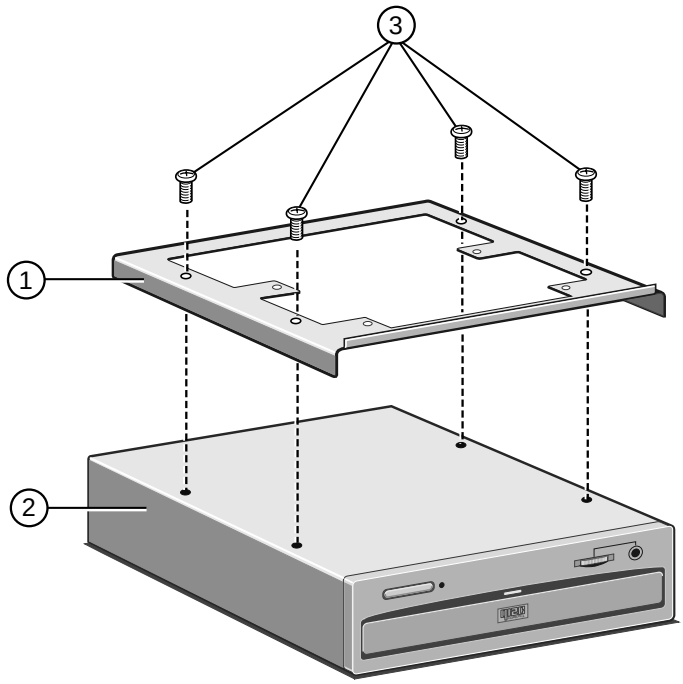


Figure 4-24 Refitting the Removable Drive Tray

1.	Drive Tray	3.	Securing Screws
2.	Drive Assembly		

3. Turn the drive upright, slide it into the drive cage and secure it to the cage using the two screws. The following illustration shows the securing screws for three of the drive trays:

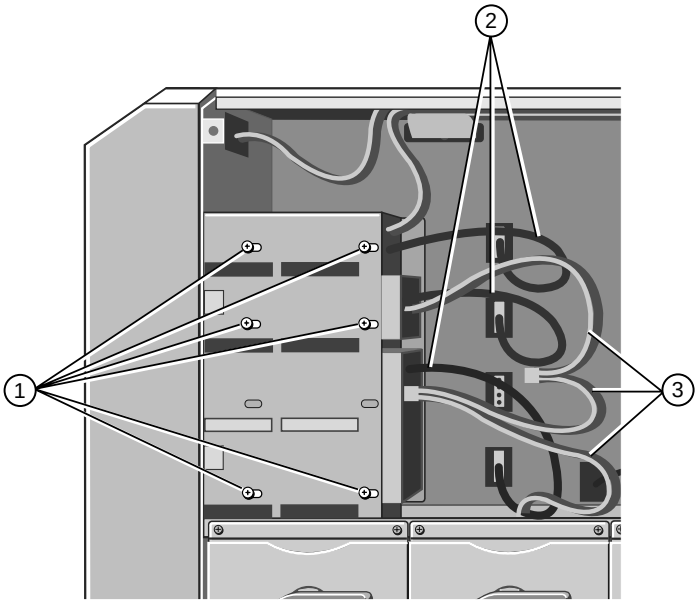


Figure 4-25 Removable Media Drive Bay (Internal)

1.	Securing Screws	3.	Drive Data Cables
2.	Drive Power Cables		

4. Connect the power cable to the back of the drive and the other end to the socket on the centre spine.

5. If you are fitting a SCSI drive, you will need to connect it to the bus cable which is attached to any other SCSI removable media drives that are present. If there are no more SCSI devices, connect the cable directly into the connector at the top of hard disk drive module B.

Note

The drive tray securing screws allow a small amount of horizontal adjustment to enable you to ensure that the front of a drive is exactly flush with the front metalwork. If the fitted drive protrudes beyond the metalwork, the drive bay door may not be able to close.

System Management Controller Board

Although some of the board is hidden behind the cooling fan assembly, all of the fixing screws and cable connections are easily accessible.

Removing

1. Unplug three ribbon cable connectors, the power connector, three fan connectors, two thermistor connectors and one keylock sensor cable connector as shown in the following diagram:

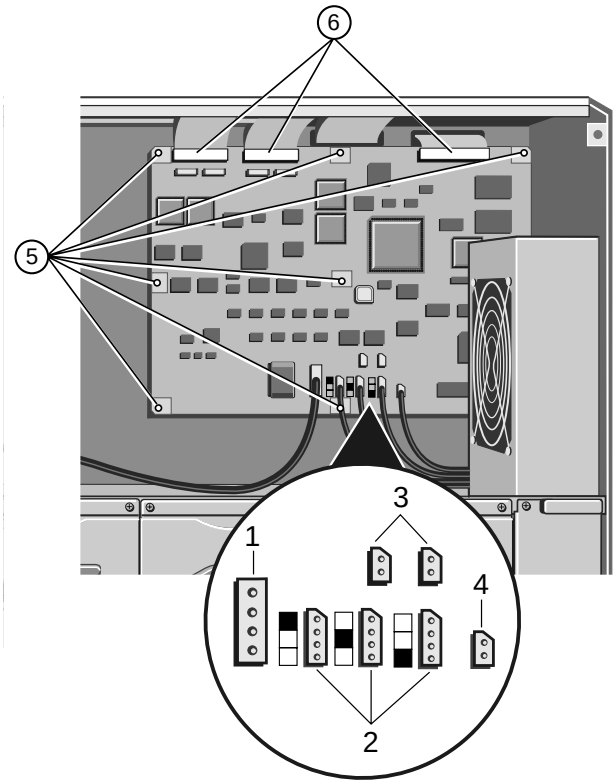


Figure 4-26 System Management Controller Board

1.	Power Connector	4.	Keylock Sensor Connector
2.	Fan Connectors	5.	Securing Screws
3.	Thermistor Connectors	6.	Ribbon Cable Connectors

2. Remove the two screw lock posts on the 25-way SMC serial port connector which is visible on the server's back panel:

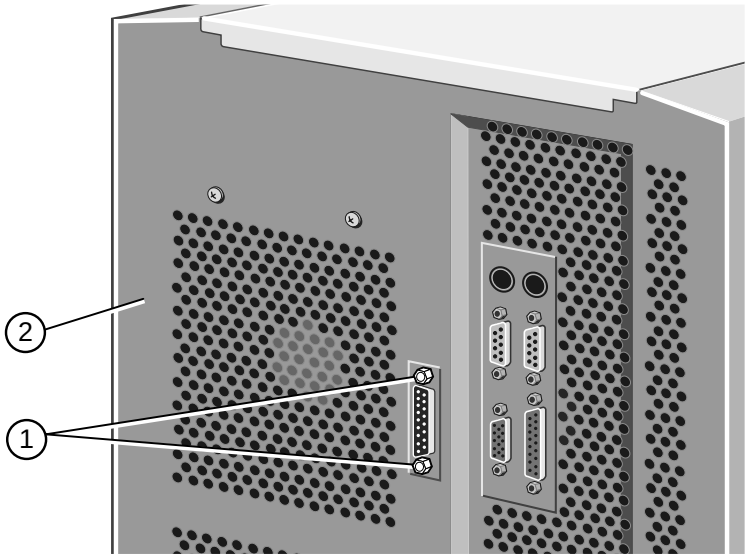


Figure 4-27 SMC Serial Port Screw Lock Posts

1.	Screw Lock Posts	2.	Back panel

3. Remove the seven fastening screws and lift the board out of the machine.

Fitting

1. Feed the 25-way serial port connector through the opening in the back panel.
2. Fasten the board to the centre spine using the seven screws as shown in the following illustration:

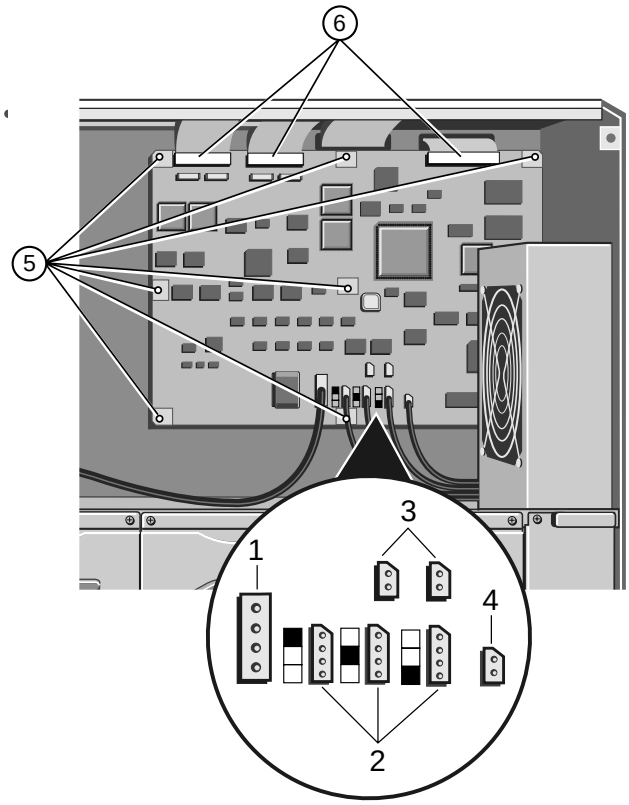
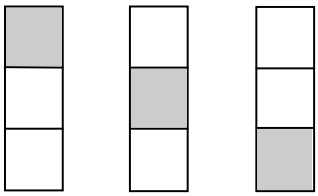


Figure 4-28 System Management Controller Board

1.	Power Connector	4.	Keylock Sensor Connector
2.	Fan Connectors	5.	Securing Screws
3.	Thermistor Connectors	6.	Ribbon Cable Connectors

3. Fasten the two screwlock posts into place at both ends of the 25-way connector on the back panel.
4. Plug the ribbon cables, power cable, fan and associated thermistor cables and the keylock sensor cable into their respective connectors on the SMC board as shown in the previous diagram.

Against each fan connector on the board there is a graphic which indicates which fan cable should be plugged in:



Top Middle Bottom

The middle and bottom fans in this series are located below the SMC board in the disk subsystem area.

System Controller Cooling Fan Assembly

Removing

1. Unplug the top fan connector on the SMC board (see fan connector graphic in "System Management Controller Board, Fitting").
2. Remove the two securing screws for the fan assembly, found on the back panel as shown:

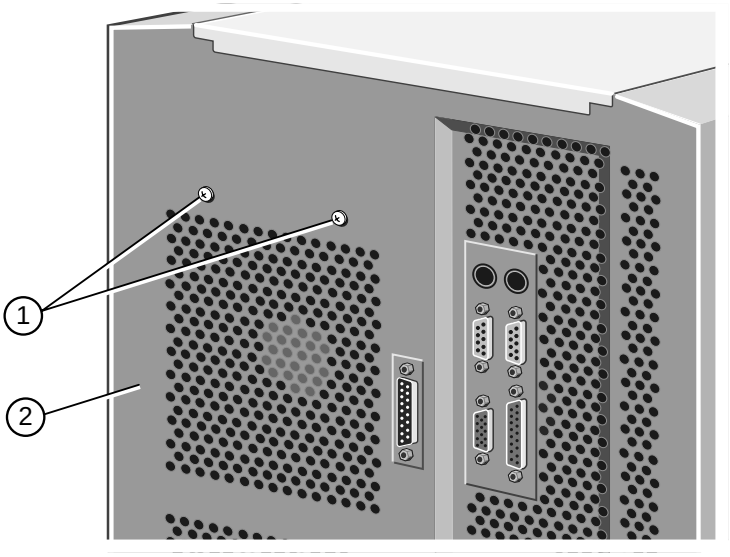


Figure 4-29 SMC Cooling Fan Securing Screws

1.	Securing Screws	2.	Back panel

3. Tilt the top of the assembly slightly towards the interior of the server (if it hasn't already) and lift it upwards to free it from the chassis.

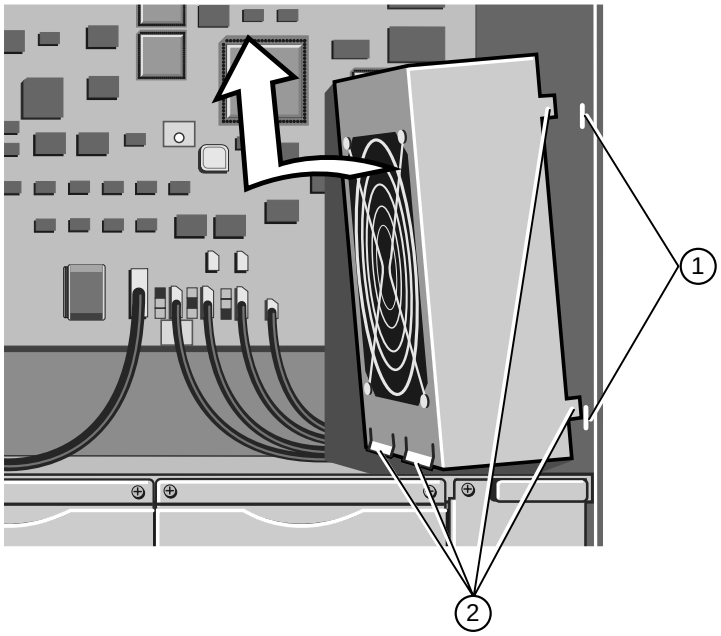


Figure 4-30 SMC Fan Assembly

1.	Tab Slots	2.	Metal Tabs

Fitting

1. Fit the assembly so that the two metal tabs at the bottom are inserted into corresponding slots. The assembly will then have a natural tilt towards the interior of the server.
2. On each side of the assembly there is also a smaller tab which fits into a corresponding slot in the chassis. Squeeze the sides gently until the tabs fit into the slots.
3. While holding the assembly in place, fasten it with the two screws on the back panel of the server.
4. Connect the fan cable to the top connector on the controller board (see fan connector graphic in "System Management Controller Board, Fitting").

Cooling Fan and Handguard

These instructions apply to all the fans in the server.

Removing

Remove the four screws which hold the handguard onto the fan assembly housing. This not only releases the handguard, but also the fan itself.

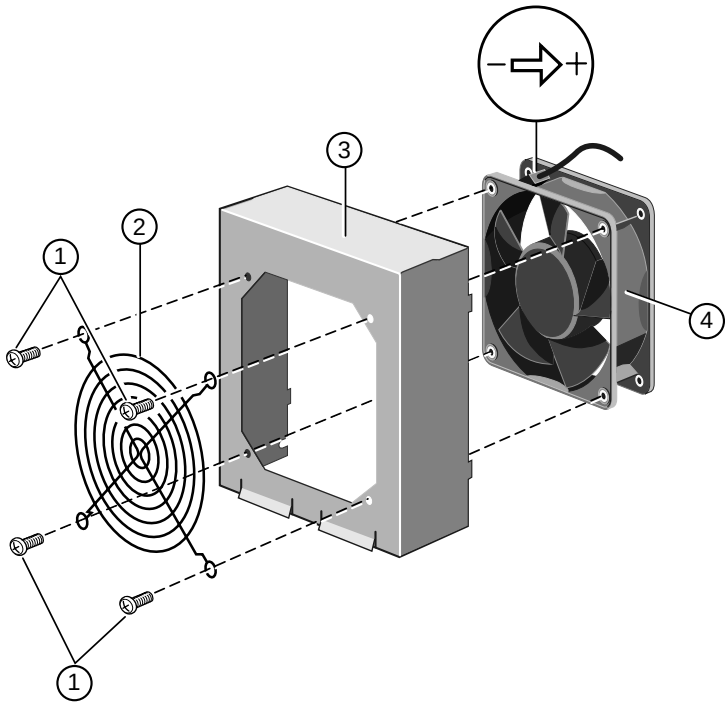


Figure 4-31 Cooling Fan Assembly

1.	Securing Screws	3.	Fan Assembly Housing
2.	Handguard	4.	Fan

Fitting

Caution

Before attempting to fit the fan onto the fan assembly housing, be sure to place the fan into the assembly so that the air flow through it is from the front of the server to the rear (see the arrow next to the electrical polarity marking on one corner of the fan). If any fan is turned the wrong way around, it will seriously reduce the overall cooling effectiveness and increase the risk of overheating.

1. With the housing upright, align one corner of the handguard with a screw hole and insert a screw.
2. While holding the handguard and screw in place, align the fan in a similar way and tighten the screw. Then align and fit the remaining three screws.

Hard Disk Drive Cooling Fan Assembly

You can remove and fit the hard disk drive cooling fan assembly without disturbing the adjacent disk drive module.

Removing

1. Unplug the middle and bottom fan connectors and their associated thermistor connectors from the SMC board as shown:

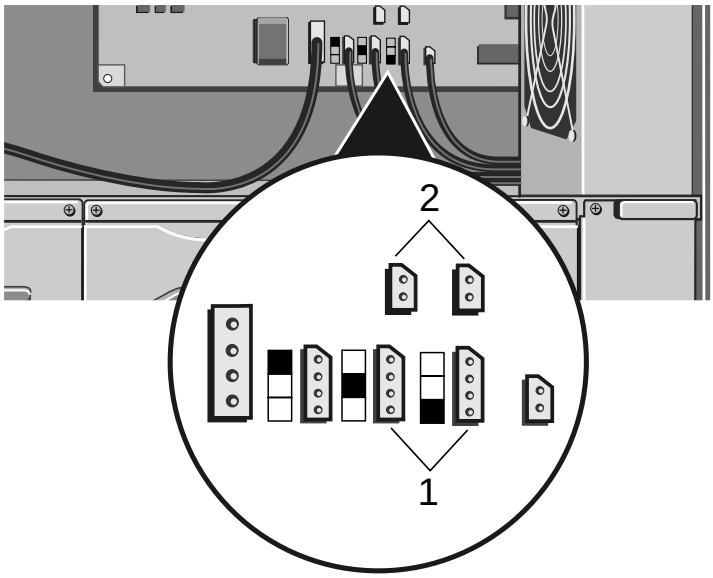


Figure 4-32 SMC Fan and Thermistor Connectors for Middle and Bottom Fans

1.	Middle & Bottom Fan Connectors	2.	Associated Thermistor Connectors

2. Push the power and thermistor cables down through the cutout in the corner of the metal work behind the top fan assembly.

3. Remove two screws which fasten the fan assembly to the chassis:

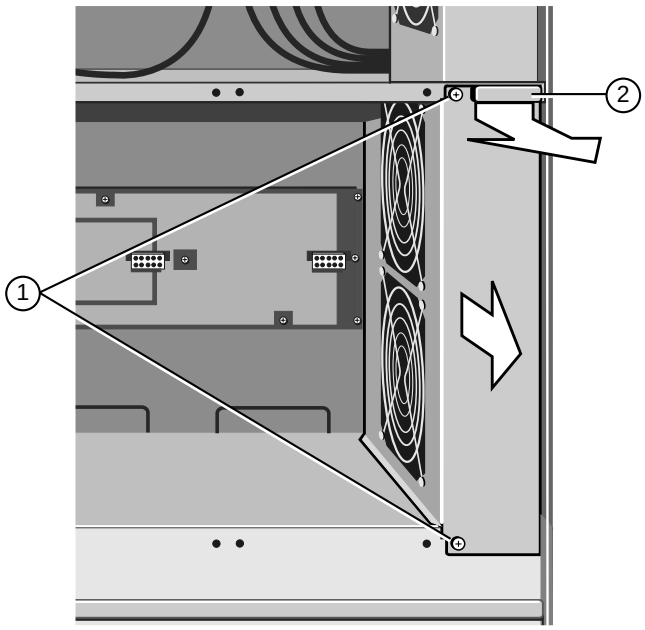


Figure 4-33 Removing the Hard Disk Cooling Fan Assembly

1.	Securing Screws	2.	Finger Grip

4. Use the finger grip to slide the assembly towards you.

Fitting

1. Slide the assembly into position, remembering to feed the guide tabs into the positioning slots as shown in the following illustration:

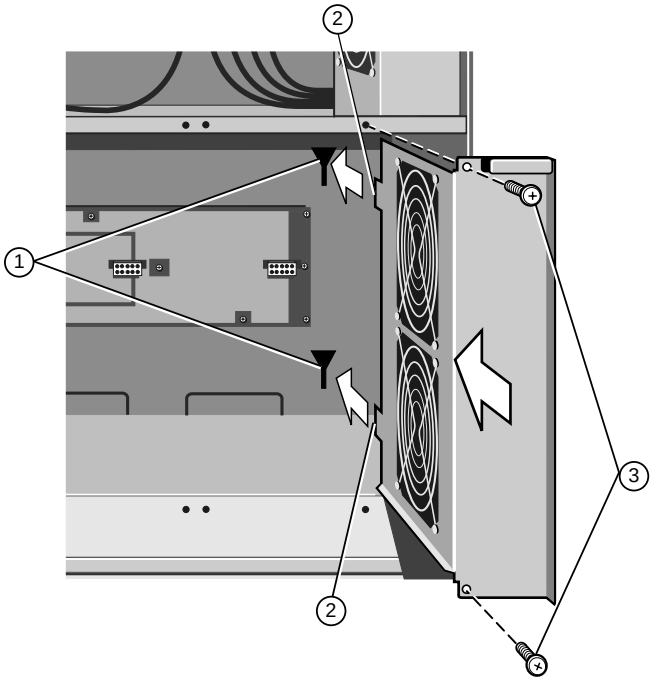


Figure 4-34 Refitting Hard Disk Cooling Fan Assembly

1.	Positioning Slots	3.	Securing Screws
2.	Guide Tabs		

2. At the same time, feed the fan cables through the cutout in the corner of the metalwork above the assembly. These cables will need to be plugged into their respective sockets on the SMC board.
3. Fasten the assembly to the chassis with the two screws.

