

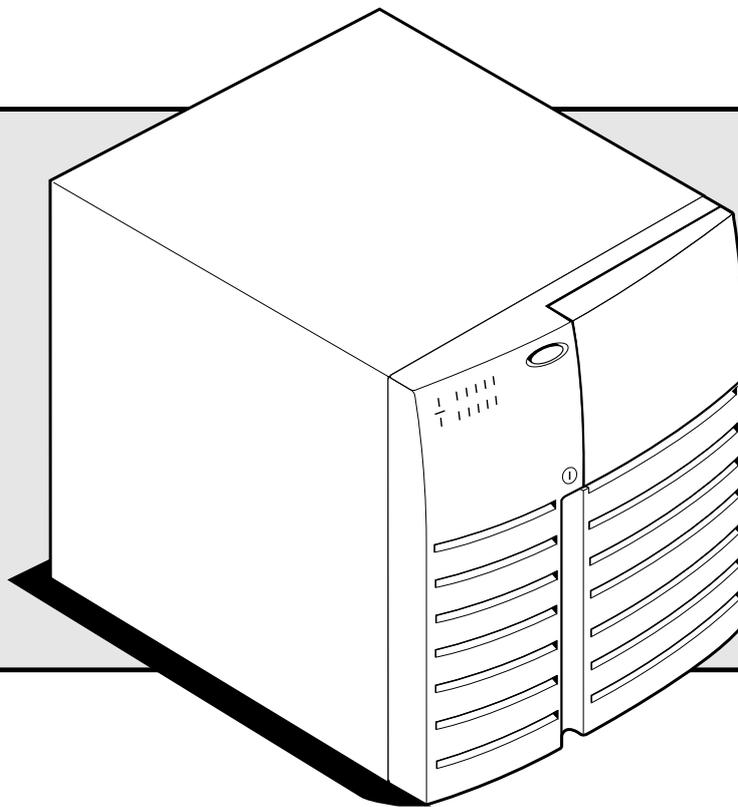


APRICOT PCs & SERVERS

Apricot

FT 2400

Owner's Handbook



Certificate No.'s:
FM 1716 FS 21715 FS 30305

APRICOT FT2400

with Pentium®II processor

OWNER'S HANDBOOK

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SAFETY AND REGULATORY NOTICES

General

Electrical

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 cord(s) packed with the computer comply 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.

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 or cleaning the system unit, or removing any of the system unit covers.

Batteries

This product contains a replaceable lithium battery.

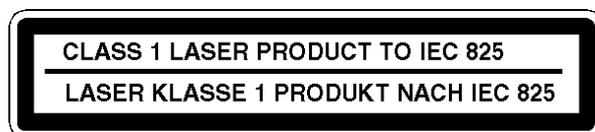
Do not use a metal or other conductive implement to remove the battery. If a short-circuit is accidentally made between its positive and negative terminals, it may cause the battery to explode.

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 battery manufacturer's instructions.

The battery's average life is between 3 and 5 years. Do not recharge, disassemble or incinerate. Keep away from children. If in any doubt, contact your supplier or an authorised maintainer.

Laser

Any fitted 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).



The CLASS 1 LASER PRODUCT warning label, bearing similar information to the sample above and in high visibility colours, is located on the CD-ROM unit and elsewhere on the computer.

Do not attempt to disassemble the CD-ROM drive; if a fault occurs, call an authorised maintainer. Use the CD-ROM drive only as described in this manual. Failure to do so may result in exposure to hazardous radiation.

Ergonomic

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

NOTE

For cooling, airflow and access to the server, it is recommended to allow about 35cm of clearance at the rear, 60cm on each side, and 22cm in front.

Cooling and airflow

Operating the server with the covers removed can damage the server components. For proper cooling and airflow, always replace the covers before turning on the server.

Thermalcote bonding compound

The thermal bonding compound used between the system processor and its heatsink can cause skin irritation and stain clothing. Avoid prolonged or repeated contact with skin. Wash thoroughly with soap and water after handling. Avoid contact with eyes and inhalation of fumes. Do not ingest.