4. Plug the bottom and middle fan connectors, together with their associated thermistor connectors, in to the SMC board as indicated in the following diagram:

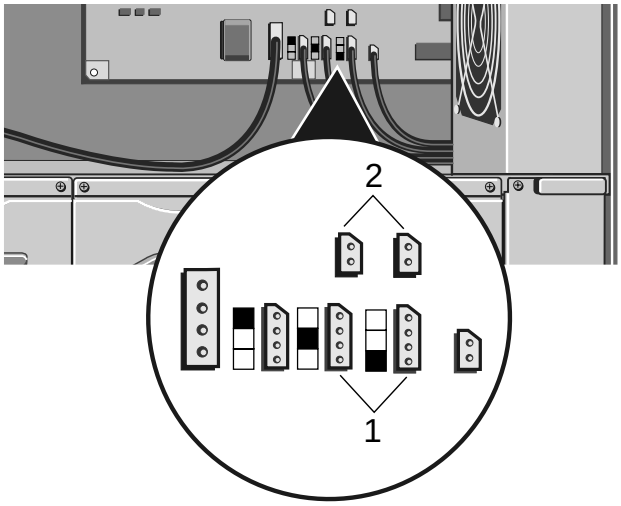


Figure 4-35 SMC Fan and Thermistor Connectors for Middle and Bottom Fans

1.	Fan Connectors	2.	Thermistor Connectors

Hard Disk Drive Module Backplane

The backplane on a hard disk drive module consists of seven small circuit boards which are fastened with screws to the metal framework and connected to each other by a flexible ribbon cable.

The following illustration identifies the various boards on the backplane:

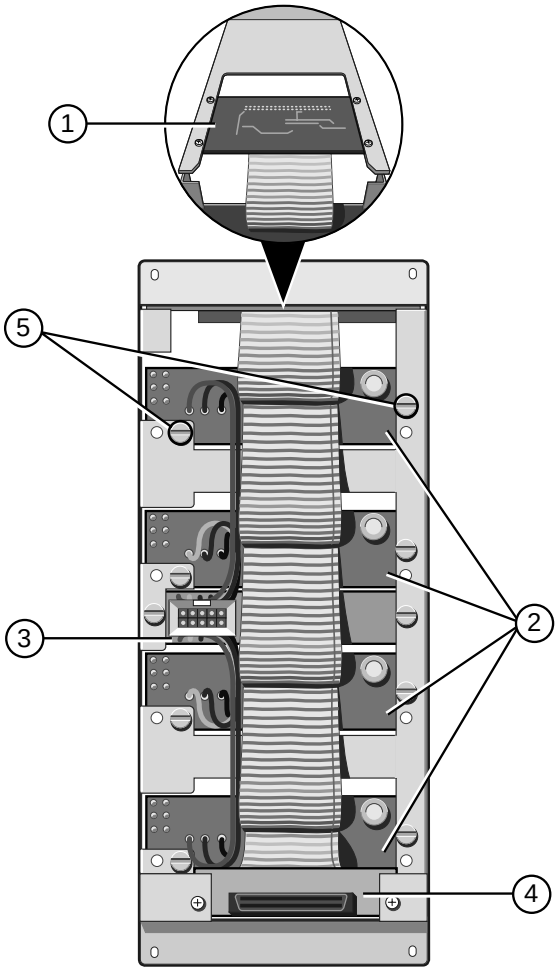


Figure 4-36 Hard Disk Drive Module Backplane

1.	Removable Media Drive SCSI Interface Board	4.	Data Connector Board
2.	Hard Disk Drive Boards	5.	Fastening screws
3.	Power Distribution Board		

Removing

There are two fastening screws for each board except the removable media drive SCSI interface board, which has four. To remove the backplane:

1. Remove all disk drives from the module.
2. Remove the fastening screws from all the boards.
3. Push each of the boards, except the data connector board, towards the interior of the module and manoeuvre it as necessary until it can be freed from the framework.
4. Lift the backplane away.

Fitting

1. Manoeuvre the boards of the backplane through the back openings into the interior of the framework so that they can be positioned properly.
2. Fasten all the boards to the module framework as shown in the previous diagram.

Jumper Settings for the Removable Media SCSI Interface Board

Each module backplane contains a removable media SCSI interface board, positioned at the top of the module. However, only one of the boards, the one in module B, is ever attached to the removable media SCSI cable. There are two jumpers on the interface board, as shown in the following diagram:

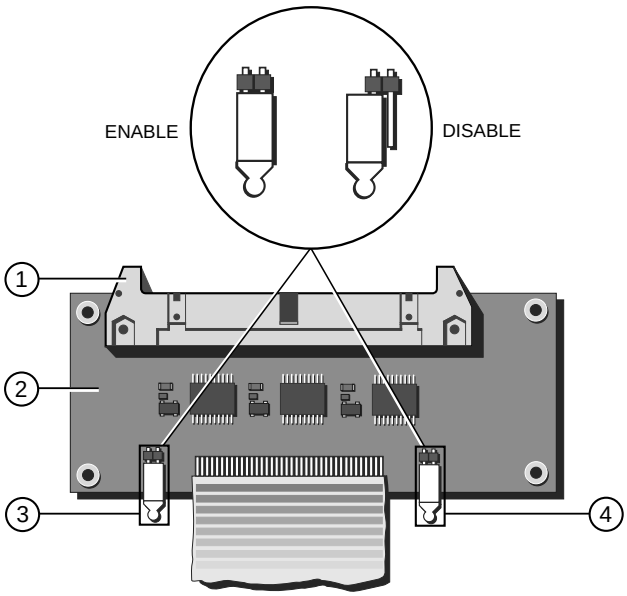


Figure 4-37 Removable Media SCSI Interface Board

1.	SCSI Connector	3.	Jumper J1
2	Interface Board	4.	Jumper J2

Both jumpers, J1 and J2, must be in the correct positions for the system to work properly, according to the following instructions:

- J1 determines whether a *delayed spinup* occurs in this module. Delayed spinup means that the installed drives will not start spinning simultaneously after you switch the server on. Instead, the drives start one at a time with a specific number of seconds between each one. This delay prevents the excessive power drain that would otherwise occur if all drives started at the same instant. Therefore, this jumper should always be in the **enabled** position.

- J2 determines where the SCSI bus terminates. If the removable media drive SCSI cable is connected to this interface board, set this jumper to the **enabled** position. Otherwise, set it to the disabled position.

Motherboard Power Distribution Panel

The motherboard power distribution panelis fixed to the inner roof of the electronics chamber and is positioned at right angles to the motherboard. The following illustration shows the connectors and the eight securing screws on the board:

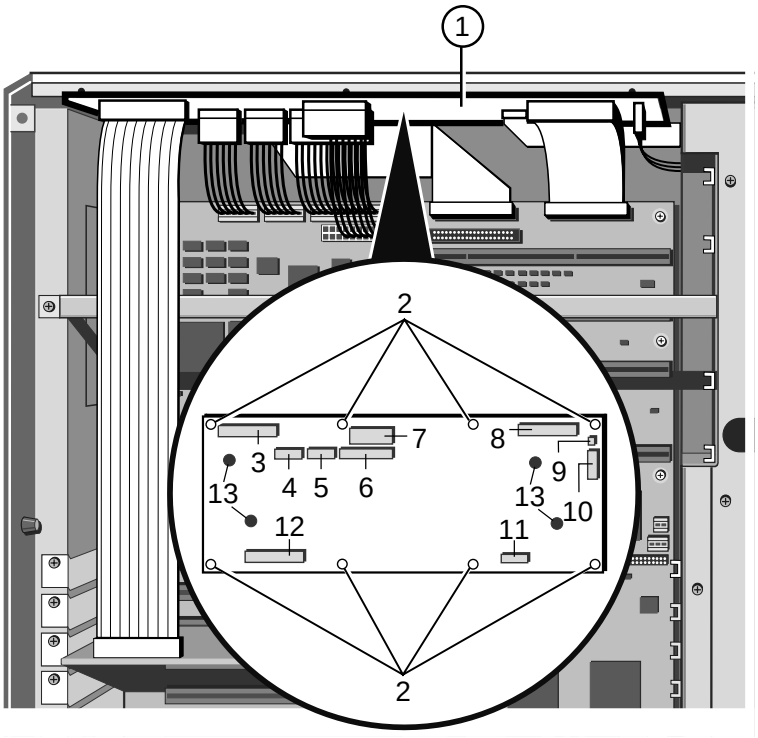


Figure 4-38 Motherboard Power Distribution Panel

1.	Power Distribution Panel	8.	Front Panel Connector
2.	Securing Screws	9.	Loudspeaker Connector
3.	SMIC Card Connector	10.	Auxiliary Power Connector
4.	Power to Motherboard	11.	Fan Board Connector
5.	Power to Motherboard	12.	System Controller Connector
6.	Power to Motherboard	13.	Bus Bar Connections
7.	3.3 Volt Supply to Motherboard		

Removing

1. Unplug all connectors on the panel.
2. Detach the bus bars (two pairs) from the panel.
3. Remove eight securing screws and remove the panel.

Fitting

1. Fasten the panel to the inner roof of the electronics chamber with the 8 screws.
2. Attach the two pairs of bus bars.
3. Plug the various connectors into the board. Each connector is keyed so that it cannot be plugged incorrectly.

Motherboard

Removing

1. Unplug all cables and leads from the back panel connectors (i.e. serial, parallel, video, keyboard, mouse) on the motherboard and from any expansion cards.
2. Remove the screws which secure the metal plate over the electronics chamber. The screws are along the top and right edges of the plate as shown in the following illustration:

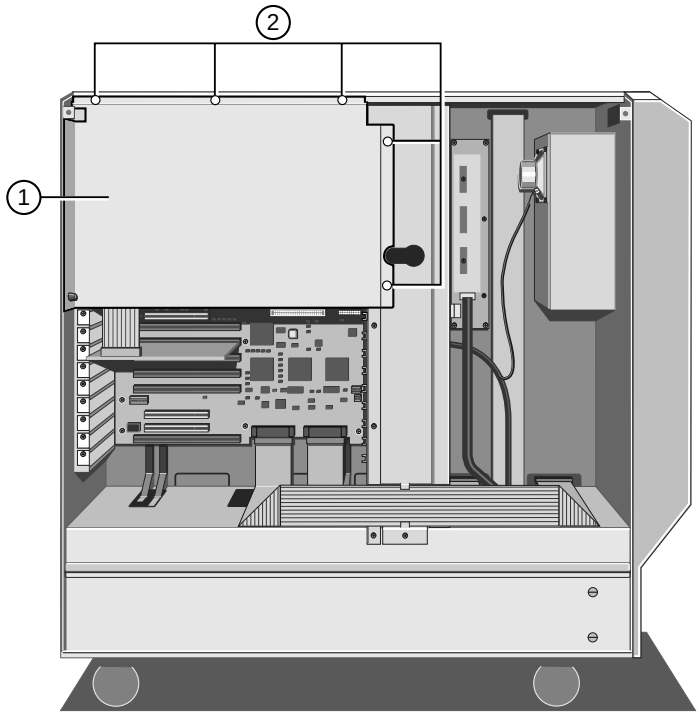


Figure 4-39 Protective Metal Plate Over Motherboard

1.	Protective Metal Plate	2.	Securing Screws

3. Rotate the right edge of the plate slightly towards you and unhook the left edge. Removing the plate uncovers the motherboard:

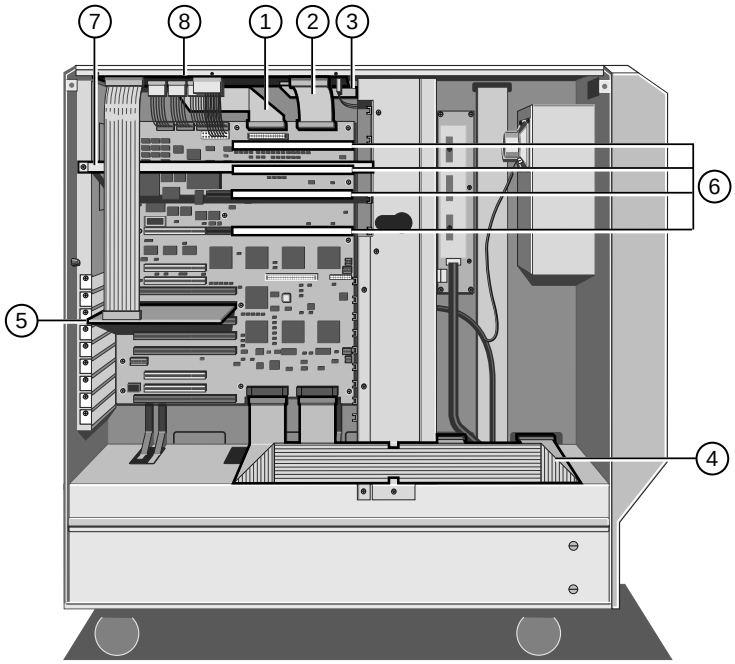


Figure 4-40 Motherboard

1.	Floppy Disk Cable	5.	System Management Interface Card (SMIC)
2.	SMC Cable	6.	Memory and CPU Slots
3.	Cable for Cooling Fan Distribution Board	7.	Support Strap for Memory and CPU Cards
4.	Hard Disk Module Data Cable	8.	Motherboard Power Distribution Panel

4. Remove six screws from the periphery of the subplate which surrounds the serial, parallel and video connectors on the back panel of the server.

5. Now remove the System Management Interface Card (SMIC). Unplug its ribbon cable, which is attached to the distribution board at the top of the electronics chamber, using the ejector latches:

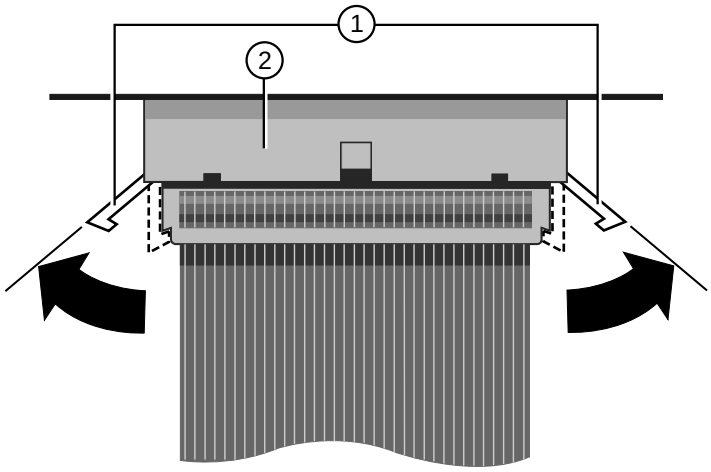


Figure 4-41 - SMIC Connector Ejector Latches

1.	Ejector Latches	2.	Connector

6. Remove the four metal straps which support CPU/memory cards. There is a single screw on one end of the strap with a hook on the other.
7. Remove all CPU, memory and expansion cards from the board.
8. Unplug the five DC power connectors on the power distribution panel at the top of the electronics chamber.
9. Unplug the Front Panel connector from the power distribution panel. Again, use the ejector latches.
10. Unplug the Floppy Drive connector.
11. Unplug the two SCSI interface cables from the connectors at the bottom of the motherboard. If your system has more than two SCSI interface cables, the extra ones will have been connected to an expansion card which you removed earlier.

Caution

It is vital that you remember the exact cable and connector arrangment of your hard disks, particularly if you are using a RAID (Redundant Array of Independent Disks) configuration. If you fail to restore the arrangement so that all cables and plugs are as they were originally, you will lose all the data on your hard disks.

12. Now remove 14 screws which secure the board to the centre spine of the server, as shown:

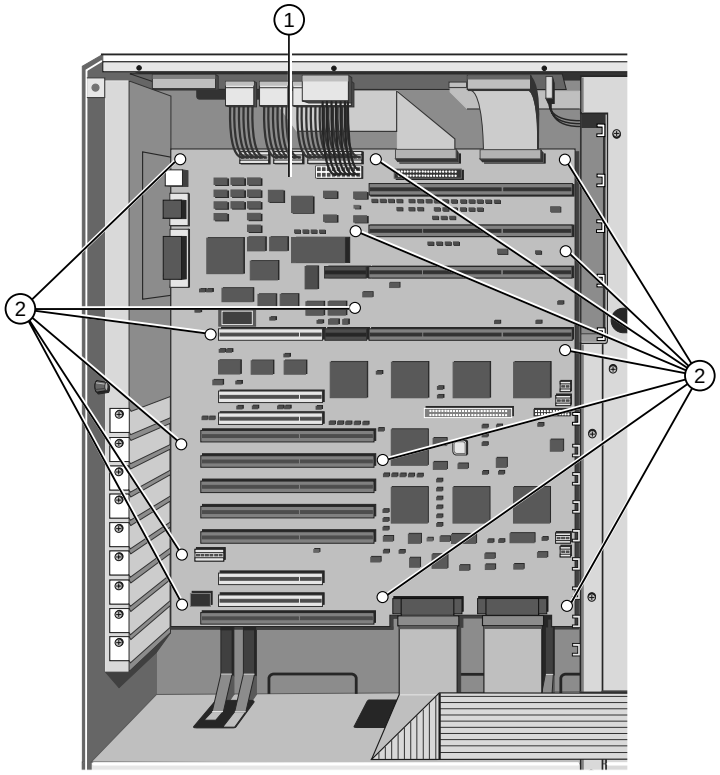


Figure 4-42 Motherboard Securing Screws

1.	Motherboard	2.	Securing Screws

13. Lift the board out of the electronics chamber.

Fitting

1. Attach the motherboard to the centre spine of the server using the 14 screws as shown in the following illustration:

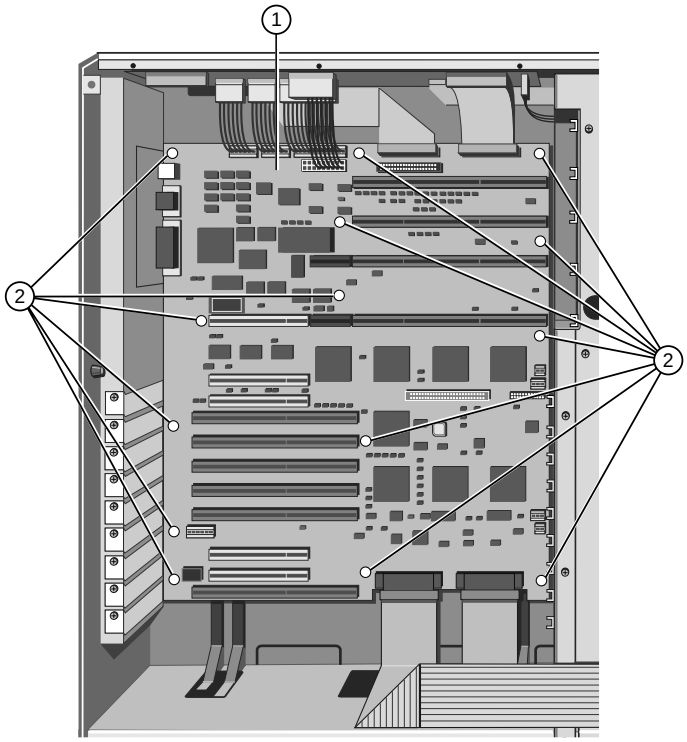


Figure 4-43 Motherboard Securing Screws

1.	Motherboard	2.	Securing Screws

2. Reconnect the hard disk cables from the drive modules to the appropriate connectors as they were originally.

Caution

Be absolutely sure that you restore the hard disk cable and connector arrangement as it was originally, particularly if you have a RAID configuration. Failure to do so will cause massive data loss.

3. Plug the Floppy Drive and Front Panel cables into their respective connectors.

4. Plug the five DC power cables into their respective connectors on the power distribution board at the top of the electronics chamber. These connectors are keyed and cannot be plugged incorrectly. Do **not** use force; you may be trying to plug a cable into the wrong connector.
5. Replace all CPU, memory and other expansion cards and connect their respective cables appropriately.
6. Replace the support straps for the CPU/memory slots.
7. Replace the SMIC card and plug its cable into the power distribution board at the top of the electronics chamber. Fasten the plug using the latches as shown in the following diagram:

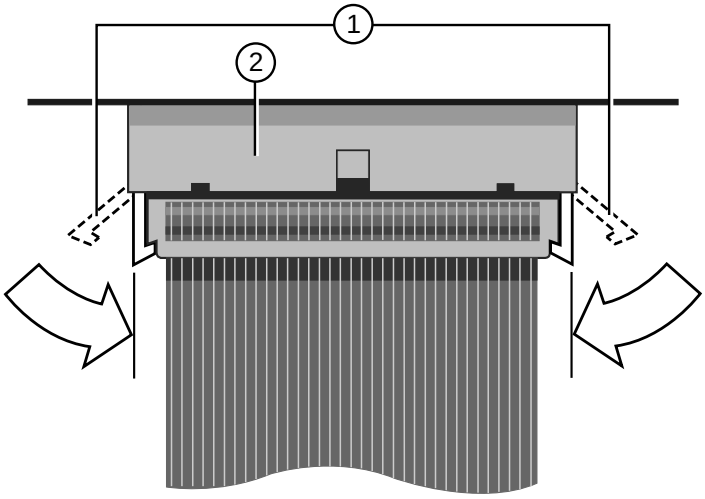


Figure 4-44 SMIC Connector Ejector Latches

1.	Ejector Latches	2.	Connector

8. Replace the six screws which secure the connector subplate, on the back panel, to the server chassis.
9. Hook the left edge of the protective metal plate in place and secure the plate to the server chassis using the screws along the top and right edges.
10. Reconnect all cables and leads to the back panel port connectors.

Note

You should always fit all protective metal plates. These plates, in addition to providing protection for delicate components, contribute to an effective flow of cool air through the machine.

Motherboard Cooling Fan Assembly

Removing

1. Remove five screws on the side of the fan assembly.
2. Remove four more screws which fasten the assembly to the centre spine of the server, as shown:

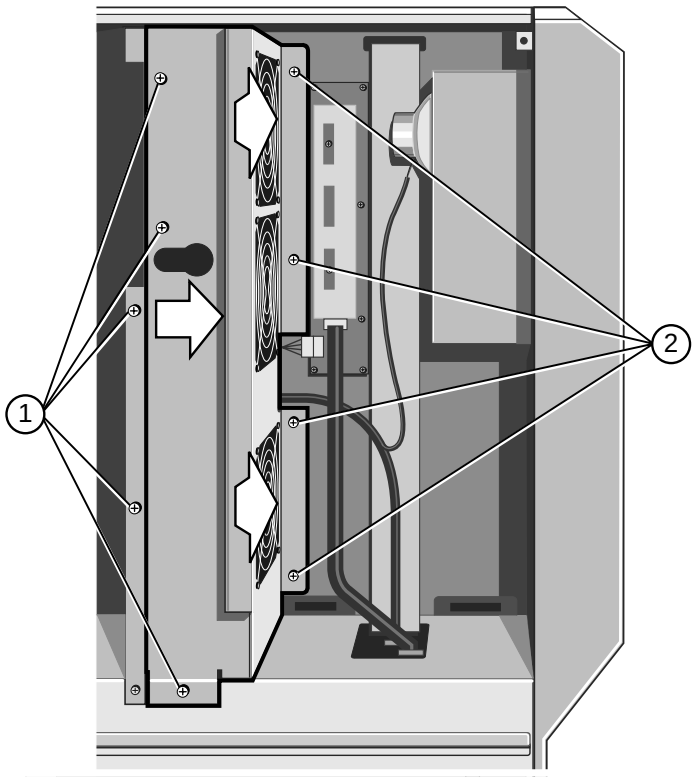
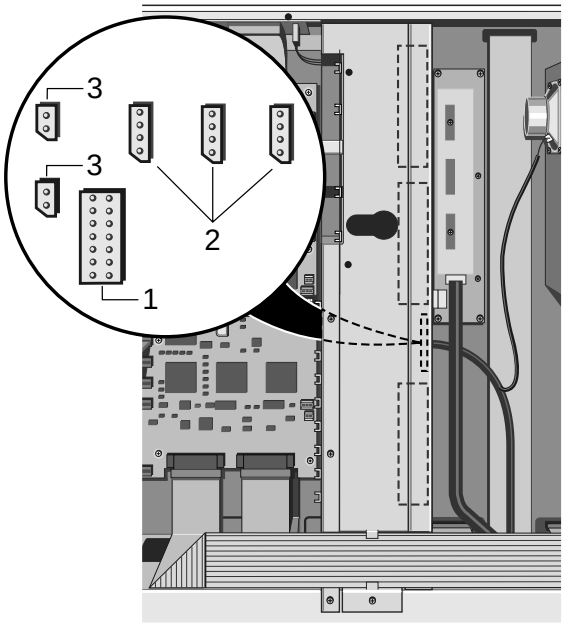


Figure 4-45 Removing Cooling Fan Assembly

1.	Side Securing Screws	2.	Centre Spine Securing Screws

3. Slide the assembly to the right and then towards you to remove it.

4. Before removing the assembly entirely, unplug the ribbon cable from the connector on the small power distribution panel between the bottom and middle fans:



4-46 Connectors on Small Power Distribution Panel

1.	Ribbon Cable Connector	3.	Fan Thermistor Cables
2.	Fan Power Cables		

Fitting

1. Fit the fan assembly into the interior of the server enough to connect the ribbon cable to the small power distribution board between the middle and bottom fans.
2. Slide the assembly to the left into place and fasten it to the chassis by means of four screws at the centre spine and five screws at the side.

Hard Disk Drive Power Distribution Panel

Removing

1. Remove the motherboard cooling fan assembly.

   This uncovers three bus bars which are attached to the power distribution panel, through a cut-out in the centre spine, and to the power supply, as shown in the following illustration:

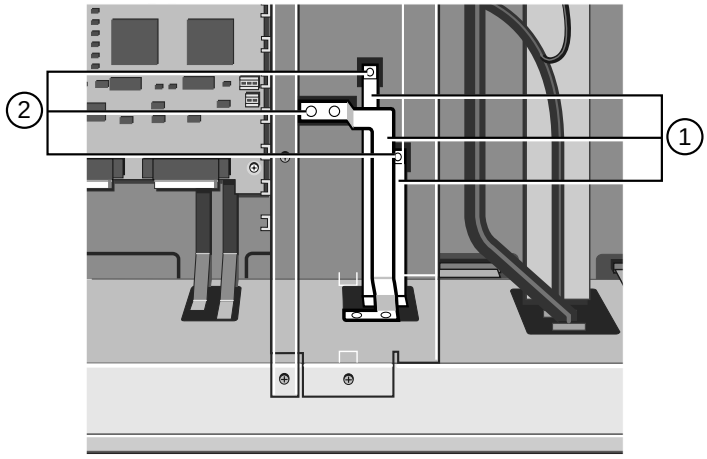


Figure 4-47 Bus Bars Connected to Hard Disk Power Distribution Panel

1.	Bus Bars	2.	Connections to Hard Disk Power Distribution Panel

2. Detach the three bus bars from the distribution panel.

3. In the disk chamber, remove all hard disk drives and drive modules. Also, remove any blanking plates that cover empty disk chamber space.

4. Remove 11 screws as shown in the following diagram and lift out the panel.

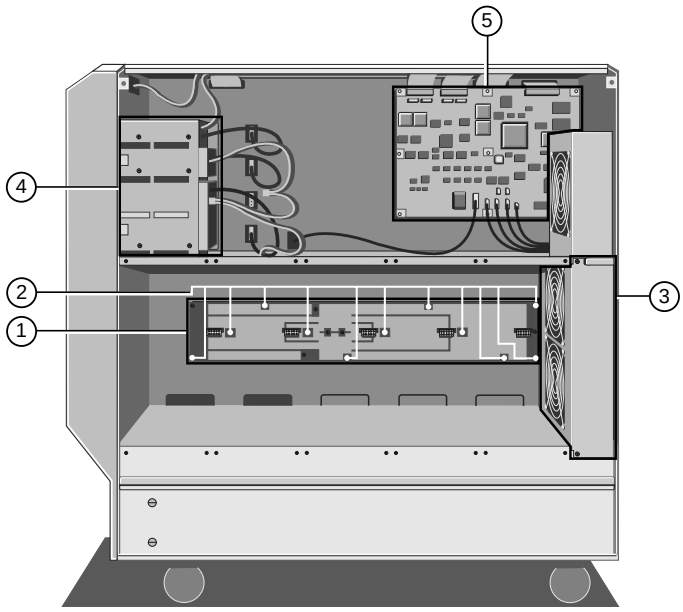


Figure 4-48 Hard Disk Power Distribution Board

1.	Power Distribution Panel	4.	Removable Media Drives
2.	Securing Screws	5.	SMC Board
3	HD Cooling Fan Assembly		

Fitting

1. With all hard disk drives, drive modules and the motherboard cooling fan assembly removed, attach the hard disk distribution board to the centre spine of the server, in the disk chamber, using the 11 screws as shown:

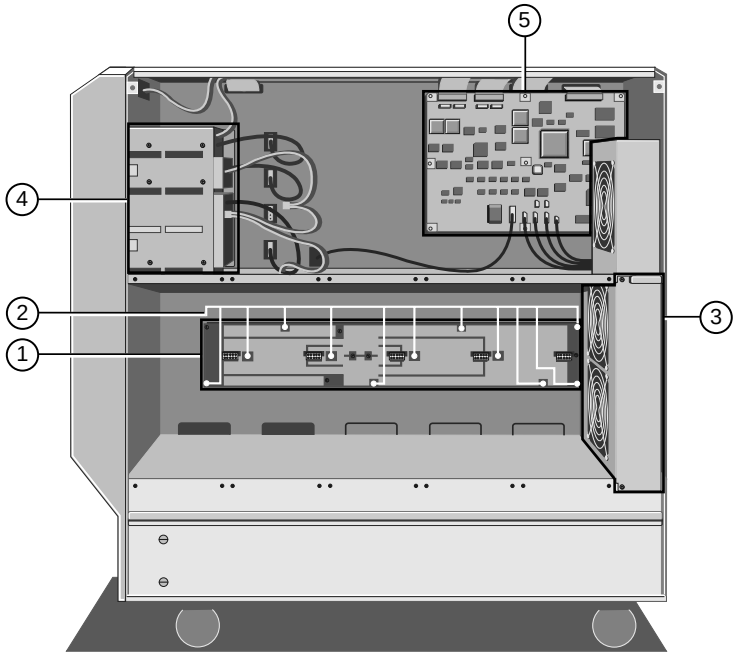


Figure 4-49 Hard Disk Power Distribution Board

1.	Power Distribution Panel	4.	Removable Media Drives
2.	Securing Screws	5.	SMC Board
3	HD Cooling Fan Assembly		

2. Refit all the hard disk drive modules and drives.

3. In the electronics chamber, attach the three bus bars as shown:

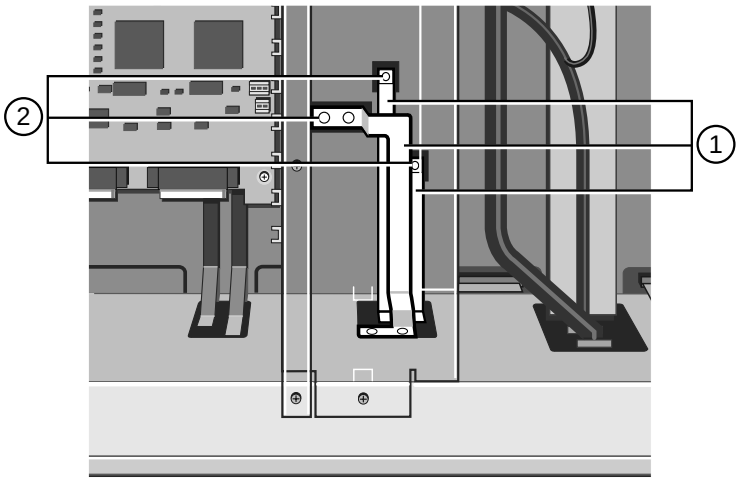


Figure 4-50 Bus Bars Connected to Hard Disk Power Distribution Panel

Note

You must use a torque wrench to tighten the bus bar bolts. The torque wrench setting is 5 newton metres (Nm).

1.	Bus Bars	2.	Connections to Hard Disk Power Distribution Panel

4. Replace the motherboard cooling fan assembly.

Removable Media Drive Bay Power Distribution Panel

Removing

1. In the electronics chamber, unplug two power cables as shown in the following diagram:

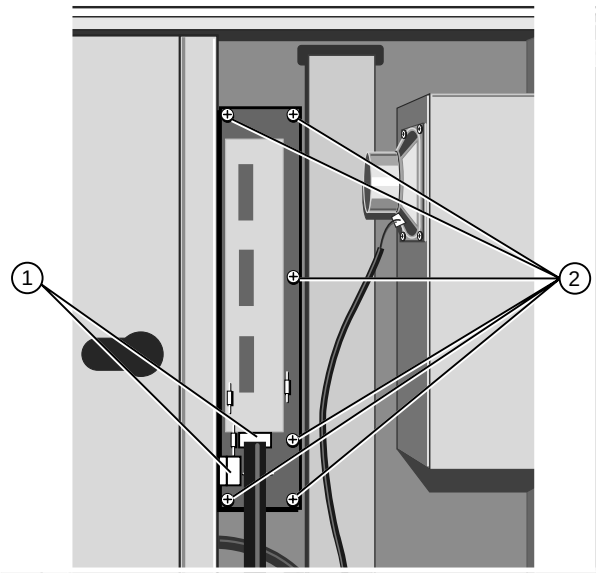


Figure 4-51 Removable Drive Bay Power Distribution Panel

1.	Cable Connectors	2.	Securing Screws

2. In the disk chamber, unplug the cables which provide power to the removable media drives.
3. Now remove the six screws which fasten the power distribution board to the centre spine and remove the board, as shown in the previous diagram.

Fitting

1. Fasten the power distribution panel onto the centre spine of the server with the six screws as shown:

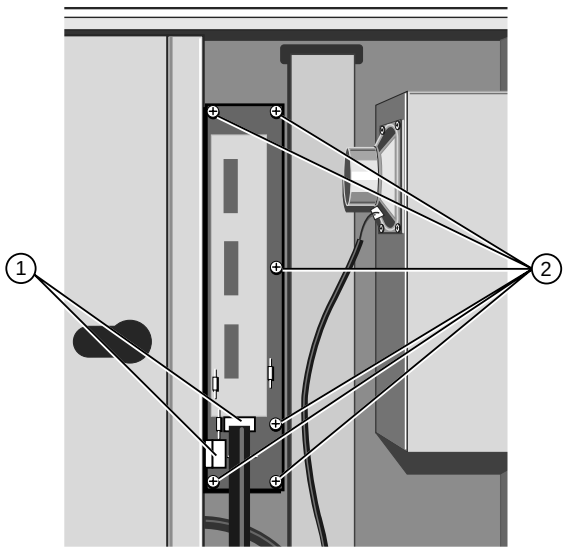


Figure 4-52 Removable Drive Bay Power Distribution Panel

1.	Cable Connectors	2.	Securing Screws

2. Connect the two power cables as shown in the previous illustration.
3. In the disk chamber, reconnect the cables which provide power to the removable media drives.

Loudspeaker

Removing

1. Remove the motherboard cooling fan assembly.
2. Unplug the loudspeaker cable from the connector on the motherboard power distribution panel, as shown:

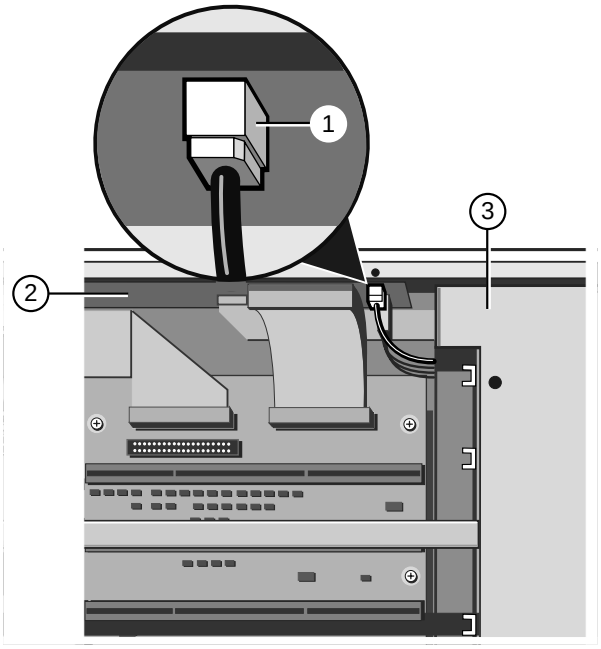


Figure 4-53 Loudspeaker Connector

1.	Loudspeaker Connector	3.	Cooling Fan Assembly
2.	Power Distribution Panel		

2. Remove the four screws which fasten the loudspeaker onto the front drive bay door housing, as shown:

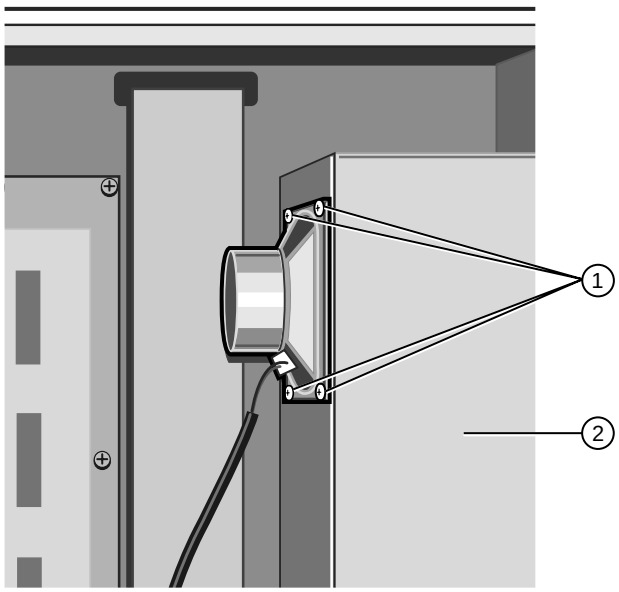


Figure 4-54 Loudspeaker

1.	Loudspeaker Securing Screws	2.	Removable Media Drive Bay

3. Thread the cable through the opening behind the cooling fan assembly and remove the loudspeaker.

Fitting

1. Remove the motherboard cooling fan assembly.

2. Use the four screws to attach the loudspeaker to the front drive bay door housing, as shown:

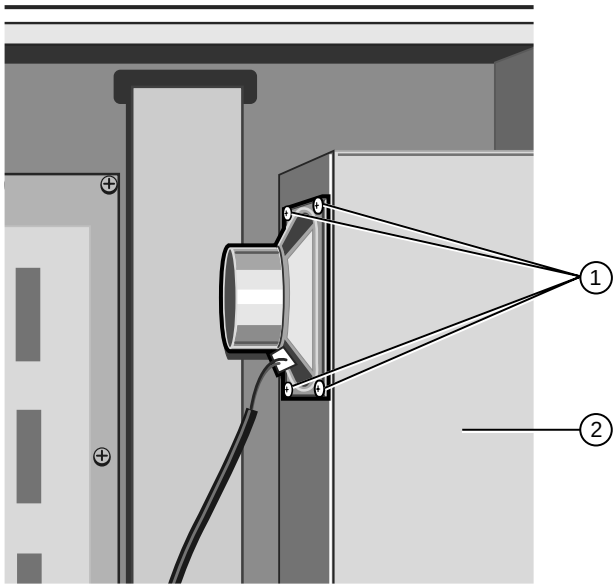


Figure 4-55 Loudspeaker

1.	Loudspeaker Securing Screws	2.	Removable Media Drive Bay

2. Feed the loudspeaker cable behind the motherboard cooling fan assembly next to the other cables.

3. Plug the cable into the loudspeaker connector on the motherboard power distribution panel as indicated in the following illustration:

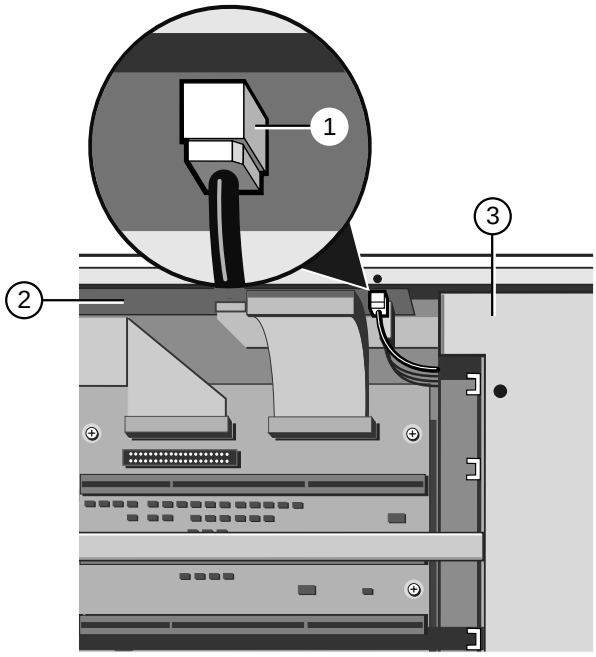


Figure 4-56 Loudspeaker Connector

1.	Loudspeaker Connector	2.	Cooling Fan Assembly
2.	Power Distribution Panel		

Uninterruptible Power Supply Unit

The UPS unit consists of the actual power supply and the accompanying battery pack. The unit is very robust and is very heavy, approximately 35kg including battery pack.

Always remove the entire power supply as a single unit. Do not remove the battery pack first. The unit is severely out of balance without the battery pack and could unexpectedly roll over as you remove it.

Warning

It is essential that you use the utmost care when removing the UPS in order to avoid injury to yourself or damage to the unit. Do not attempt to remove or fit the unit alone. There must always be at least one other person available to help you.

Before you begin, ensure that the server is in a suitable area with plenty of work space. Then, use the jacking mechanism in the front castors to anchor them firmly to the floor so that the server cannot roll about.