Antistatic precautions

WARNING

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.

The computer is especially at risk from static discharge while the covers are removed, as the electronic components of not only the motherboard, but all other boards are exposed. Memory modules are specific examples of electrostatic sensitive devices (ESSDs).

All work that involves removing the covers must be carried out 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, and you should wear an earthed wrist strap and anti-static clothing. It is also a good idea to use an ioniser or humidifier to remove static from the air.

- ◆ When installing any upgrade, be sure you understand what the installation procedure involves before you start. This will enable you to plan your work, and so minimise the amount of time that sensitive components are exposed.
- ◆ Do not remove either the system unit covers, nor the anti-static bag or 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, foodstuffs and especially liquids, away from your work area and the open computer.

Maintenance

Switch off and disconnect all cables before attempting to clean the computer.

Do not use sprays, solvents or abrasives that might damage the system unit surface. Do not use cleaning fluids or sprays near air vents, ports, or the diskette and CD-ROM drives.

Occasionally wipe the system unit with a soft, slightly damp, lint-free cloth.

Occasionally wipe over the air vents on the rear and sides of the system unit. Dust and fluff can block the vents and limit the airflow.

Occasionally clean the diskette and CD-ROM drives using a proprietary head cleaner.

Occasionally wipe the monitor with a soft, slightly damp, lint-free cloth. It is best to use anti-static glass cleaner on the monitor screen, but do not spray glass cleaner directly onto the screen; it could run down inside the case and damage the circuitry.

Transporting

Use common sense when handling the computer; hard disks in particular can be damaged if the computer is dropped or handled roughly. As a precaution, back up the contents of the hard disks to tape or diskettes before moving the computer.

Switch off and disconnect all cables before attempting to move the computer, particularly do not try to move the computer while it is plugged into the AC power supply.

When lifting and carrying the computer, use the metal sides of the system unit and never attempt to lift the system unit with a monitor still on top.

WARNING

The minimum server configuration weighs 29 Kg, and the maximum one weighs 44 Kg. To avoid personal injury, two persons should always be present to move the server.

If you need to transport the computer any great distance, use the original packing materials.

If you are planning to use the computer in another country, it may not be suitable, check with your supplier, particularly on the availability of the correct AC power cords.

NOTE

Any existing maintenance or warranty agreement may not be supportable in another country. The system may need to be returned to the supplier for repair.

Standards

Safety

This product complies with the European safety standard EN60950 plus amendments 1, 2, 3 and all European country deviations.

Electro-magnetic Compatibility (EMC)

This product complies with the following European EMC standards:

Emissions	EN55022	Class B
Immunity	EN50082	Level 1

This product also complies with the following International EMC standards:

VCCI class 1 (Japan)

German Acoustic Noise Regulation

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

Notes

All interconnecting cables and communication cables should be less than 2 metres in length. If cable extensions are used, ensure adequate earth connections are provided and screened cables are used.

If any metal casework components are removed, during upgrade work for example, ensure that all metal parts are correctly re-assembled and all internal and external screws are re-fitted and correctly tightened.

Legalities

This equipment complies with the following European Directives (and all subsequent amendments):

Low Voltage Directive	73/23/EEC
EMC Directive	89/336/EEC
CE Marking Directive	93/68/EEC

and where applicable:

Telecommunications Directive	91/263/EEC
-------------------------------------	-------------------

IMPORTANT

This system complies with the CE Marking Directive and its strict legal requirements. Use only parts tested and approved by Mitsubishi Electric PC Division. Failure to do so may result in invalidating both the compliance and your warranty. All expansion cards, drives and peripherals must carry the CE mark to ensure continued compliance.

POWER CONNECTION INFORMATION

The computer uses a safety ground and must be earthed. The AC power supply cable is the 'disconnect device'. The system can be fitted with up to three power supplies, each having its own AC power cable. All power cables must be disconnected before removing any system side or top cover. Ensure that the system unit is positioned close to the AC power outlet(s), and that the plug(s) can be easily accessed.