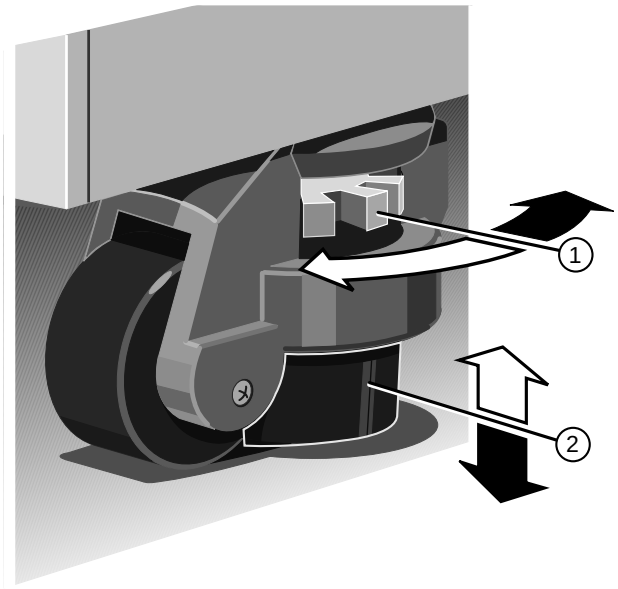


Figure 4-57 Front Castor Adjustment

1.	Adjustment Wheel	2.	Jacking Pad

Removing

1. It is **vitally** important to ensure that the system is shut down, the battery pack circuit breaker switch is in the Off position and the system is disconnected from the mains electricity supply.
2. If necessary, remove some of the expansion cards to improve access to the bus bars, which provide power to the motherboard. You may also need to unplug some of the data cables which are connected to the hard disk drive modules.

Caution

*If you remove any hard disk SCSI controller card or cables, you **must** remember the exact cable and connector arrangment of your hard disks, particularly if you are using a RAID (Redundant Array of Independent Disks) configuration. If you fail to restore the arrangement so that all cables and plugs are as they were originally, you will lose all the data on your hard disks .*

3. Remove the motherboard cooling fan assembly.
4. Detach two pairs of motherboard bus bars and remove the set of 3 bus bars under the cooling fan assembly as shown in the following diagram:

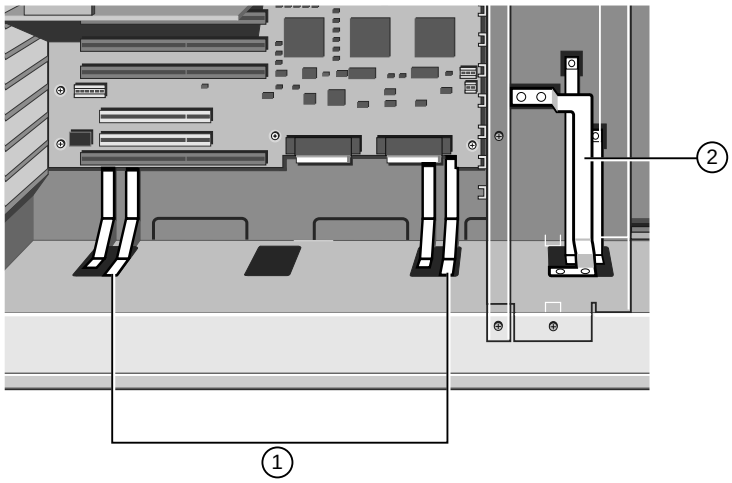


Figure 4-58 Bus Bars

1.	Motherboard Bus Bars	2.	Bus Bars for Hard Disk Power Distribution Panel

Make sure that there is enough clearance between the bus bars and their power supply connections to allow the unit to slide freely. If there is not enough clearance, you will need to remove the motherboard and then the bus bars themselves. The bus bars are

also attached to the power distribution panel at the top of the electronics chamber.

5. Unplug three cables, one ribbon, one 12-way and one 16-way, from the power supply as shown:

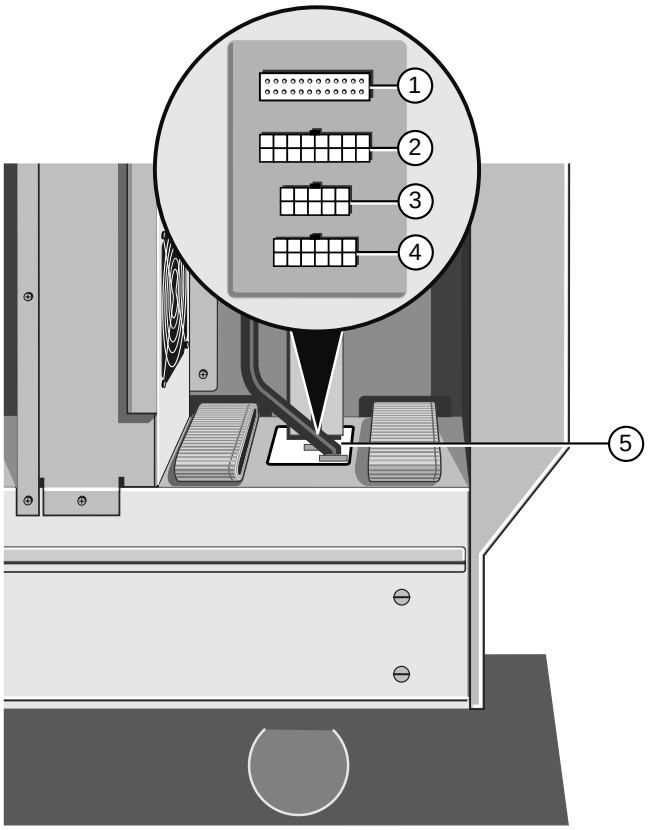


Figure 4-59 Disconnecting Power Supply Cables

1.	System Controller Connector (Ribbon Cable)	4.	Removable Media Drive Bay Connector (12-way)
2.	Motherboard Auxiliary Power (16-way)	5.	Cable Connector Group
3.	Not used		

6. Loosen four floating fasteners, two on each side of the server, until they are free of the power supply unit, as indicated in the following diagram:

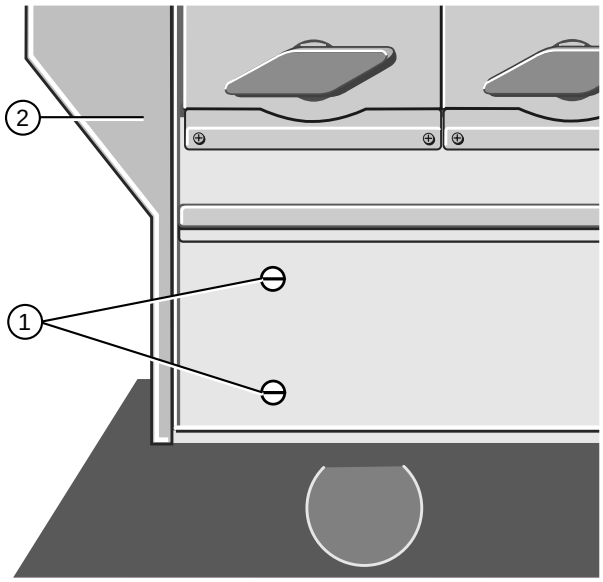


Figure 4-60 Power Supply Floating Fasteners

1.	Floating Fasteners	2.	Front Bezel

7. Now remove six screws on the backplane of the server, as shown:

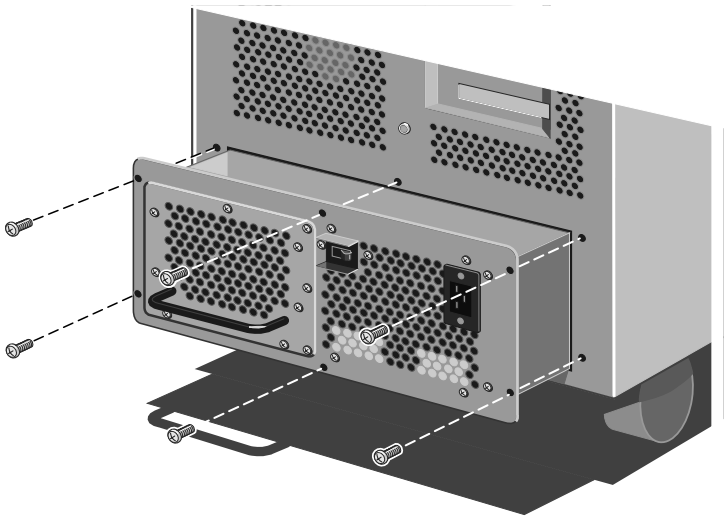


Figure 4-61 Power Supply Securing Screws

8. Using the handle on the battery pack, pull the unit **carefully** until it is a little less than halfway out (about 30cm), just before it begins to tip towards you.
9. A second person should assist you, on the opposite side of the unit, from this point onwards.
10. Place your hands under the metal casing of the unit as indicated by the arrows in the following illustration:

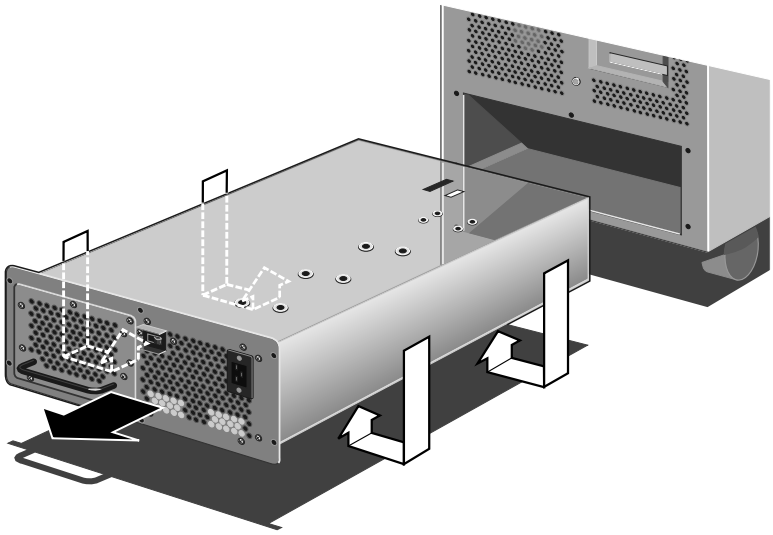


Figure 4-62 Power Supply Removal

11. Slide the unit out **slowly** until it is free from its housing. Now rest the unit on the floor; do not drop it.

Fitting

1. With the help of a second person on the opposite side, place your hands underneath the power supply as indicated by the arrows in the following illustration:

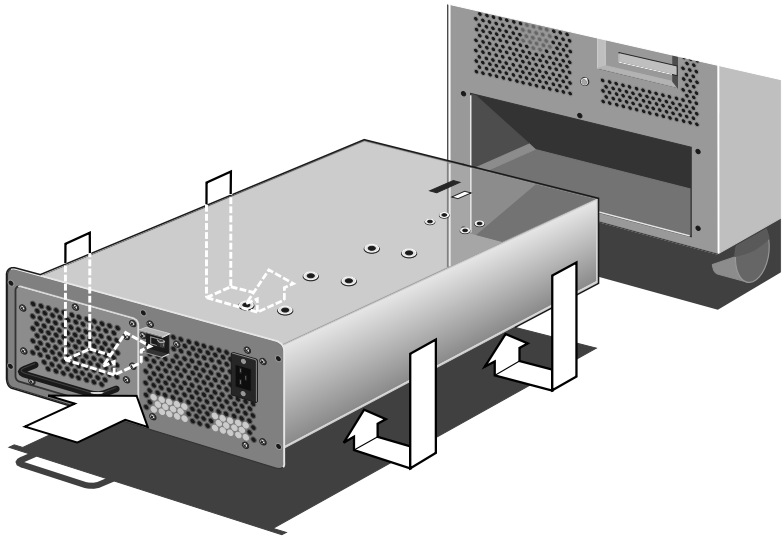


Figure 4-63 Fitting the Power Supply

2. Now carefully slide the unit all the way into the chassis.

3. Secure the unit to the chassis with the six screws as shown:

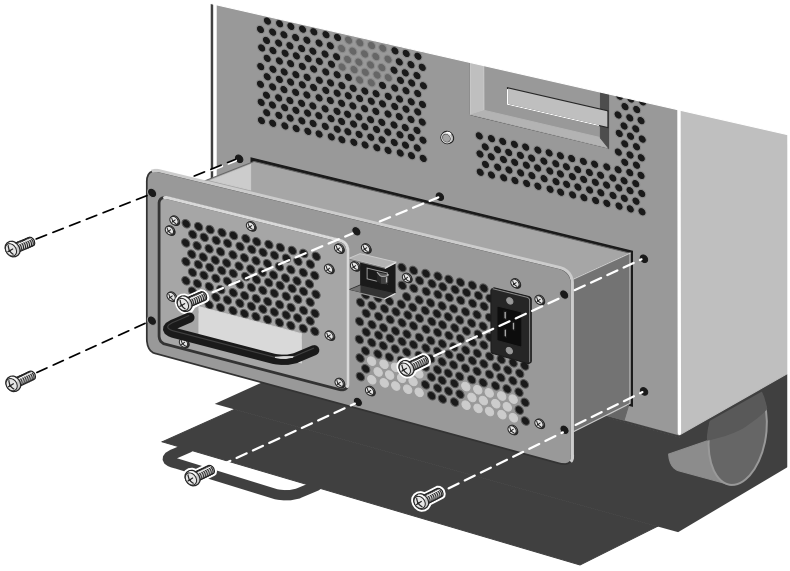


Figure 4-64 Power Supply Securing Screws

4. Now tighten the four floating fasteners, two on each side, located towards the front of the machine:

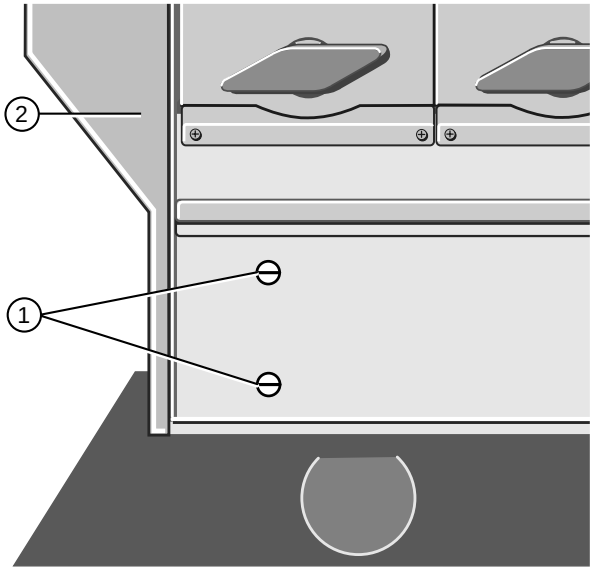


Figure 4-65 Power Supply Floating Fasteners

1.	Floating Fasteners	2.	Front Bezel

5. Plug the ribbon, 12-way and 16-way cables into their connectors on the power supply:

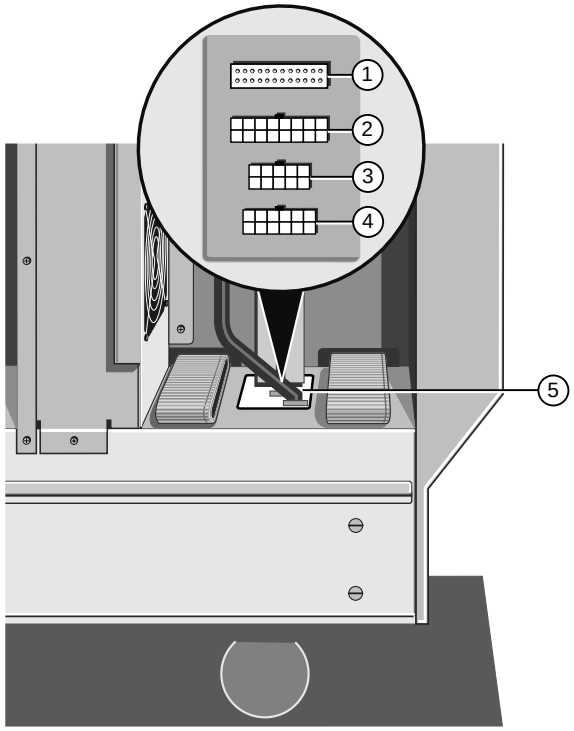


Figure 4-66 Connecting Power Supply Cables

1.	System Controller Connector (Ribbon Cable)	4.	Removable Media Drive Bay Connector (12-way)
2.	Motherboard Auxiliary Power (16-way)	5.	Cable Connector Group
3.	Not used		

6. Note that these connectors are keyed and cannot be plugged incorrectly.

7. Attach two pairs of bus bars and fit one set of 3 bus bars as shown:

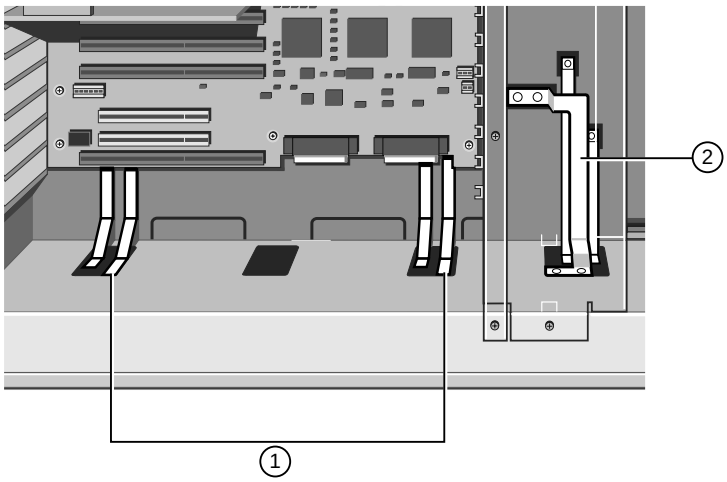


Figure 4-67 - Bus Bars

1.	Motherboard Bus Bars	2.	Bus Bars for Hard Disk Power Distribution Panel

As with the cables, it is not possible to fit these bars incorrectly.

8. Fit the motherboard cooling fan assembly.
9. Refit any expansion cards you may have removed to improve access.

Caution

If you have removed any SCSI hard disk controller cards or cables, be absolutely sure that you restore the hard disk cable and connector arrangement as it was originally, particularly if you have a RAID configuration. Failure to do so will cause massive data loss.

UPS Battery Pack

The UPS is equipped with a replaceable battery pack. It will provide electric power for your system for a specific period of time, depending on how many hard disks or other devices are installed. Use the SMA at any time to find out the exact battery life remaining (see the *SMA User's Guide* for more details).

Important

The battery pack contains lead acid batteries. Health and Safety Statutory Instrument No. 232, The Batteries and Accumulators (Containing Dangerous Substances) Regulations Act 1994, designates lead as a dangerous substance.

As a result, the battery pack must only be removed by a qualified electrician and must not be disposed of in domestic waste.

Removing

1. Remove the fastening screws as shown in the following diagram:

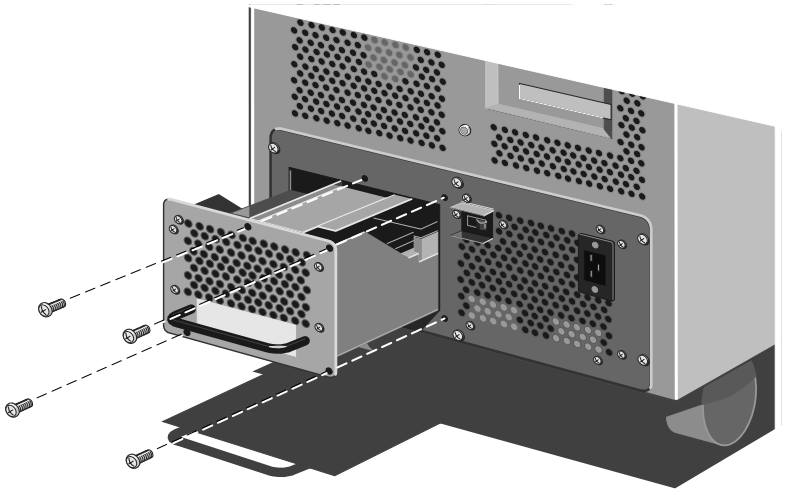


Figure 4-68 Battery Pack Fastening Screws

2. Pull the battery pack handle carefully and slide the pack out **slowly** until the power connector, as shown in the following illustration, appears:

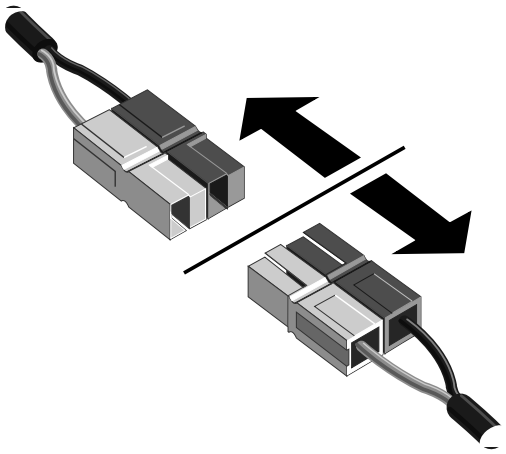


Figure 4-69 Unplugging the Battery Pack Power Connector

3. Gently pull the connector apart as indicated. Now you can remove the battery pack the rest of the way.

Fitting

1. Make sure that the battery pack power connector is visible and accessible.
2. Carefully slide the battery pack far enough into the chassis to reconnect the battery pack power connector.