WARNING

Failure to observe the correct supply voltage may result in serious damage to the power supplies and other components within the system.

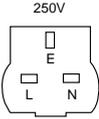
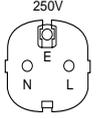
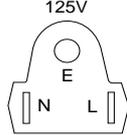
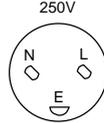
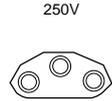
Unplug all fitted power supply cable(s) before moving the system unit, cleaning the computer or removing the side panels. An exception to this is opening the front panel before hot-plugging a hard disk drive.

Power cable requirements

The AC power supply cable(s) packed with the computer are compliant with the safety standards applicable in the country in which it is first sold. Do not use any other power supply cable or substitute a power supply cable from other equipment. Refer to your authorised supplier if you ever need additional or alternative power supply cables.

If you wish to use the computer in another country, you must ensure that you use AC power supply cable(s) and AC plug(s) which are compliant with the safety standards of that country. The power supply cable fittings should bear the certification mark of the agency responsible for evaluation within the country of use. Check with your Apricot supplier as to the suitability of the server for operation in another country.

Typical AC plugs

				
BS1363A	SHUCO	NEMA 5-15P	SRAF 1962/DB16/87	ASE 1011
U. K.	Austria Belgium Italy	Taiwan Thailand	Denmark	Switzerland
	Finland Holland	USA Canada		
	Norway Sweden	Japan		
	France Germany			

Additional Power cable information - UK ONLY

This equipment is supplied with an AC power cable that has a moulded, non-removable, 3-pin AC plug. There may be more than one cable if the server has more than one power supply.

Always replace the fuse with one of the same type and rating which is BSI or ASTA approved to BS1362.

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

Power connection

NOTE

Any ancillary equipment using an AC power supply cable should be earthed.

- ◆ Before connecting up any parts of the system, ensure that the AC supply is switched off or disconnected.
- ◆ First connect up the keyboard, mouse, monitor signal cable, network connection, as appropriate.
- ◆ Connect up **all** AC cables. System to supply (there may be up to three supply cables for the system), monitor to supply etc. Then switch on or connect the AC supply.
- ◆ Switch on the monitor first, then the computer followed by the peripherals.

Server power on/off

The *push-button on/off power switch* on the front panel of the server *does not* turn off the AC power. To remove AC power from the server, you must unplug all of the AC power cables from each power supply or wall outlet.

Hazardous conditions, Power Supply and Power Share Backplane (if present)

Hazardous voltage, current, and energy levels are present inside a power supply and a power share backplane. There are no user serviceable parts inside them. Servicing should be done by technically qualified personnel.

1 SYSTEM DESCRIPTION

The modular scaleable architecture of your high performance server system supports symmetrical multiprocessing (SMP) and a variety of operating systems. The server comes with both Peripheral Component Interconnect (PCI) and Industry Standard Architecture (ISA) buses. The server board set consists of:

- ◆ System board with seven PCI expansion slots, three ISA expansion slots, and several embedded controller devices (PCI video, Dual Ultra SCSI, Narrow SCSI, and IDE)
- ◆ One or two Pentium ® II processors
- ◆ Memory module with either eight 3.3 V EDO DIMM sockets for up to 1 GB of memory, or four SDRAM DIMM sockets for 512 MB of memory
- ◆ Optional RPX module with two SIMM sockets for RAID applications

The server chassis contains a floppy diskette drive, a CD-ROM drive and, depending on the server configuration, up to three 360 watt power supplies.

Three half-height peripheral bays can house tape back-up drives, extra CD-ROM drives, and other mass storage devices. Any two adjacent bays can be converted into a single full-height bay. The two hard drive bays, when fully configured with ten SCSI drives, can provide over 90 GB of storage. They allow hot-swapping of drives.