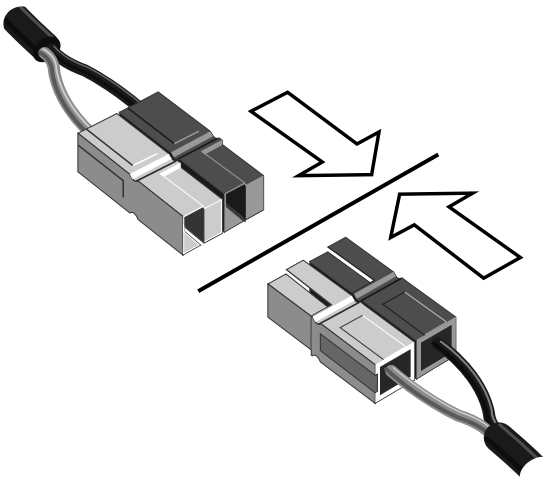


Figure 4-70 Plugging the Battery Pack Power Connector

3. Push the pack the rest of the way into the chassis.

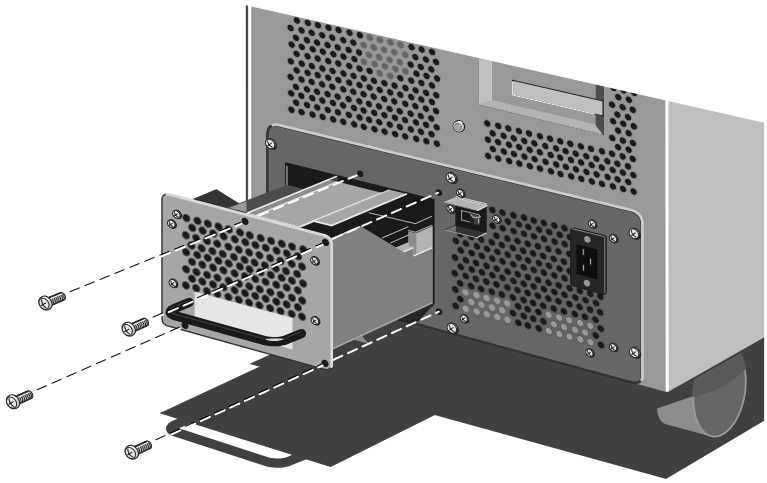


Figure 4-71 Refitting the Battery Pack

4. Use the screws as shown in the previous diagram to secure the battery pack.

5 TECHNICAL INFORMATION

This section contains technical information about your Apricot under the following topics:

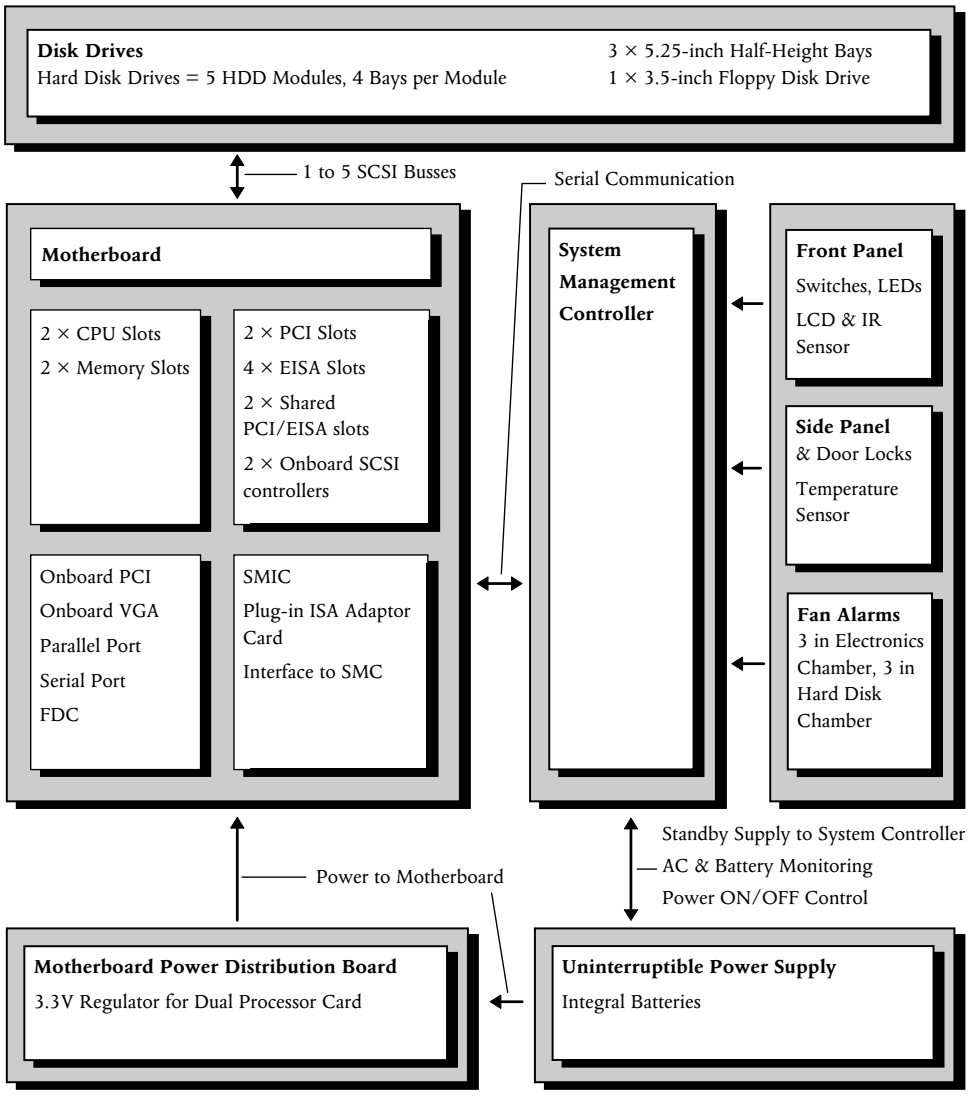
- Functional Architecture
- Memory
- Central Processing Unit
- Motherboard
- Switches and Jumpers
- I/O Connectors and Headers
- System Management Interface Card (SMIC)
- System Management Controller
- Power Distribution Boards
- Uninterruptible Power Supply

Functional Architecture

Your server's functional divisions consist of the following:

- Motherboard
- System Management Controller
- Front Panel
- Uninterruptible Power Supply (UPS)
- Hard Disk Drives and Removable Media Drives
- Motherboard Power Distribution Board

The following block diagram indicates the relationship of these divisions to each other:



The architecture of your server supports symmetrical multiprocessing (MP) and a variety of operating systems. The server is equipped with both PCI (Peripheral Component Interconnect) and EISA (Extended Industry Standard Architecture) busses. The standard removable media bays can house a variety of storage devices, such as tape backup or CD-ROM. One 3.5-inch floppy drive comes with every server.

The System Management Controller (SMC) monitors your system and reports problems. The methods that the SMC uses to communicate the status of the system are as follows:

- Hexadecimal codes sent to the Front Panel liquid crystal display
- Audible beep codes and alarms
- Detailed information is available in the System Management Application, a Windows software program specially designed for the server. This application, which you can run on another computer remotely via modem link, alerts you if there are problems such as component failure, overheating, security breaches and power failures.

The SMC communicates with the motherboard by means of the System Management Interface Card which occupies EISA slot M2.

The 1-kilowatt Uninterruptible Power Supply (UPS) provides power for the server. It has a removable battery pack and is itself removable as a complete unit.

Memory

Server memory is located on one or two ECC memory module expansion cards. Fully loaded, one card provides 384 Mbytes of common high-speed memory for the server. The card has three memory banks. Each bank consists of four SIMM sockets. Each socket can hold a 2, 4, 8, 16, or 32 Mbytes approved fast-page parity SIMM. You can install any size SIMM in any bank; however, all four SIMMs within a bank must be the same size (see Chapter 3, *Upgrading Your System*, for more information about SIMMs). The SIMM's height must not exceed one inch; taller SIMMs will interfere with an adjacent CPU card or ECC memory card. If you need more memory, you can install an additional ECC memory card in the server. Fully loaded, the two cards provide 768 Mbytes of common high-speed memory for the server.

The ECC memory card detects and corrects single-bit errors from DRAM (Dynamic Random Access Memory) in real time, allowing your system to function normally. It detects all double-bit errors but does not correct them; it also detects all three-bit and four-bit adjacent errors in a DRAM nibble but does not correct them. When one of these multiple-bit errors occurs, the ECC memory card generates an NMI (NonMaskable Interrupt) and usually halts the system.

The data transfer width of the ECC memory card is 64/128 bits. It is compatible with all Pentium processor modules.

The server supports both base (conventional) and extended memory. Base memory is located at addresses 00000h to 9FFFFh (the first 640 Kbytes). Extended memory begins at address 100000h (1 Mbyte) and extends to the limit of addressable memory (4 Gbytes).

Some operating systems and application programs use base memory; for example, MS-DOS, OS/2, and UNIX. Other operating systems use both conventional and extended memory; for example, OS/2 and UNIX. MS-DOS does not use extended memory; however, some MS-DOS utility programs such as RAM disks, disk caches, print spoolers, and windowing environments use extended memory for better performance.

Memory Map

Address Range (hex)	Amount	Function
0000,0000 – 0003,FFFF	256 KB	Base system memory (fixed)
0004,0000 – 0007,FFFF	256 KB	Base system memory (fixed)
0008,0000 – 0009,FFFF	128 KB	Base system memory or ISA memory enabled in Setup
000A,0000 – 000B,FFFF	128 KB	ISA video DRAM
000C,0000 – 000E,FFFF	192 KB	Off board video BIOS (can be shadowed) AIC-7870 SCSI BIOS (can be shadowed)
000F,0000 – 000F,FFFF	64 KB	ISA memory, system BIOS (fixed)
0010,0000 – 00EF,FFFF	14 MB	System memory or unused
00F0,0000 – 00FF,FFFF	1 MB	System memory or EISA/ISA memory
0100,0000 – 3FFF,FFFF	1008 MB	System memory or unused
4000,0000 – BFFF,FFFF	1024 MB	EISA memory or I/O slave memory
C000,0000 – C1FF,FFFF	32 MB	Memory mapped math coprocessor
C200,0000 – FEBF,FFFF	944 MB	EISA memory or I/O slave memory
FEC0,0000 – FEC0,0FFF	4 KB	I/O APIC #1
FEC0,1000 – FEC0,1FFF	4 KB	I/O APIC #2
FEC0,2000 – FEC0,2FFF	4 KB	I/O APIC #3
FEC0,3000 – FEC0,3FFF	4 KB	I/O APIC #4
FEC0,4000 – FFDF,4FFF	32752 KB	EISA memory or I/O slave memory
FFE0,0000 – FFFF,FFFF	32 KB	EISA (BIOS/ECU)

Central Processing Unit

The server's CPU is found on an add-on CPU card and not on the motherboard. The system will accept either a single or dual processor module. The dual module has a 64-bit data bus interface with its own 1-Mbyte secondary cache; the single module has a 512-Kbyte cache. The module provides a high-performance symmetric multiprocessing (SMP) environment in a server system. In SMP, all processors are equal and have no preassigned tasks. Distributing the processing loads between more than one processor increases system performance. This is particularly useful when application demand is low and the I/O request load is high. In the SMP environment, processors share the same interrupt structure and access to common memory and I/O channels.

The module's central processing unit incorporates a processor/cache core subsection for each processor. Each subsection contains an independent local bus with a Pentium processor, 82498 DX cache controller and eight 82493 DX cache SRAMs. Each subsection's external two-way set associative write-back cache provides 1 Mbyte of SRAM secondary cache memory (512 Kbyte for single processor card) for each processor. Each Pentium processor has separate 8K internal L1 cache cores for code and data and an internal numeric processor. A Memory Bus Controller (MBC) and a Data-Path Parity (DPP) interface both cache cores to the proprietary bus.

The processor module's power-up configuration logic provides the server's system board with information about its CPU speed, the presence of numeric coprocessor, cache size, cache line size and snooping policy.

Features

- One or two Pentium processors running at 100 MHz
- 2/3 bus/core speed ratios enabling operation at 66/100 MHz
- 82498/82493 Intel cache chip set providing:
  - 1-Mbyte cache capacity (512 Kbytes for single processor card)
  - Zero wait-state for MRU (Most Recently Used) read hit, one wait-state for LRU (Least Recently Used) read hit
  - Zero wait state write hit cycles
  - Enhanced Lock Functionality - Cache Based Locking
  - PUPGR# (Potentially Upgradeable Write) support for enhanced performance with ECC (Error Checking and Correcting) memory.

- Compatible Intel proprietary bus interface providing support for:
  - 64-bit data bus
  - Bus level symmetrical multiprocessing
  - 64/128-bit memory only (ECC) memory 4 × 16
  - Back-off to allow concurrency in system
  - Address and data bus parity
- Cache coherency via snooping between processors on the module and with other modules on the memory bus
- Data path control allowing pipelining of read and write data through a separate data path ASIC
- Supports the ECC memory module protocol

Specifications

Parameter	Specification
Temperature/Airflow	
Operating	0° to 50° C, 200 linear ft/min. (The Pentium processor's case temperature must not exceed 70° C).
Non-operating	-40° to 70° C
Power usage	48 watts (maximum) at 100/66 MHz
Supply Voltage	+3.3 VDC, +5 VDC, +12 VDC
Processor speed	100 MHz
Weight	Approximately .312 kg (11 oz)
Humidity	
Operating	92% RH @ 55° C
Non-operating	85% RH @ 55° C
Shock	
Non-operating	30 g, trapezoidal wave form; delta V= 170 in/sec
Vibration	
Non-operating	Random input: .01 g^2/Hz @ 5 Hz sloping to .02 g^2/Hz @ 20 and maintaining .02 g^2/Hz from 20 Hz to 500 Hz

Motherboard

Expansion Slots

EISA Slots

The six EISA bus slots on the motherboard provide for expansion and performance enhancement. Two of these share a common chassis I/O expansion slot with two of the PCI slots; if you use these EISA slots, you cannot use the PCI slots.

All six slots have the capability of being bus masters. When EISA masters arbitrate for the bus, not all slots are created equal. The following pairs of slots share arbitration requests: 1 and 2, 3 and 4, and 5 and 6. Therefore, in the round-robin scheme of letting EISA masters take over the bus, ownership of it occurs in the following sequence: 1, 2, 3, 4, 5, 6, 1, 2, 3, 4, 5, 6,1, 2, 3, 4, 5, 6, etc.

The EISA bus, an extension of the Industry Standard Architecture (ISA) bus, provides:

- 32-bit memory addressing
- Type A transfers at 5.33 Mbytes per second
- Type B transfers at 8 Mbytes per second
- Burst transfers at 33 Mbytes per second
- 8-, 16-, or 32-bit data transfers
- Automatic translation of bus cycles between EISA and ISA masters
- Interrupt sharing

Since EISA is fully backward compatible with ISA, you can install old or new ISA add-in boards and software in your server.

PCI Slots

The five PCI (Peripheral Component Interconnect) bus slots on the system board provide for expansion and performance enhancement.

Two of these slots share a common chassis I/O expansion slot with two of the EISA slots; if you use these PCI slots, you cannot use the EISA slots.

The PCI bus provides:

- 32- and 64-bit memory addressing
- +5 V and + 3 V signalling environments
- Burst transfers at 133 Mbytes per second
- 8-, 16-, or 32-bit data transfers
- Plug-and-play configuration
- PeerBus to maximize throughput

Video Controller

The on-board, integrated Cirrus Logic CL-GD5424 super VGA controller is fully compatible with video standards CGA, EGA, Hercules Graphics, MDA, and VGA. The standard system configuration comes with 512 KB of on-board video memory allowing pixel resolutions of 640 x 480 and 800 x 600 in 256 colors, and 1024 x 768 x 16 colors. The SVGA controller supports only analog monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace interlaced frequency of 87 Hz.

By increasing the buffer size of the onboard video memory from 512 KB to 1 Mbyte (with one, 40-pin 256 K x 16, 70 ns fast-page DRAM), the controller can support 132-column text modes and high resolution graphics with 1280 x 1024 x 16 colors. Depending on the environment, the controller displays up to 64,000 colours in some video resolutions. It also provides hardware accelerated bit block transfers (BITBLT) of data.

On-Board SCSI Controller

The system board includes two Adaptec AIC-7870 wide/fast SCSI-2 controller chips, channels A and B, integrated as PCI bus masters. These controllers support data path widths of 8-bit (narrow SCSI) at a data transfer rate of 10 Mbytes/sec and 16-bit (wide SCSI) at a data transfer rate of 20 Mbytes/sec. As PCI bus masters, these controllers support data transfer rates of 133 Mbytes/sec.

You can connect up to seven 8-bit narrow SCSI devices or up to fifteen 8-bit narrow and/or 16-bit wide SCSI devices and one controller (maximum of seven 8-bit narrow devices) to each channel. For example, tape drives, printers, optical media drives, and other devices.

The SCSI controller provides active negation outputs, controls for external differential transceivers, a disk activity output, and a SCSI terminator power-down control.

Active negation outputs reduce the chance of data errors by actively driving both polarities of the SCSI bus and avoiding indeterminate voltage levels and common-mode noise on long cable runs. The SCSI

output drivers can directly drive a 48 mA, single-ended SCSI bus with no additional drivers.

No additional logic, termination, or resistor loads are required to connect up to seven 8-bit narrow SCSI devices or up to fifteen 16-bit wide SCSI devices to each SCSI-2 channel on the system board.

I/O Map, EISA Slot Assignments and Interrupt Information

The following tables present I/O map, EISA slot assignment and interrupt information.

I/O Map

I/O Address(es)	Resource
0000 – 001F	DMA controller 1
0020 – 0021	Interrupt controller 1
0022 – 0023	EISA bridge configuration space access ports
0024 – 0025	AIP configuration space access ports
0026 – 0027	Configuration Space Access Ports
0040 – 005F	Programmable Timer
0060, 0064	Keyboard Controller
0061	NMI Status & Control Register
0070	NMI Mask (bit 7) & RTC Address (bits 6:0)
0071	Real Time Clock (RTC)
0080 – 008F	DMA Low Page Register
0092	System Control Port A (PC-AT control Port)
00A0 – 00BF	Interrupt Controller 2
00C0 – 00DF	DMA Controller 2
00F0	Clear NPX error
00F8 – 00FF	x87 Numeric Coprocessor
0102	Video Display Controller
0170 – 0177	Secondary Fixed Disk Controller (IDE)
01F0 – 01F7	Primary Fixed Disk Controller (IDE)
0200 – 0207	Game I/O Port
0220 – 022F	Serial Port
0238 – 023F	Serial Port
0278 – 027F	Parallel Port 3
02E8 – 02EF	Serial Port 2
02F8 – 02FF	Serial Port 2
0338 – 033F	Serial Port 2
0370 – 0375	Secondary Floppy
0376	Secondary IDE
0377	Secondary IDE/Floppy
0378 – 037F	Parallel Port 2
03B4 – 03BA	Monochrome Display Port

I/O Address(es)	Resource
03BC – 03BF	Parallel Port 1 (Primary)
03C0 – 03CF	Enhanced Graphics Adapter
03D4 – 03DA	Color Graphics Controller
03E8 – 03EF	Serial Port
03F0 – 03F5	Floppy Disk Controller
03F6 – 03F7	Primary IDE - Sec. Floppy
03F8 – 03FF	Serial Port 1 (Primary)
0400 – 043F	DMA Controller 1, Extended Mode Registers.
0461	Extended NMI / Reset Control
0462	Software NMI
0464	Last EISA Bus master granted
0480 – 048F	DMA High Page Register.
04C0 – 04CF	DMA Controller 2, High Base Register.
04D0 – 04D1	Interrupt Controllers 1 and 2 Control Register.
04D4 – 04D7	DMA Controller 2, Extended Mode Register.
04D8 – 04DF	Reserved
04E0 – 04FF	DMA Channel Stop Registers
0678 – 067A	Parallel Port (ECP)
0778 – 077A	Parallel Port (ECP)
07BC – 07BE	Parallel Port (ECP)
0800 – 08FF	NVRAM
0C80 – 0C83	EISA System Identifier Registers
0C84	Board Revision Register
0C85 – 0C86	BIOS Function Control
0CF8	PCICONFIG_ADDRESS Register
0CFC	PCICONFIG_DATA Register
n000 – n0FF	EISA Slot n I/O Space
x100 – x3FF	ISA I/O slot alias address
n400 – n4FF	EISA Slot n I/O Space (n = 1 to 15)
x500 – x7FF	ISA I/O slot alias address
n800 – n8FF	EISA Slot n I/O Space (n = 1 to 15)
x900 – xBFF	ISA I/O slot alias address
nC00 – nCFF	EISA Slot n I/O Space (n = 1 to 15)
xD00 – xFFF	ISA I/O slot alias address
46E8	Video Display Controller

EISA Slot Assignments

EISA Slot (hex)	Device
0	System board
1–8	EISA expansion boards
9–A	Embedded SCSI
B	Memory module
C	Memory module (expansion module)
D	Primary PCI segment
E	CPU1 module
F	CPU2 module

Direct Memory Access Channels

Channel	Device
0	(add-in board)
1	(add-in board)
2	Diskette drive
3	IDE hard disk drive
4	Reserved
5	(add-in board)
6	(add-in board)
7	(add-in board)

ISA Interrupts

This table is continued on the following page.

Device	Interrupt
NMI	Parity error
0	Interval timer
1	Keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	Onboard serial port B (COM2), if enabled
4	Onboard serial port A (COM1), if enabled
5	Parallel port LPT2, if enabled
6	Onboard diskette (floppy) controller, if enabled
7	Parallel port LPT1, if enabled
8	Real-time clock (RTC)
9	Video

10	COM3; if enabled, it can be set for EISA add-in boards using the SCU
11	COM4; if enabled, it can be set for EISA add-in boards using the SCU
12	Onboard PS/2 mouse port, if enabled
13	Math coprocessor error
14	IDE hard drive controller, if enabled
15	User definable; using the SCU, it can be set for the following: • EISA add-in boards • IDE hard drive controller • onboard video, programmable to 9, 10, 11, or 15 • onboard SCSI, programmable to 9, 10, 11, or 15 (SCU limits SCSI to three choices)

PCI Interrupts

IRQ	Device
any IRQx	SCSI channel A INTA
any IRQx	SCSI channel B INTA
any IRQx	PCI-0 INTA
any IRQx	PCI-0 slot B INTA
any IRQx	PCI-0 slot x INTB
any IRQx	PCI-0 slot A INTA
any IRQx	PCI-0 slot B INTA
any IRQx	PCI-0 slot C INTA
any IRQx	PCI-0 slot x INTB
any IRQx	PCI-0 & 1 slot x INTC
any IRQx	PCI-0 & 1 slot x INTD
any IRQ or NMI, or SMI	INT1 slot MEM1
any IRQ or NMI, or SMI	INT2 slot MEM2

Switches and Jumpers

This section explains how to set the motherboard switches and jumpers for specific operating parameters. The following diagram shows the positions of the switches and jumpers and indicates their default settings:

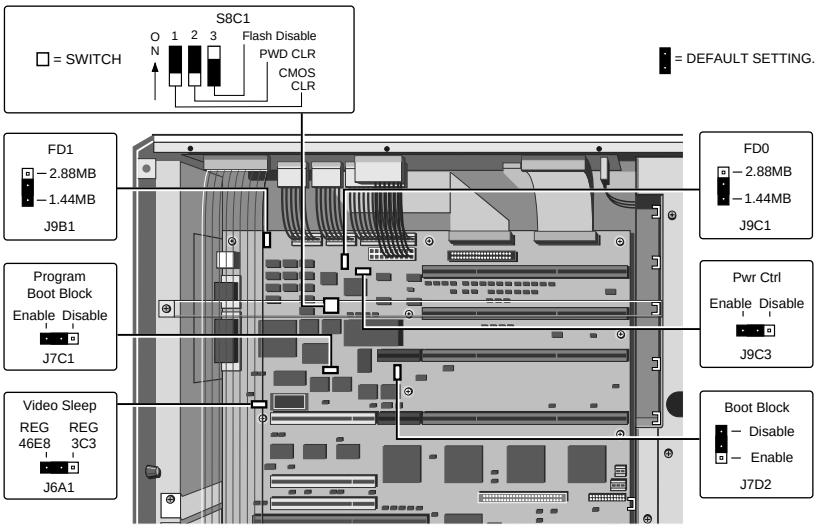


Figure 5-1 Motherboard Switches and Jumpers

Configuration Switch Block S8C1

This switch block on the system board contains three switches. To change a setting, slide the switch to the desired position.

Switch	Position	Function
S8C1-1	On Off*	Clear CMOS Protect CMOS
S8C1-2	On Off*	Clear password Enable password
S8C1-3	On* Off	Enable Flash write Disable Flash

* Factory default setting.

CMOS S8C1-1

Setting this switch to ON clears CMOS and sets it and the real-time clock (RTC) to the manufacturing defaults during system reset. Setting it to OFF preserves the settings during system reset.

To reset the system's CMOS and RTC chip to factory default values, do this:

1. Remove the ECC memory module card(s).
2. Set the switch to ON, replace the memory card(s) and side panel and connect the power lead to the system.
3. Turn the system on and wait for POST to complete. This automatically reprograms the CMOS and RTC to their default settings.
4. Turn the system off, disconnect the power cord from the system, and remove the side panel and memory cards.
5. Set the switch to OFF; replace the memory cards and side panel and connect the power cord to the system.
6. After resetting the CMOS, run the SCU to configure your system. For instructions about how to run the SCU, see Chapter 2, *Normal Operation.*

Password S8C1-2

With this switch you can enable or disable the use of passwords. To set this switch:

1. Remove the side panel which covers the electronics chamber and then remove the ECC memory cards to provide access to the switch.
2. The default setting of this switch is OFF, which enables the system password. If you wish to disable the password, set the switch to ON. Then reboot the machine to clear the existing password.

Note

Only set this switch to ON if your server cannot complete its boot procedure because you have forgotten the password and consequently cannot enter it. Normally you should use the SCU to enable or disable the password.

Flash Memory S8C1-3

This switch enables or disables writing to the motherboard Flash memory. To set this switch:

1. With the side panel removed and the electronics chamber uncovered, set this switch to ON to apply +12V power to the VPP pin on the flash memory device. This allows the user to enter the BIOS and modify selections with the SCU.
2. Set it to OFF to prevent the user from updating the contents of (i.e. write-protect) flash memory.

Configuration Jumpers

The jumper is a small plastic-encased conductor (shorting plug) that slips over two jumper pins. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove it from its current location. Position the jumper over the two pins for the desired setting, and press it onto them. Be careful not to bend the pins. The following table summarizes the jumper options. The illustration on page 5/15 indicates the enable and disable settings for these jumpers.

Jumper	Pins	Description
J6A1, Video Sleep	1–2 (REG 46E8)	Selects address register at 46E8H
	*2–3 (REG 3C3)	Selects address register at 03C3H
J7C1, Program Boot Block	*1–2 (Disable)	Prevents writing to the BIOS boot block
	2–3 (Enable)	Enables writing to the BIOS boot block
J7D2, Boot Block	*1–2 (Disable)	Normal BIOS boot block
	2–3 (Enable)	Recovery BIOS boot block
J9B1 FD1 (Floppy Driver 1)	*1–2 (1.44 MB)	Disables 2.88 MB size detection
	2–3 (2.88 MB)	Enables automatic size detection
J9C1 FD0 (Floppy Driver 0)	*1–2 (1.44 MB)	Disables 2.88 MB size detection
	2–3 (2.88 MB)	Enables automatic size detection
J9C3, PWR CTRL	*1–2 (Enable)	Disables RTC power control
	2–3 (Disable)	Enables power supply maintenance voltage control using the RTC

* Factory default setting.

Video Sleep Jumper J6A1

The video address jumper determines which I/O port the onboard Cirrus Logic CL-GD5424 super VGA controller uses for its internal AT mode setup port. The starting address of the default port is 03C3h. You will probably not need to change the starting address unless you install a video adapter card that creates an address conflict. To change the starting address to 46E8h, do this:

1. Remove the CPU module from slot CPU 1 to improve access to the jumper. You may also want to disconnect the ribbon cable from the System Management Interface Card (SMIC).
2. Move the jumper to pins 2 and 3 (REG 46E8h) to change the address.
3. Replace the CPU module, the SMIC ribbon cable if necessary and the side panel.

BIOS Program Boot Block Jumper J7C1

Note

This procedure should only be done by a qualified technical person because it requires a special "Boot Block Update Utility." Contact your supplier or sales representative for more information about this utility.

When this jumper is on pins 1 and 2, you cannot update the BIOS boot block.

1. Remove the CPU module from slot CPU 1 to improve access.
2. Move the jumper to pins 2 and 3 to enable writing to the BIOS boot block.
3. Replace the CPU module and side panel.

BIOS Boot Block Jumper J7D2

The boot block jumper enables the BIOS flash memory special recovery mode. The system BIOS can be corrupted, for example when the update procedure is aborted due to a power outage. The flash memory contains a protected area that cannot be corrupted. Code in this area is used to boot the computer from drive A when the BIOS has been corrupted. After booting, the flash memory update utility is used to recover the system BIOS automatically from the BIOS recovery files on the diskette.

Note

If you have mapped the BIOS of an add-in board to any part of the E0000h address range, you must either map it to another area or physically remove the board from the system before a recovery procedure can be completed. You do not have to remove add-in boards for normal BIOS updates.

To recover the BIOS, do this:

1. Remove the CPU module from slot CPU 1.
2. Move the jumper to pins 2 and 3 to enter the recovery mode.
3. Ensure that Switch S8C1-3 is in the ON position.
4. Replace the side panel and CPU module and insert the flash memory update diskette in drive A.
5. Connect the power cord to the system and turn it on. After the system boots successfully, the speaker emits a single beep and the recovery process starts; it takes about three minutes. When the recovery process completes, the system speaker emits two beeps.

   While in the recovery mode, there is no screen display on the monitor, and the keyboard is disabled as the system automatically recovers the BIOS. The recovery status is identified through beep codes, given in the following table:

Beep Code	Message
2	Successful completion, no errors.
4	The system could not boot from the diskette. The diskette may not be bootable.
Continuous series of low beeps	The wrong BIOS recovery files are being used and/or the Flash memory switch S8C1-3 is in the OFF position.

5. Turn the system off. Remove the side cover and the CPU module from slot CPU 1.
6. Move the jumper to pins 1 and 2 to return to the normal boot mode.
7. Replace the CPU module and side panel, and remove the flash memory update diskette from drive A.
8. After running the special recovery mode, run the SCU to specify a new password. For information on running the SCU, see Chapter 2, *Operating Your System.*

FD0/FD1 (Floppy Drive 0/1) Jumpers J9C1 and J9B1

These jumpers let you configure the floppy ports for 2.88 Mbyte drives that support automatic size detection.

1. Remove the side panel and the ECC memory module from slot MEM 1.
2. Move the jumper to pins 2 and 3 on the relevant block to select the 2.88 Mbyte diskette drive type.
3. Replace the CPU module and side panel.

Power Control Jumper J9C3

This jumper (PWR CLR) enables power supply maintenance voltage control using the RTC.

To disable the RTC power control, do this:

1. Remove the side cover and the ECC memory module from slot MEM 2 as described in Chapter 4, *Service Information.*
2. Move the power control jumper from enable to disable.
3. Replace the ECC memory module and side panel.

I/O Connectors and Headers

This section lists the pin numbers for the various connectors and headers on the motherboard. The following illustration shows the locations of the connectors and headers:

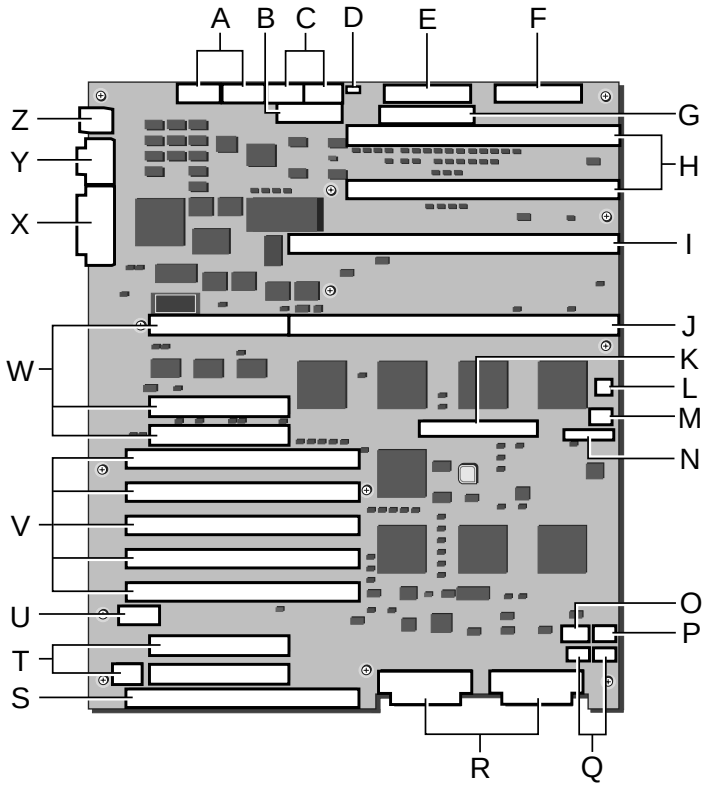


*Figure 5-2 Motherboard Connectors and Headers**

A.	PS3, PS4; 6-pin Power	N.	Server Management Header
B.	PS5, +3.3V Power	O.	HD-LED 2, SCSI HD Drive Activity Header
C.	PS1, PS2, 12-pin Power	P.	Fan 2 Header
D.	UPS Enable Header	Q.	I^2C Headers
E.	Diskette Drive Header	R.	SCSI Channels A (right), B (left) Headers
F.	Front Panel Header	S.	M6, EISA Master Exp. Slot 6
G.	IDE Header	T.	P2-1, P2-2, PCI Expansion Slots
H.	MEM1, MEM2; Memory Exp. Slots	U.	PS6, +3.3V Power Connector
I.	CPU1 Primary, CPU1 Module Power, (+3.3V, +12V) Auxiliary	V.	M1-M5, EISA Master Exp. Slots 1-5
J.	CPU2 Secondary, CPU2 Module Power, (+3.3V, +12V) Auxiliary	W.	P1-1, P1-2, P1-3, PCI Expansion Slots
K.	P2-3, PCI expansion connector	X.	Parallel Port, VGA Port Connectors
L.	Fan 1 Header	Y.	Serial Ports COM1, COM2 Connectors
M.	HD-LED 1, SCSI HD Drive Activity Header	Z.	Keyboard, Mouse (PS/2) Connectors

* In headings on the following pages, letters in brackets, e.g. (C), refer to this illustration.

Power Connectors

These connectors provide power for add-in EISA/ISA boards, PCI boards, CPU modules, ECC memory modules, and the system board. All power connector pins are rated at 5 amperes.

PS1 and PS2, Connector J9D2 (C)

This keyed, 12-pin connector accepts two, 6-pin power supply cable connectors that install in only one way. The following tables define the pin-outs for this connector:

Pin	Signal	PS1 Color
1	PWRGOOD (power good)	Orange
2	+5 V	Red
3	+12 V	Yellow
4	–12 V	Blue
5	GND (ground)	Black
6	GND (ground)	Black

Pin	Signal	PS2 Color
7	GND (ground)	Black
8	GND (ground)	Black
9	–5 V	White
10	+5 V	Red
11	+5 V	Red
12	+5 V	Red

PS3 Connector J9B2 and PS4 Connector J9C2 (A)

Pin	Signal	Pin	Signal
1	+5 V	4	GND
2	+5 V	5	GND
3	+5 V	6	GND

Pin	Signal	Pin	Signal
1	+5.1 V	4	GND
2	GND	5	GND
3	+12 V	6	GND

PS5 Connector J9D1 (B)

Pin	Signal	Pin	Signal
1	N/C	10	N/C
2	N/C	11	N/C
3	N/C	12	3.3VRD
4	Sense+	13	3.3 V
5	GND	14	3.3 V
6	GND	15	3.3 V
7	GND	16	3.3 V
8	GND	17	3.3 V
9	GND	18	3.3 V

PS6 Connector J1A1 (U)

Pin	Signal	Pin	Signal
1	GND	4	+3.3 V
2	GND	5	+3.3 V
3	GND	6	+3.3 V

Power Supply Enable Header J9E1 (D)

Pin	Signal	Color
1	Remote enable	Purple
2	+5 V standby	Black
3	No connection	

Diskette Drive Header J9F2 (E)

Pin	Signal	Pin	Signal
1	GND (ground)	18	Head direction
2	Density select	19	GND (ground)
3	GND (ground)	20	Step
4	Not connected	21	GND (ground)
5	Key (pin missing)	22	Write data
6	Extended density in	23	GND (ground)
7	GND (ground)	24	Write enable
8	Index	25	GND (ground)
9	GND (ground)	26	Track 0
10	Motor A on	27	GND (ground)
11	GND (ground)	28	Write protect
12	Drive B select	29	Extended density out
13	GND (ground)	30	Read data
14	Drive A select	31	GND (ground)
15	GND (ground)	32	Head select side 1
16	Motor B on	33	High density out
17	GND (ground)	34	Disk change

Front Panel Header J9H1 (F)

Pin	Signal	Pin	Signal
1	SPKDAT(speaker data)	17	
2	+5 V (speaker power)	18	
3	+5 V standby	19	I^2C-SDA
4	PS-ON (power supply on)	20	Chassis switch return
5	FP Reset (front panel reset)	21	LCD-SD
6	GND	22	KS # (kick start)
7	Pwr LED (power on LED)	23	LCD-SCLK
8	GND	24	LCD-SCL
9	SC 1 LED (SCSI controller 1 LED)	25	LCD-PCLK
10	SC 1 RTN (SCSI controller 1 return)	26	GND
11	SC 2 RTN (SCSI controller 2 return)	27	EN
12	SC 2 LED (SCSI controller 2 LED)	28	GND
13	KEYBD (keyboard key lock)	29	RW (read/write)
14	GND	30	+3.3 V
15	Secure mode	31	RS (register select)
16	Chassis switch	32	PWR #
17	KEY (missing pin)	33	VDD-LCD
18	+5V	34	GND

IDE Header J9F1 (G)

Pin	Signal	Pin	Signal
1	IDERST (reset)	21	IDEDRQ (DMA request 3)
2	GND (ground)	22	GND (ground)
3	ID7 (data bit 7)	23	IDEIOW (I/O write)
4	ID8 (data bit 8)	24	GND (ground)
5	ID6 (data bit 6)	25	IDEIOR (I/O read)
6	ID9 (data bit 9)	26	GND (ground)
7	ID5 (data bit 5)	27	CHRDY (I/O channel ready)
8	ID10 (data bit 10)	28	SPSYNC (address latch enable)
9	ID4 (data bit 4)	29	IDEDAK (DMA acknowledge 3)
10	ID11 (data bit 11)	30	GND (ground)
11	ID3 (data bit 3)	31	IDEIRQ14 (interrupt request 14)
12	ID12 (data bit 12)	32	IDEIO16 (I/O channel size 16)
13	ID2 (data bit 2)	33	IDESA1 (address bit 1)
14	ID13 (data bit 13)	34	PDIAG
15	ID1 (data bit 1)	35	IDESA0 (address bit 0)
16	ID14 (data bit 14)	36	IDESA2 (address bit 2)
17	ID0 (data bit 0)	37	IDECSO (host chip select 0)
18	ID15 (data bit 15)	38	IDECS1 (host chip select 1)
19	GND (ground)	39	IDEHDACT/DRVPRES (disk activity/drive present)
20	KEYED (pin missing)	40	GND (ground)

CPU Auxiliary Connectors J7D1 and J6D1 (I and J)

Pin	Signal	Pin	Signal
1	+3.3 VDC-1	2	+3.3VDC-2
3	+3.3 VDC-1	4	+3.3VDC-2
5	+3.3 VDC-1	6	+3.3 VDC-2
7	+3.3 VDC-1	8	+3.3 VDC-2
9	+3.3 VDC-1	10	+3.3 VDC-2
11	+3.3 VDC-1	12	+3.3 VDC-2
13	+3.3 VDC-1	14	+3.3 VDC-2
15	+3.3 VDC-1	16	+3.3 VDC-2
17	Sense 1	18	Sense 2
19	VSS	20	VCC
21	SCLK	22	SIRD0
23	SIRD1	24	VCC
25	+12 VDC	26	+12 VDC

Memory Module Connectors , J8J1 and J9J1, and CPU Module Connectors, J6J1 and J7J1, (H for memory, I and J for CPU)

The system board connector pin assignments and signals in Table B of this section are identical for all four connectors except for the ones specified in Table A.