As your application requirements increase, you can upgrade your server system with:

- ◆ more powerful processors
- ◆ additional memory
- ◆ other peripheral devices
- ◆ add-in I/O boards

System description

Server Features

Feature	Description
Processor support	Two slots for Pentium II processors
Memory support	One slot for a memory module that supports either a) up to 1 GB of EDO memory, or b) up to 512 MB of SDRAM memory
Optional RAID support	One slot for an RPX module that supports I ² O and non-I ² O RAID
Chassis	1.44 MB, floppy diskette drive in the vertical bay Three full-width half-height standard bays; top bay contains a CD-ROM drive Two hot-docking bays; each bay has space for five narrow, half-height SCSI hard disk drives. One or two SCSI hot-docking backplanes Two blowers direct air at the processors Three integrated power supply fans cool and circulate air through the power supply side of the system; if it contains only one or two power supplies, an additional fan provides cooling and airflow
Power system	with optional redundancy 360 watt power supply, autoranging for 115 or 230 VAC operation, includes an integrated fan for cooling (system may be configured with up to three power supplies) An optional power share board distributes the power load between the installed power supplies and allows hot swapping power supplies
Server management	Real-time clock/calendar (RTC) Front panel controls and indicators (LEDs) System Configuration Utility (SCU) Basic Input/Output System (BIOS), Power-on Self Test, and Setup stored in a flash memory device
System I/O	Nine available expansion slots: Six 32-bit PCI, two 16-bit ISA and one common PCI/ISA Integrated Cirrus Logic CL-GD54M40 SVGA controller shipped with 1 MB One Symbios SCSI controller for connecting up to seven 8-bit narrow SCSI devices Two Symbios wide SCSI controllers for connecting a mixture of fifteen 8-bit narrow and 16-bit wide SCSI devices to the controller—maximum of seven 8-bit narrow SCSI devices Diskette controller that supports two drives PCI-enhanced Integrated Drive Electronics (IDE) hard disk interface that supports two hard disk drives PS/2 -compatible keyboard/mouse controller PS/2-compatible keyboard and mouse ports PS/2-compatible parallel port Analogue VGA, 15-pin video port Two 9-pin serial ports

Chassis

The electro-galvanised metal server chassis minimises electromagnetic interference (EMI) and radio frequency interference (RFI).

Two spring-loaded captive screws secure the removable metal door behind the lower plastic front door to the chassis. This cover provides proper air-flow and easy access to the bays for hot-swapping SCSI hard disk drives in and out of the server. The removable side covers, each one is attached to the chassis with three screws, provide proper airflow and easy access to the system board and power supplies. You can secure these covers to the chassis with padlocks (not provided). Figures 1-1 and 1-2 show the major system components.