Table A. CPU and Memory Module Connector Differences (continued on next page)

Pin	Signal	CPU 2 (J6J1)	CPU 1 (J7J1)	MEM 2 (J8J1)	MEM 1 (J9J1)
1	FLSHREQ# (reserved)	FLSHREQ# (reserved)	No connection	No connection	No connection
2	DISABLEx#	DISABLE3#	DISABLE2#	VSS [no connection]	VSS [no connection]
4	DISABLEx#	VSS [no connection]	VSS [no connection]	DISABLE1#	DISABLE0#
7	MEMREQ#	MEMREQ#	No connection	No connection	No connection
8	SMI#	SMI#	SMI#	SMI#	No connection
9	MEMACK#	MEMACK#	No connection	No connection	No connection
19	ID1 (pull down)	VCC	VCC	No connection	No connection
20	ID0 (pull-up)	No connection	VSS	No connection	VSS
25	SPID1#	SPID1#	SPID1#	SPID1#	No connection
28	SPID0#	SPID0#	SPID0#	SPID0#	No connection
29	PICCLK	PICCLK	PICCLK	PICCLK	No connection
31	PICD0	PICD0	PICD0	PICD0	No connection
32	PICD1	PICD1	PICD1	PICD1	No connection
33	SNPINV#	SNPINV#	SNPINV#	SNPINV#	No connection
34	SHARED#/ CFG16#	SHARED#/ CFG16#	SHARED#/ CFG16#	SHARED#/ CFG16#	No connection
36	BACKOFF#	BACKOFF#	BACKOFF#	BACKOFF#	No connection
61	DEFER#	DEFER#	DEFER#	DEFER#	No connection
62	NACK#	NACK#	NACK#	NACK#	No connection
63	VSS	VSS	VSS	VSS	No connection
64	STAT3	STAT3	STAT3	STAT3	No connection
67	GRNTx#/WT /WB#	GRNT2#	GRNT1#	WT/WB#	No connection
68	SFTRES	SFTRES	SFTRES	SFTRES	No connection
69	REQx#/SEL7# /SEL/9#	REQ2#	REQ1#	SEL9#(MSEL4#)	SEL7# (MSEL4#)
72	SEL10::11# (CSEL0#)	SEL10# (CSEL0#)	SEL11# (CSEL0#)	CCEN#	No connection
73	ALW20M#/ CORERR(1::0) #/XREQ#/ CFG10(B,A)#	ALW20M#	ALW20M#	XREQ#/ CORERR1#/ CFG10B#	CORERR0#/ CFG10A#
74	SMIACT#/ XGRNT#	SMIACT#	SMIACT# XGRNT#	No connection	
75	MEM#/ ERROR(1::0)#	MEM#	MEM#	ERROR1#	ERROR0#
76	RSNPXER#/ PARFRC	RSNPXER#	RSNPXER#	PARFRC	PARFRC
77	FLUSH#/SEL1 #/SEL4#	FLUSH#	FLUSH#	SEL1# (MSEL1#)	SEL4# (MSEL1#)

Pin	Signal	CPU 2 (J6J1)	CPU 1 (J7J1)	MEM 2 (J8J1)	MEM 1 (J9J1)
79	SYNC#/SEL6# /SEL8#	SYNC#	SYNC#	SEL8# (MSEL3#)	SEL6# (MSEL3#)
80	IRQ13B/A/ REMAP#/ CFG(12::11)#	IRQ13B/ CFG12#	IRQ13A/ CFG11#	REMAP#	REMAP#
81	INTR/ MODIFIED	INTR	INTR	MODIFIED	MODIFIED
82	NMI	NMI	NMI	MEM#	MEM#
84	MODIFIED# /SEL0# /SEL3#	MODIFIED#	MODIFIED#	SEL0# (MSEL0#)	SEL3# (MSEL0#)
85	SPRDY(2::1)#/ XPSPRY#/ CFG(15::13)#	SPRDY2#/ CFG14#	SPRDY1#/ CFG13#	XPSPRY#/ CFG15#	No connection
86	SSTB#/SEL2# /SEL5#	SSTB#	SSTB#	SEL2# (MSEL2#)	SEL5# (MSEL2#)
87	WT/WB#/ SSTB#/ CFG1#	WT/WB#/ CFG1#	WT/WB#/ CFG1#	SSTB#	No connection
92	CCEN# /XINTx# /CFG0#	CCEN# /CFG0#	CCEN# /CFG0#	XINT1#	XINT0#
93	LOCK#	LOCK#	LOCK#	LOCK#	No connection
197	OWNID2#	OWNID2	OWNID2	OWNID2	No connection
198	OWNID1#	OWNID1#	OWNID1#	OWNID1#	No connection
199	OWNID0#	OWNID0#	OWNID0#	OWNID0#	No connection
200	VSS	VSS	VSS	VSS	No connection

Table B CPU and Memory Module Connectors J8J1, J9J1, J6J1, & J7J1 (continued on next page)

Pin	Signal	Pin	Signal
1	FLSHREQ# (reserved)	2	DISABLEX#
3	I2C_SDA	4	VSS [no connection]
5	VSS	6	I2C_SCL
7	MEMREQ# (reserved)	8	SMI#
9	MEMACK#	10	VSS
11	VCC	12	TDO
13	Reserved	14	Reserved
15	VCC	16	VSS
17	Reserved	18	Reserved
19	ID1 (pull down)	20	ID0 (pull-up)
21	TDI	22	VSS
23	TMS	24	TRST#
25	SPID1#	26	TCLK
27	VSS	28	SPID0#
29	PICCLK	30	VSS
31	PICD0	32	PICD1
33	SNPINV#	34	SHARED# (CFG16#)
35	VSS	36	BACKOFF#
37	MBS64#	38	VSS
39	APAR	40	SBS64#
41	VSS	42	BUSCHK
43	APPERR_E# (CFG17#)	44	VSS
45	DPERR_E#	46	APERR_O#
47	VSS	48	DPERR_O#
49	DP2	50	VSS
51	DP0	52	DP3
53	VSS	54	DP1
55	MBE6#	56	VSS
57	MBE4#	58	MBE7#
59	VSS	60	MBE5#
61	DEFER#	62	NACK#
63	VSS	64	STAT3
65	HRDRES	66	VSS
67	GRNTx#	68	SFTRES
69	REQx#	70	OP64#
71	VCC	72	SEL10/11# (CSEL0#)
73	ALW20M#	74	SMIACT#
75	Reserved	76	RSNPXER#
77	FLUSH#	78	VSS
79	SYNC#	80	IRQ13B/A (CFG12/11#)
81	INTR	82	NMI
83	VCC	84	MODIFIED#
85	SPRDYx# (CFG14/13#)	86	SSTB#
87	WT/WB# (CFG1#)	88	WPROT#
89	ALLOC# (CFG6#)	90	VSS
91	CSB# (CFG7#)	92	CCEN# (CFG0#)
93	LOCK#	94	RESP0# (CFG8#)

Pin	Signal	Pin	Signal
95	VCC	96	RESP1# (CFG9#)
97	STAT0	98	RDY
99	STAT1	100	MISS#
101	STAT2	102	VSS
103	VSS	104	ASTB#
105	CSLTCHE#	106	VSS
107	CSLTCHO#	108	ODD#
109	VSS	110	EVEN#
111	MBE1#	112	VSS
113	MBE3#	114	MBE0#
115	MA3 (CFG3#)	116	MBE2#
117	MA5 (CFG5#)	118	VCC
119	VCC	120	MA2(CFG2#)
121	MA7	122	MA4 (CFG4#)
123	MA9	124	MA6
125	MA11	126	VSS
127	MA13	128	MA8
129	VCC	130	MA10
131	MA15	132	VCC
133	MA17	134	MA12
135	VSS	136	MA14
137	MA19	138	MA16
139	MA21	140	MA18
141	MA23	142	VCC
143	VCC	144	MA20
145	MA25	146	MA22
147	MA27	148	MA24
149	VSS	150	MA26
151	MA29	152	VSS
153	MA31	154	MA28
155	VSS	156	MA30
157	MD1	158	VSS
159	VSS	160	MD0
161	MD3	162	MD2
163	MD5	164	MD4
165	MD7	166	VCC
167	MD9	168	MD6
169	MD11	170	MD8
171	VSS	172	MD10
173	MD13	174	MD12
175	MD15	176	MD14
177	MD17	178	VCC
179	MD19	180	MD16
181	MD21	182	MD18
183	VSS	184	MD20
185	MD23	186	MD22
235	MD62	236	MD46
237	VSS	238	MD47
239	MD63	240	VSS

Fan Headers J4J3 and J1J1 (L and P)

These headers are identical.

Pin	Signal
1	GND (ground)
2	+12 V
3	Fan sense

SCSI Controller Activity Light Headers J4J2 and J1J2 (M and O)

These headers are identical.

Pin	Signal	Pin	Signal
1	Return	3	Hard disk active
2	Hard disk active	4	Return

Server Management Header J4J1 (N)

Pin	Signal	Type	Description
1	SMI#	Input	System management interrupt
2	I2CCLK	Output	I^2C clock (8 MHz)
3	GND	Power	Electrical ground
4	KEY		No connection, pin missing
5	PWROFF#	Output	Power supply off (active low)
6	I2CDATA	I/O	I^2C data signal
7	LPOK	Input	Host line power okay
8	KEYUNLK	Input	Keyboard unlock
9	NMI	Input	Nonmaskable interrupt
10	3.3 V	Input	3.3 V power
11	RESET#	Output	Reset baseboard
12	GND	Power	Electrical ground
13	GND	Power	Electrical ground
14	KEY		No connection, pin missing
15	SECURE	Input	Host in secure mode
16	GND	Power	Electrical ground
17	INTRUD	Input	Chassis is open
18	RESERVED		No connection
19	KEY		No connection, pin missing
20	GND	Power	Electrical ground

SCSI Channels A and B Headers J0J1 and J0G2 (R)

These Adaptec AIC-7870 PCI SCSI controller channels are identical.

Pin	Signal	Pin	Signal
1–16	GND (ground)	49–50	GND (ground)
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	RESERVED	53	RESERVED
20–34	GND (ground)	54	GND (ground)
35	DB 12	55	ATN#
36	DB 13	56	GND (ground)
37	DB 14	57	BSY#
38	DB 15	58	ACK#
39	DB P1	59	RST#
40	DB 0	60	MSG#
41	DB 1	61	SEL#
42	DB 2	62	CD#
43	DB 3	63	REQ#
44	DB 4	64	I/O#
45	DB 5	65	DB 8
46	DB 6	66	DB 9
47	DB 7	67	DB 10
48	DB P	68	DB 11

PCI Connectors J0B1, J1B1, J4B1, J4B2, and J6B1 (T and W)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST-	B1	–12 V	A32	AD[16]	B32	AD[17]
A2	+12 V	B2	TCK	A33	+3.3 V	B33	C/BE[2]#
A3	TMS	B3	GND	A34	FRAME#	B34	GND
A4	TDI	B4	TDO	A35	GND	B35	IRDY#
A5	+5 V	B5	+5 V	A36	TRDY#	B36	+3.3 V
A6	INTA#	B6	+5 V	A37	GND	B37	DEVSEL#
A7	INTC#-	B7	INTB#	A38	STOP#	B38	GND
A8	+5 V	B8	INTD#	A39	+3.3 V	B39	LOCK#
A9	Reserved	B9	PRSNT1#	A40	SDONE	B40	PERR#
A10	+5 V	B10	Reserved	A41	SBO#	B41	+3.3 V
A11	Reserved	B11	PRSNT2#	A42	GND	B42	SERR#
A12	GND	B12	GND	A43	PAR	B43	+3.3 V
A13	GND	B13	GND	A44	AD[15]	B44	C/BE[1]#
A14	Reserved	B14	Reserved	A45	+3.3 V	B45	AD[14]
A15	RST#	B15	GND	A46	AD[13]	B46	GND
A16	+5 V	B16	CLK	A47	AD[11]	B47	AD[12]
A17	GNT-	B17	GND	A48	GND	B48	AD[10]
A18	GND	B18	REQ#	A49	AD[9]	B49	GND
A19	Reserved	B19	+5 V	A50	KEY	B50	KEY
A20	AD[30]	B20	AD[31]	A51	KEY	B51	KEY
A21	+3.3 V	B21	AD[29]	A52	C/BE[0]#	B52	AD[8]
A22	AD[28]	B22	GND	A53	+3.3 V	B53	AD[7]
A23	AD[26]	B23	AD[27]	A54	AD[6]	B54	+3.3 V
A24	GND	B24	AD[25]	A55	AD[4]	B55	AD[5]
A25	AD24	B25	+3.3 V	A56	GND	B56	AD[3]
A26	IDSEL	B26	C/BE[3]#	A57	AD[2]	B57	GND
A27	+3.3 V	B27	AD[23]	A58	AD[0]	B58	AD[1]
A28	AD[22]	B28	GND	A59	+5 V	B59	+5 V
A29	AD[20]	B29	AD[21]	A60	REQ64#	B60	ACK64#
A30	GND	B30	AD[19]	A61	+5 V	B61	+5 V
A31	AD[18]	B31	+3.3 V	A62	+5 V	B62	+5 V

* The hash sign (#) next to the signal indicates active low.

EISA/ISA Connectors J0A1, J1A2, J2A1, J2A2, J3A6, and J3A7 (S and V)

Table continues on following page.

Pin	Signal	Pin	Signal
B1	GND	A1	IOCHK-
B2	RSTDRV	A2	SD7
B3	Vcc	A3	SD6
B4	IRQ9	A4	SD5
B5	–5 V	A5	SD4
B6	DRQ2	A6	SD3
B7	–12 V	A7	SD2
B8	0WS-	A8	SD1
B9	+12 V	A9	SD0
B10	GND	A10	IOCHRDY
B11	SMEMW-	A11	AEN
B12	SMEMR-	A12	SA19
B13	IOW-	A13	SA18
B14	IOR-	A14	SA17
B15	DACK3-	A15	SA16
B16	DRQ3	A16	SA15
B17	DACK1-	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH-	A19	SA12
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7
B25	IRQ3	A25	SA6
B26	DACK2-	A26	SA5
B27	TC	A27	SA4
B28	BALE	A28	SA3
B29	Vcc	A29	SA2
B30	OSC	A30	SA1
B31	GND	A31	SA0
KEY		KEY	
D1	MEMCS16-	C1	SBHE-
D2	IOCS16-	C2	LA23
D3	IRQ10	C3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19

Pin	Signal	Pin	Signal
D7	IRQ14	C7	LA18
D8	DACK0-	C8	LA17
D9	DRQ0	C9	MEMR-
D10	DACK5-	C10	MEMW-
D11	DRQ5	C11	SD8
D12	DACK6-	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7-	C14	SD11
D15	DRQ7	C15	SD12
D16	Vcc	C16	SD13
D17	Master-	C17	SD14
D18	GND	C18	SD15

* The minus sign next to the signal indicates active low.

Parallel Port J7A1 (X)

The parallel and video connectors share a common housing. When viewed on the rear panel, the parallel port is on the right. The parallel port sends data in parallel format, and it is used primarily for a printer.

Pin	Signal	Pin	Signal
1	Strobe	10	ACK (acknowledge)
2	Data bit 0	11	Busy
3	Data bit 1	12	PE (paper end)
4	Data bit 2	13	SLCT (select)
5	Data bit 3	14	AUFDXT (auto feed)
6	Data bit 4	15	Error
7	Data bit 5	16	INIT (initialize printer)
8	Data bit 6	17	SLCTIN (select input)
9	Data bit 7	18–25	GND (ground)

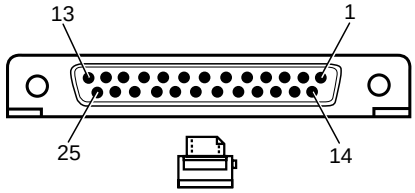


Figure 5-3 Parallel Connector

VGA Video Port J7A1 (X)

When viewed on the rear panel, the video port is on the left.

Pin	Signal	Pin	Signal
1	Red	10	GND (ground)
2	Green	11–12	NC (not connected)
3	Blue	13	HSYNC (horizontal sync)
4	NC (not connected)	14	VSYNC (vertical sync)
5–8	GND (ground)	15	NC (not connected)
9	NC (not connected)		

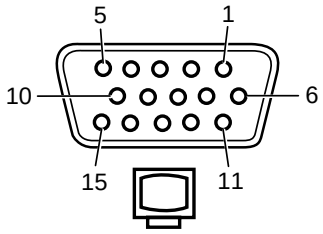


Figure 5-4 VGA Video Connector

Serial Ports J8A1 (Y)

These identical PS/2 compatible connectors share a common housing. When viewed on the rear panel, COM2 is on the left and COM1 is on the right. These ports support external devices such as modems and scanners that require serial data transmission.

Pin	Signal
1	DCD (data carrier detect)
2	RXD (receive data)
3	TXD (transmit data)
4	DTR (data terminal ready)
5	GND (ground)
6	DSR (data set ready)
7	RTS (request to send)
8	CTS (clear to send)
9	RIA (ring indicator)

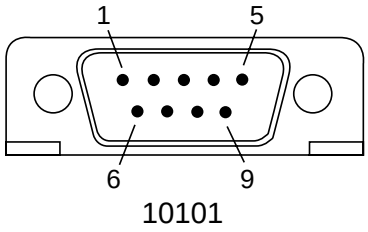


Figure 5-5 Serial Port

Keyboard and Mouse Connectors J9A1 (Z)

These identical PS/2 compatible connectors share a common housing. When viewed on the rear panel, the keyboard connector is on the left and the mouse connector is on the right.

Keyboard		Mouse	
Pin	**Signal**	**Pin**	**Signal**
1	KEYDAT (keyboard data)	1	MSEDAT (mouse data)
2	NC (not connected)	2	NC (not connected)
3	GND (ground)	3	GND (ground)
4	FUSED_VCC (+5 V)	4	FUSED_VCC (+5 V)
5	KEYCLK (keyboard clock)	5	MSECLK (mouse clock)
6	NC (not connected)	6	NC (not connected)

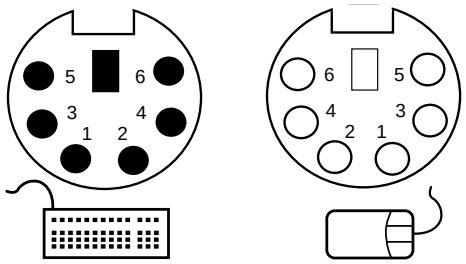


Figure 5-6 PS/2-Compatible Keyboard and Mouse Connectors

System Management Interface Card (SMIC)

The System Management Interface card is an ISA card designed to provide the interface between the motherboard and System Management Controller (SMC). It is an integral part of the Shogun's diagnostic function which allows you to monitor the system from a remote computer.

The card must be fitted to EISA slot M2. Using any other slot may cause the System Management Application software to report incorrect motherboard configuration.

Specification

The following list describes the general characteristics of the SMIC:

- ISA plug-in card
- Extended BIOS - 128 Kbytes with 32-Kbyte and 16-Kbyte pages
- 32 Kbytes SRAM with 8-Kbyte pages
- Flash disk - 2 Mbytes with 8-Kbyte pages; 12V programming voltage generator
- Diagnostic Processor (DiagP) - 87C51; drives RESET#/NMI# /IOCHCK#; serial link to SMC; port 80 monitor port, CTRL-ALT-DEL reset detection
- Management serial link (COMx)
- Diagnostic serial link
- Port 80 monitor - Catches port 80 accesses; DiagP reads out values and sends them to SMC
- Connectors - Power distribution interface: 34-way IDC

Description

Memory

The on-board memory occupies a contiguous 32-Kbyte address space, the base being at C8000h or D0000h (jumper selectable). All memory is 8-bit only. The following table shows the memory map:

Offset	Device	Page Size	Total Size
0000	BIOS page, SRAM and DOS FLASH disabled	32 Kbytes	128 Kbytes
	BIOS page, SRAM and DOS FLASH enabled	16 Kbytes	
4000	DOS Flash page	8 Kbytes	2 Mbytes
6000	SRAM	8 KBytes	8 KBytes

The BIOS is a 12V non-sectored Flash device. Since it is not critical to the system boot process, no jumper mechanism is present to enable an alternative 'boot' block.

The Flash disk is a 2-Mbyte 12V part. Since the part requires a tight-toleranced 12V rail, a DC/DC converter generates the programming voltage. The part is protected from programming via an Apricot port.

The 32-Kbyte SRAM is for use by the BIOS as a stack or for other storage purposes.

On card reset, the SRAM and DOS Flash are disabled, being enabled by the BIOS through the Apricot Control Register.

I/O Map

I/O Address	Port
0800h : write	Port 80 Diagnostic Port
0120h[2] : write	BIOS page register
0120h : read	Status register
0121h : write	DOS Flash page register
0122h : r/w	Control register
0123h ⟶ 0127h	Reserved for expansion
0128h ⟶ 012Fh	Diagnostic UART
03E8h ⟶ 03EFh	COM3
02E8h ⟶ 02EFh	COM4

= Unused portion of memory

Port 80 Monitor : 0080h : write

This 8-bit port captures all diagnostic codes written by the motherboard BIOS. The port is readable by DiagP, which can then communicate the codes to the SMC. If the port contents are lost due to overrun by the motherboard, there is no problem; the aim is merely to keep track of the last value in the event that the system hangs.

When the port is written, the DiagP must be informed through an interrupt line (PORT80_IRQ).

When the DiagP reads the port, the interrupt line must be automatically reset.

BIOS Page Register 120h (write only)

This controls the BIOS and SRAM paging. All bits are cleared on reset. When the Flash disk/SRAM decoding is disabled, the BIOS has a page size of 32 Kbytes. Bit 4 of the Control Register = 0.

Bits	Function
7:3	n/a
2:1	BIOS page (0 ⟶3)
0	n/a

When Flash disk/SRAM decoding is enabled, the BIOS has a page size of 16 Kbytes. Bit 4 of the Control Register = 1

Bits	Function
7:3	n/a
2:0	BIOS page (0 ⟶7)

DOS Flash Page Register 121h (write only)

This controls the Flash disk paging. All bits are cleared on reset.

Bits	Function
7:0	Flash disk page (0 ⟶255)

Control Register 122h (R/W)

This contains miscellaneous control bits. All bits are cleared on reset.

Bits	Function
7:6	IRQ select for COM port: 00 = No IRQ selected 01 = IRQ10 10 = IRQ14 11 = IRQ15
5	Management UART address: 0=COM3: 1=COM4
4	Enable DOS Flash/SRAM decode: 1=enable
3	Enable DOS Flash write: 1=enable
2	Enable BIOS Flash write: 1=enable
1:0	IRQ select for Diagnostic UART: 00 = No IRQ selected 01 = IRQ10 10 = IRQ14 11 = IRQ15

SRAM Page Register 123h (write only)

This controls the SRAM paging. All bits are cleared on reset.

Bits	Function
7:2	n/a
1:0	SRAM page (0 → 3)

Status Register

This register contains miscellaneous control bits. All bits are cleared on reset.

Bits	Function
7:4	4-way switch pack : read only, 0 = on
3	Flash RDY line : read only, 1 = ready
2	n/a
	DiagP, IOCHCK# line : read only
	DiagP NMI# line : read only

Management UART (COM3 or COM4)

This is a standard 16550-compatible serial port, occupying 8 contiguous bytes. The Management UART interrupt is software selectable (Apricot Control Register) to be IRQ10, IRQ14 or IRQ15. The serial interface uses TTL levels.