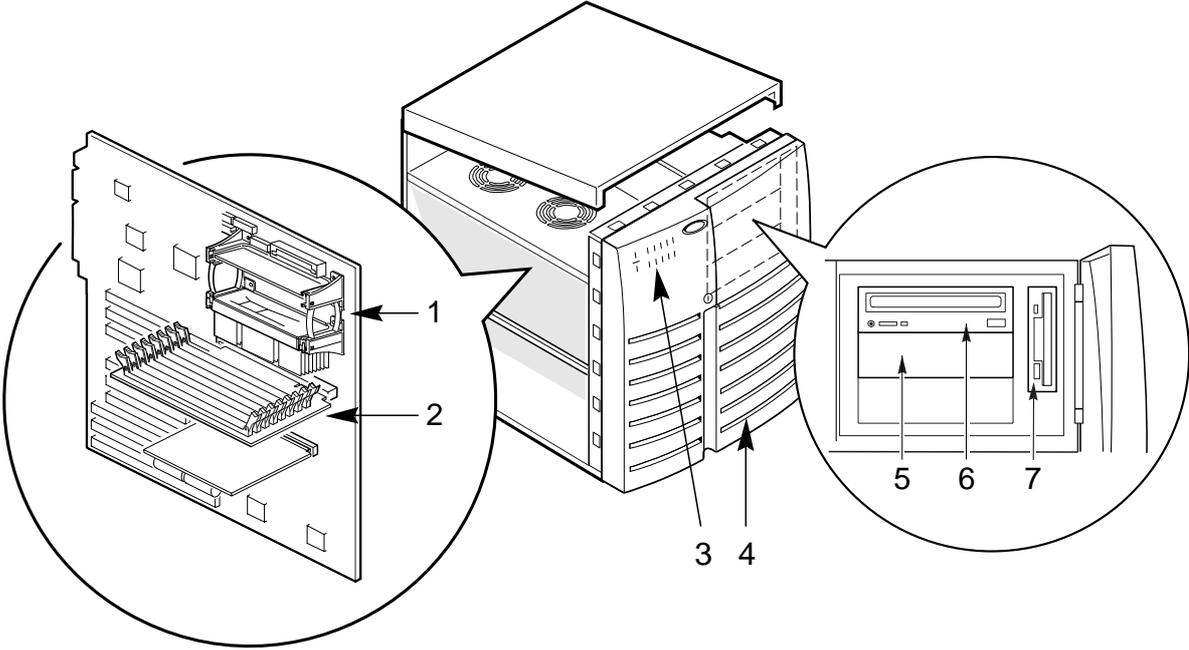


Figure 1-1. Server, Front/Left Side View

- | | | | |
|---|------------------------------|---|----------------------------|
| 1 | Processor sockets | 5 | Full-width peripheral bays |
| 2 | Memory board | 6 | CD-ROM drive |
| 3 | Control panel and indicators | 7 | Floppy diskette drive |
| 4 | SCSI hot-docking bays | | |

System description

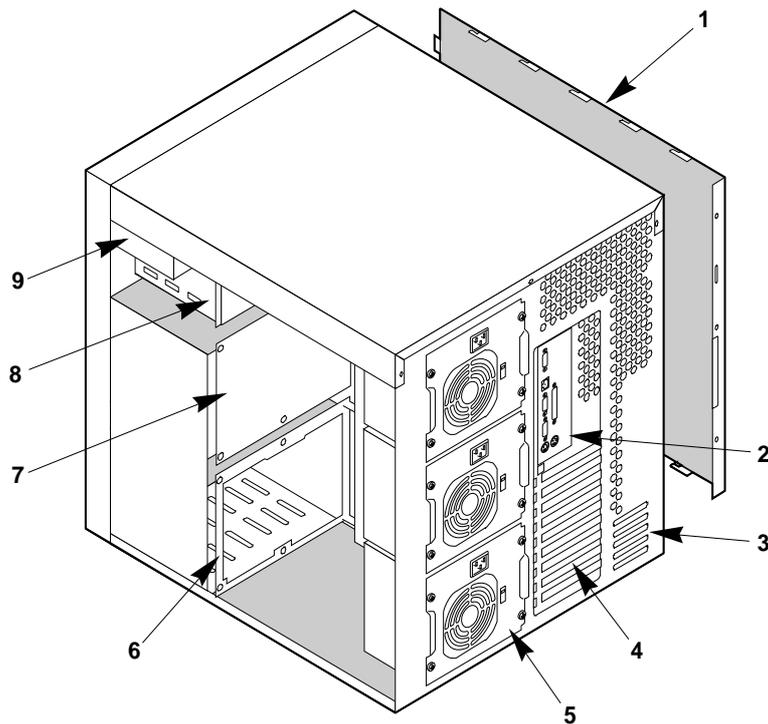


Figure 1-2. Server, Back/Right Side View

- | | | | |
|---|--|---|----------------------------------|
| 1 | Left side cover | 6 | SCSI hot-docking bay |
| 2 | I/O panel | 7 | SCSI hot-docking backplane |
| 3 | Knock-out slots for external SCSI connectors | 8 | Half-height peripheral bays |
| 4 | Expansion slots | 9 | Floppy diskette drive (vertical) |
| 5 | Power supplies | | |

Controls and Indicators

Figure 1-4 shows the location of the server controls and indicators, external peripheral bays, floppy diskette drive, and CD-ROM drive.