Diagnostic UART

This is a standard 16550 compatible serial port, occupying 8 contiguous bytes. The UART interrupt is software selectable (Apricot Control Register) to be IRQ10, IRQ14 or IRQ15. The serial interface uses TTL levels.

Diagnostic Processor

The Diagnostic Processor has its own power-on reset, as it holds the entire motherboard in reset while its firmware initializes.

Port 0 : Input data port

The data source is selected via port 2.

Bits	Function
7:0	Port 80 diagnostic code (Port 0 : Input Port)
3	Ambient Temperature: 1 = over temperature (System Status Monitor)
2:0	Fan fail; 1=fail (System Status Monitor)

Port 1

Bits	Function
4	Motherboard reset - active high

Port 2

Bits	Function	Dir
4	Port 80 port read : active low	o/p
1	System status port read: active low	o/p

Port 3

Bits	Function	Dir
7	Motherboard NMI# - active low	o/p
6	ISA IOCHCK# - active low	o/p
5	Clear warm reset interrupt - active low	o/p
4	Diagnostic mode select - active low	i/p
3	Interrupt : warm reset	i/p
2	Interrupt : port 80 monitor	i/p
1	Serial port Tx	o/p
0	Serial port Rx	i/p

Connectors

Power Distribution Board Interface : 34-way header

Signals	Dir	Pin	Description
SYSTXD	o/p	1	TXD of system management port (TTL)
GND		2	
SYSRXD	i/p	3	RXD (TTL)
GND		4	
SYSRTS	o/p	5	Request To Send (TTL)
SYSCTS	i/p	6	Clear To Send (TTL)
SYSDSR	i/p	7	Data Set Ready (TTL)
SYSDCD	i/p	8	Data Carrier Detected (TTL)
SYSDTR	o/p	9	Data Terminal Ready (TTL)
SYSRI	i/p	10	Ring Indicator (TTL)
DIAGTXD	o/p	11	TXD of diag port (BIOS,driver I/F) (TTL)
GND		12	
DIAGRXD	i/p	13	RXD of diag port (BIOS,driver I/F) (TTL)
GND		14	
DIAGDTR	o/p	15	Receive ready control from S/W (TTL)
		16	
NMI	o/p	17	NMI to motherboard - open collector
GND		18	
FAN1 ALARM	i/p	19	Fan1 alarm to SMIC
FAN2 ALARM	i/p	20	Fan2 alarm to SMIC
FAN3 ALARM	i/p	21	Fan3 alarm to SMIC
GND		22	
RESET#	o/p	23	Reset to motherboard
		24	
		25	
1V2	i/p	26	DC 5V via a 510R, 1% resistor for SMIC detection
GND		27	
MBHWTXD	o/p	28	TXD of H/W port (diag. processor I/F) (TTL)
GND		29	
MBHWRXD	i/p	30	RXD of HW port (diag. Processor I/F) (TTL)
GND		31	
	i/p	32	
AMB_TEMP		33	Ambient temperature exceeded alarm (1=overtemp)

System Management Controller

The purpose of the System Management Controller (SMC) is to monitor and report the status of your system in terms of its integrity. It functions as the interface between the following:

- Uninterruptible Power Supply
- Motherboard via the System Management Interface Card (SMIC)
- Front Panel
- Fans

Whenever the server develops a problem, perhaps a faulty disk drive or too high a temperature within the server, the SMC reports it to the System Management Application, which is a Windows program that interprets the reports that the SMC sends.

In addition there is a modem port which appears on the backplane of the server. This is a standard serial interface which enables monitoring of the system from a remote computer.

The SMC has the following attributes:

- Validates the infrared data stream from the Front Panel.
- Sends data to Front Panel
- Communicates via a dedicated serial interface to the motherboard, by means of the SMIC
- Provides power to the fans in the disk chamber
- Contains a Real-Time Clock (RTC) which maintains the date and time
- Contains an 80186 processor chip which functions as an embedded controller rather than a microprocessor
- Equipped with 256K Kbytes of SRAM, which shadows the EPROM or the Flash device to enhance the speed of the system
- Contains Flash ROM in order to provide the firmware for the functions of the Front Panel.

Power Distribution Boards

There are several power distribution boards in your server (see Chapter 4, *Service Information*, in this handbook for removal instructions). They are associated with the following components:

- Motherboard
- Removable media (5.25 Inch) drives
- Hard disk drives
- Electronics chamber cooling fans

The main purpose of these boards is to distribute electric power from a single source to several different components. However, the motherboard power distribution board and the cooling fan board have additional functions. The following paragraphs explain the additional functions for each board.

Motherboard Power Distribution Board

There are three additional functions for this board:

- The board receives the audio signals from the motherboard and the system controller, mixes and amplifies them and sends them to the loudspeaker.
- The board contains a 5V-3.3V DC to DC converter. This accommodates the dual Pentium processor card, which requires 3.3V while all the other components connected to this board require 5V.
- The board also contains an internal temperature sensor.

Cooling Fan Board

This board is equipped with the following items:

- Three power connectors for the fans
- One microsensor for the side panel lock
- One power connector for the cable from the motherboard power distribution board
- One thermistor mounted on the board which serves as an ambient temperature sensor.

Uninterruptible Power Supply

The Uninterruptible Power Supply is a self-contained battery-backed unit which supplies the system unit with all its power requirements. The following is a list of its major features:

- 1000W maximum total DC output
- Auto-ranging AC input voltage selection
- 48V DC input from backup batteries
- Battery power circuit breaker
- Constant voltage battery charging output
- Remote control/monitoring facility
- Cooling fans mounted on, and powered from, the power supply
- Compliance with all relevant safety standards

Four 12V batteries mounted inside the power supply unit in a removable pack provide backup power in the event of a mains electricity supply failure. These batteries allow the system to function normally during a short power failure. During a longer failure, the batteries allow the system to be shut down in an orderly fashion, thereby preventing any data loss. Whenever the AC supply is available, the power supply charges the batteries unless the battery isolation switch (i.e. circuit breaker) is in the OFF position.

The power supply is controlled from the Front Panel. It normally operates in one of two modes, Power On or Standby. In Power On mode, unit provides electricity to all its outputs and the system functions normally. In Standby mode, the power supply unit is shut down, but it continues to keep the batteries fully charged, and some of the control signals are still valid.

A temperature sensor with normally closed contacts is fitted in the power supply. This forms part of the over-temperature protection circuit and an alarm will sound if the contacts open.

During operation from the batteries, the power supply shuts down when the battery terminal voltage reaches 42V. This avoids battery damage.

The power supply voltage selection is auto-ranging. This means that there is no selector switch on the unit. It will detect the proper voltage and function normally with no effort on your part. The ideal voltage ranges for the power supply unit are:

- 85-132V
- 180-264V

Control Interface

The PSU is controlled by an external module through its control interface. The PSU provides the control interface signals on a flying ribbon cable terminated by a flush-mounted 26-way IDC connector.

The control interface signals are:

Signal	Function
Power Up:	Turns on DC0-6 outputs. Also used to clear 15A Latch.
Shutdown:	Turns off DC0-6 outputs.
DC good:	Digital output indicates that the DC0-4 output rails are within spec.
ACvolts:	Analogue output allows monitoring of the AC line input voltage.
Battery voltage monitor:	Analogue output allows monitoring of the lead-acid battery voltage.
Circuit breaker sense	Digital output allows the System Management Unit to sense the circuit breaker position.
AC current monitor	Analogue output allows the System Management Unit to sense the PSU AC line current.
DC current monitor	Analogue output allows the System Management Unit to sense the PSU DC battery current.
Thermal alarm	Digital output from PSU used to detect cooling failure.
-12V (DC output 6)	DC power for the System Management Unit.
5V (DC output 7)	Standby DC power for the System Management Unit.
15A Latch	Digital output indicates PSU is in 15A Latch mode due to the AC line input current exceeding 15A.
Battery charge monitor	Combined output, when below 2.5V is proportional to battery charge current, when above 3.1V indicates battery or charger failure.
AC good	Digital output indicates when true that the AC input voltage is suitable and that the PSU is currently powered by the AC input only.
0V	Reference for the control interface.

Power On Input

In Standby (with AC input present), connecting this input to 0V until the PSU asserts DC Good will power up the PSU. The input will be held for a maximum of 1 second. If DC Good fails to become asserted, then the outputs DC0-6 are considered to have failed. When the PSU is in Backup mode with 15A Latch active, connecting this input to 0V causes the PSU to revert to AC Power. If AC current is still greater then 15A the 15A

Latch signal will remain asserted. If the AC current is less than 15A the 15A latch signal is deasserted and the PSU changes to the Power On mode.

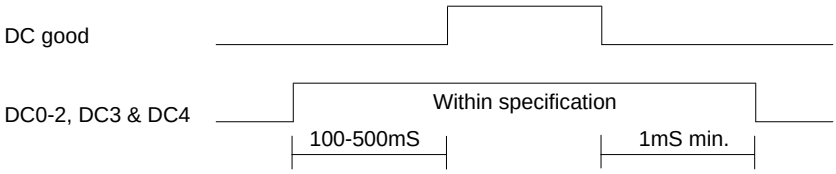
Shutdown input

Driving this input to logic 0 when the DC0-6 outputs are on returns it to Standby or Power Off mode. Shutdown has no effect when the PSU is in Standby mode or when the Power Up input is active. The PSU acknowledges recognition of Shutdown active by negating DC good. This takes no longer to signal than 1 second. The System Management Unit may then immediately release Shutdown.

DC good output

The active high DC good output should be driven high between 100mS and 500mS after the DC rails are stabilised within specification after power up.

When the PSU powers down (except in fault conditions) the DC good signal are driven low at least 1mS before the DC outputs deviate from their specified ranges. This output is valid at all times as it is critical to the operation of the computer system. It must not glitch during AC disturbances or when the PSU is changing between operating modes. If any DC0-2, DC3 or DC4 output module fails DC good will go low immediately.



Output drive (logic high):	2mA at 3.1V min. Max. open-circuit voltage 5.5V.

AC volts output

Whenever the PSU is in Standby, Power On or Backup modes, this analogue output signal indicates the rms value of the AC input voltage, assuming it is sinusoidal. The relationship between output voltage and AC input voltage is lenear.

This signal is used by the System Management Unit in determining whether the AC supply voltage is sufficient to power the system configuration and in reporting AC supply problems to the user.

The signal indicates 0V AC input when the unit is in Power Off mode.

Battery voltage monitor output

This output allows the System Management Unit to monitor the voltage level (nominally 48V) of the internal lead-acid batteries.

Circuit breaker sense

When the battery circuit breaker is open this signal is connected to 0V. When the circuit breaker is closed (i.e. batteries are connected), this signal is open.

AC Current Monitor

This analogue output indicates the rms value of the current being drawn by the input AC-DC converter from the AC supply when the PSU is in Power On or Backup mode.

DC Current Monitor

This analogue output indicates the current being drawn from the internal batteries when the PSU is in Backup mode.

Thermal alarm

This output is used to indicate PSU cooling failure, for example caused by fan failure or obstructed vents. The sensor will be thermally coupled to a component which will overheat quickly in the event of cooling failure, or will sense the exhaust air temperature. The normal state of the signal will be high. When cooling failure occurs, the PSU will drive the output low.

15A Latch

This active low output is used to indicate that the PSU has drawn 15A or more from the AC supply.

The PSU has an input current detect circuit (with a bandwidth of 0.1Hz) which is used to set the 15A Latch. When the output goes active, the PSU will enter 15A Latch mode. In this mode, AC Good is driven to False to indicate that the batteries are providing some of the power. This will greatly reduce the AC input current as most of the power will be drawn from the batteries in this mode. When the System Management Unit pulses Power Up to exit Backup mode with 15A Latch aserted the unit will revert to AC operation. If AC current is greater than 15A the PSU will remain the the backup mode with 15A Latch aserted. If the AC Current is less than 15A , the PSU will de assert 15A Latch and change to the Power On mode. If the AC Voltage is less than the minimum operating voltage (85V ac) the PSU will remain in the backup mode and de asert 15A Latch.

Battery Charge Monitor

This PSU output has two functions. In the 0V-2.5V range it indicates the magnitude of the battery charge current (indicates 2.0V +/-10% at 0.5A). If there is a fault in the battery system the PSU should drive the output high (greater then 3.1V) to indicate the condition.

AC Good

This output indicates that the AC supply is within specification. The System Management Unit uses this output to recognise whether the DC output modules are powered by AC input or by the battery. This output is activated (logic high) in the Standby and Power On modes. It is negated (logic low) in the Backup and Power Off modes.

PSU state diagram

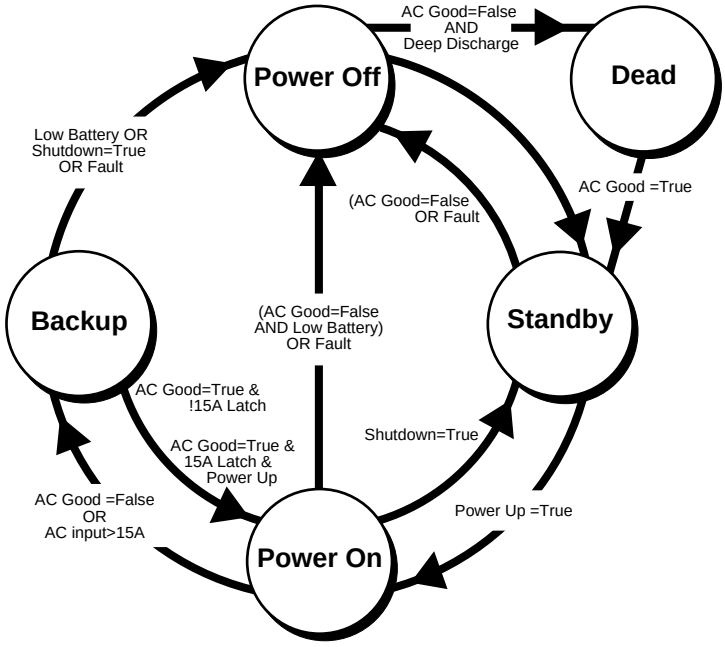


Figure 5-7 PSU State Diagram

The "Deep discharge" transition on the state diagram occurs when the PSU detects a very low battery voltage while it is providing a Standby 5V supply in Power Off mode. This can occur due to excessive battery drain or the batteries being disconnected by the circuit breaker. In the case of battery exhaustion in Backup mode, the PSU will remain in the Power Off state for at least 0.5 second before entering the Dead state. If the circuit breaker disconnects the batteries, the transition from Backup to Dead may be instantaneous.

The "Fault" entries in the table below correspond to the equivalent transitions on the state diagram. Other PSU failures may also cause the "Fault" transition.

PSU mode truth table

State	AC Good	DC Good	DC7
Dead	Don't care	Don't care	Off
Power Off	False	False	On
Standby	True	False	On*
Power On	True	True	On*
Backup	False	True	On*

On* , Output is on in all except current limiting conditions on this output.

APPENDIX - ANTISTATIC PRECAUTIONS

Static electricity can cause permanent damage to electronic components. You should be aware of this risk and take precautions against the discharge of static electricity into the computer.

Anyone can generate static electricity by moving on a chair, brushing against desks or walls, or simply walking across an ordinary carpet. Items handed from one person to another, or being wrapped or unwrapped, can acquire a static charge. Air conditioning systems can also result in ambient static. Clothing made of synthetic fibres is particularly likely to generate static electricity; this static electricity is often completely unnoticed by the wearer, but can be sufficient to cripple or impair an electronic component.

The computer is at risk from static discharge while the side panels are removed. This is because the electronic components of the motherboard and other items are exposed. Memory modules, cache upgrades and processors are other examples of electrostatic-sensitive devices (ESSDs).

All work that involves removing the side panels must be done in an area completely free of static electricity. We recommend using a Special Handling Area (SHA) as defined by EN 100015-1: 1992. This means that working surfaces, floor coverings and chairs must be connected to a common earth reference point. You should wear an earthed wrist strap and antistatic clothing. It is also a good idea to use an ionizer or humidifier to remove static from the air.

When installing any upgrade, be sure you understand what the installation involves before you start. This will enable you to plan your work, thus minimizing the amount of time that sensitive components are exposed.

Do not remove the side panels, the component's antistatic bag or the wrapping of any upgrade until you need to.

Handle static-sensitive items with extreme care. Hold expansion cards and add-on components only by their edges, avoiding their electrical contacts. Never touch the components or electrical contacts on the motherboard or on expansion cards. In general, do not handle static-sensitive items unnecessarily.

Keep all conductive material, food and drink away from your work area and the open computer.

GLOSSARY

Bus Bars

Metal insulated bars, two pairs of which carry DC power from the Uninterruptible Power Supply to the power distribution panel at the top of the electronics chamber. This panel then supplies power to the motherboard and associated components. There is a third set of 3 bars, located behind the motherboard cooling fan assembly, which provides power to the hard disk drives via the hard disk power distribution panel.

Diagnostic Codes

Special codes, expressed as hexadecimal numbers, which appear on the front panel LCD. These codes indicate errors or problems with the system, but can also indicate a perfectly normal sequence of events. The separate document, *Diagnostic Codes Reference Guide*, provides a definition for each code.

Disk Subsystem

The area of the hard disk chamber inside the server which houses all of the hard disk drives. The subsystem will accommodate up to 20 drives in five modules. It also includes a cooling fan assembly, containing 2 fans, at the rear.

Drive Chamber

The area inside the server, on the opposite side from the electronics chamber, which contains the removable media drives, System Management Controller board, hard disk cooling fans and the disk subsystem.

Electronics Chamber

The area of the interior of server which contains the motherboard and associated cables and power distribution panels.

Front Panel

The panel on the front of the server that consists of the diagnostic codes LCD, the POWER, STANDBY, RESET and CONTROL buttons as well as the UPS and Power LEDs.

Hard Disk Drive Module

The metal framework inside the disk subsystem which houses four hard disk drives. The server can accommodate up to five of these modules, providing a maximum of 20 drives.

HDD Module Backplane

A series of small circuit boards on the back of the hard disk module. They are connected together by a SCSI interface cable and are semi-rigid to help overcome excessive vibration that can sometimes occur. All hard disks in the server are connected to the module backplane.

Hot Pluggable

A term which refers to the ability to remove and fit a hard disk drive easily without switching the server off. The technology involved in this feature prevents the loss of data stored on a drive which might need replacing.

Knockout Panel

A small metal blanking panel which covers the centre spine opening for the hard disk module data connector. This panel must be removed when a module is installed for the first time in the server's hard disk chamber.

On-line Battery Pack

The removable part of the Uninterruptible Power Supply which maintains power to the system when a power failure occurs. Under normal conditions the mains electricty keeps the battery pack fully charged, even when the system is switched off. There is enough power in the battery pack to keep a fully laden system (i.e equipped with 20 hard disk drives) operational long enough to shut the server down. With fewer drives this operation time will be longer.

Power Distribution Board

A special circuit board which distributes power from a single source, i.e. the power supply unit, to several components. For example, the power distribution board at the top of the electronics bay draws power from the UPS and distributes it to the motherboard and associated components.

RAID

An acronym that stands for Redundant Arrays of Independent Disks. This technology provides a high level of data safety and integrity by enabling the storage of the same data on more than one hard disk. It then manages the data in such a way as to prevent data loss if one hard disk should fail or become corrupted.

Removable Media Drives

Refers to drives whose storage media are removable from the drive itself. Typical examples are floppy disk, CD-ROM and tape backup drives.

Security System

A system of audible and visual alarms that warns of unauthorized access to the interior of the server or tampering with the front panel controls.

Security Token

The implement which activates the alarms after the security system has been enabled. The removable media drive bay door key is the security token. When the door is closed and locked with the key, the system will sound the alarm when it detects a security violation.

Standby Mode

When the system has been powered down using the STANDBY button under normal conditions, it is said to be in Standby Mode. In this mode, the system is switched off, but the mains electricity still keeps the UPS battery pack fully charged.

System Configuration Utility

A special program in which you store information about your system's hardware. Memory, hard and floppy disks, expansion cards and other items are configurable in the SCU. Each time you make a hardware change, such as increasing the amount of memory or adding an expansion card, you must run the SCU to inform the system about the change.

System Management Application

A Windows software program which allows you to control your system either locally or from a remote computer. This program acts as the interface between you and the System Management Controller.

System Management Controller

A special feature within the server which enables you to monitor the system and diagnose any problems. The controller reports errors, hardware failures and other problems via the System Management Application.

Uninterruptible Power Supply (UPS)

The server's power supply is designed to maintain DC electricity supply to the system for a limited period in the event of a mains power failure. This period gives you enough time to log users off the network and shut the system down without the danger of loss or corruption of data and programs.

UPS Circuit Breaker Switch

A switch on the back panel of the server which isolates the power supply from the mains electricity. This switch should always be set to Off when any service procedure or other exceptional intrusion into the machine is carried out.

INDEX

N

O

P

R

S

T

U

V

W

apricot

MITSUBISHI ELECTRIC

APRICOT COMPUTERS LIMITED
3500 PARKSIDE
BIRMINGHAM BUSINESS PARK
BIRMINGHAM B37 7YS
UNITED KINGDOM

APRICOT COMPUTERS LIMITED
TRAVELLERS LANE
HATFIELD
HERTFORDSHIRE AL10 8XB
UNITED KINGDOM

MITSUBISHI ELECTRIC EUROPE GmbH
GOTHAER STRASSE 8
POSTFACH 1548
40835 RATINGEN
DEUTSCHLAND