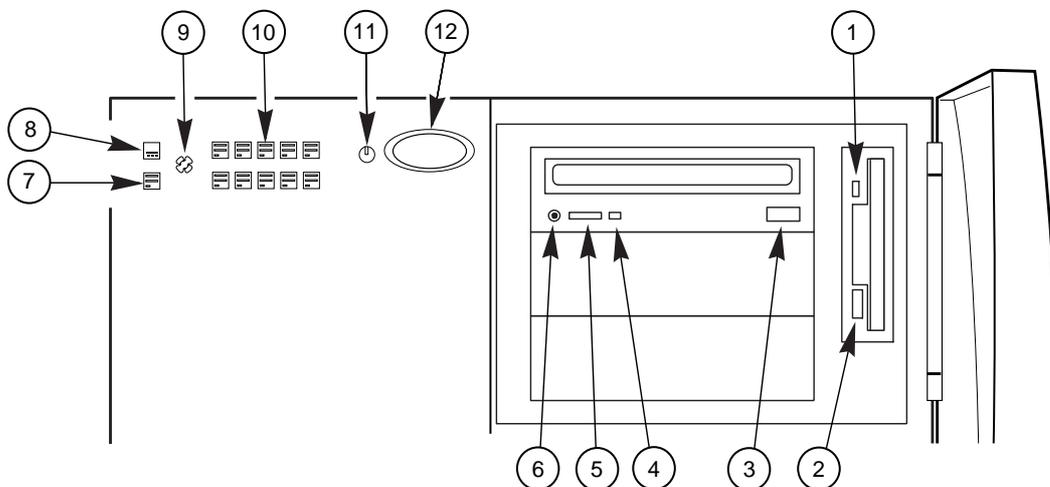


Figure 1-3. Server Controls and Indicators

1. Diskette drive activity LED: when lit, indicates the drive is in use.
2. Diskette drive ejector button: when pressed, ejects the disk.
3. CD-ROM open/close button: used to open and close the CD tray.
4. CD-ROM activity LED: when lit, indicates the drive is in use.
5. CD-ROM volume control: used to adjust the volume of headphones or speakers.
6. CD-ROM headphone jack: used to connect headphones or speakers
7. Green (HD ACT) LED: when lit, indicates hard drive activity.
8. Yellow power supply failure LED: when flashing, indicates a power supply has failed.
9. Yellow fan failure LED: when flashing, indicates the fan has failed.
10. Ten yellow hard drive failure LEDs: when lit, indicates a drive failure.
 - ◇ In a RAID configuration: when flashing, drive re-building.
11. Green power LED: when lit continuously, indicates the presence of DC power.
 - ◇ This LED goes out when the power is turned off or the power source is disrupted.
12. Server power push-button: when pressed, turns the server DC power on or off.

Server Security

There are several ways to prevent unauthorised entry or use of the server.

Security with padlocks and alarm switches:

- ◆ Secure the side covers and the hot-docking bay metal door to the chassis by inserting padlocks (not provided) through the holes in the metal tabs protruding through slots in the covers and door. (see Figure 1.)
- ◆ Activate alarm switches for the side covers and hot-docking bay metal door. These switches transmit alarm signals to the system board. Software on the system board intercepts these signals and alerts the user of unauthorised activity.

Security with the Setup utility:

- ◆ Set server administrative and user passwords.
- ◆ Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel controls.

Security with the System Configuration Utility (SCU):

- ◆ Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period (1 to 128 minutes).
- ◆ Set an administrative password.
- ◆ Set a user password.
- ◆ Activate the secure mode hot-key.
- ◆ Disable writing to the diskette drive.
- ◆ Enable video blanking if using onboard video.

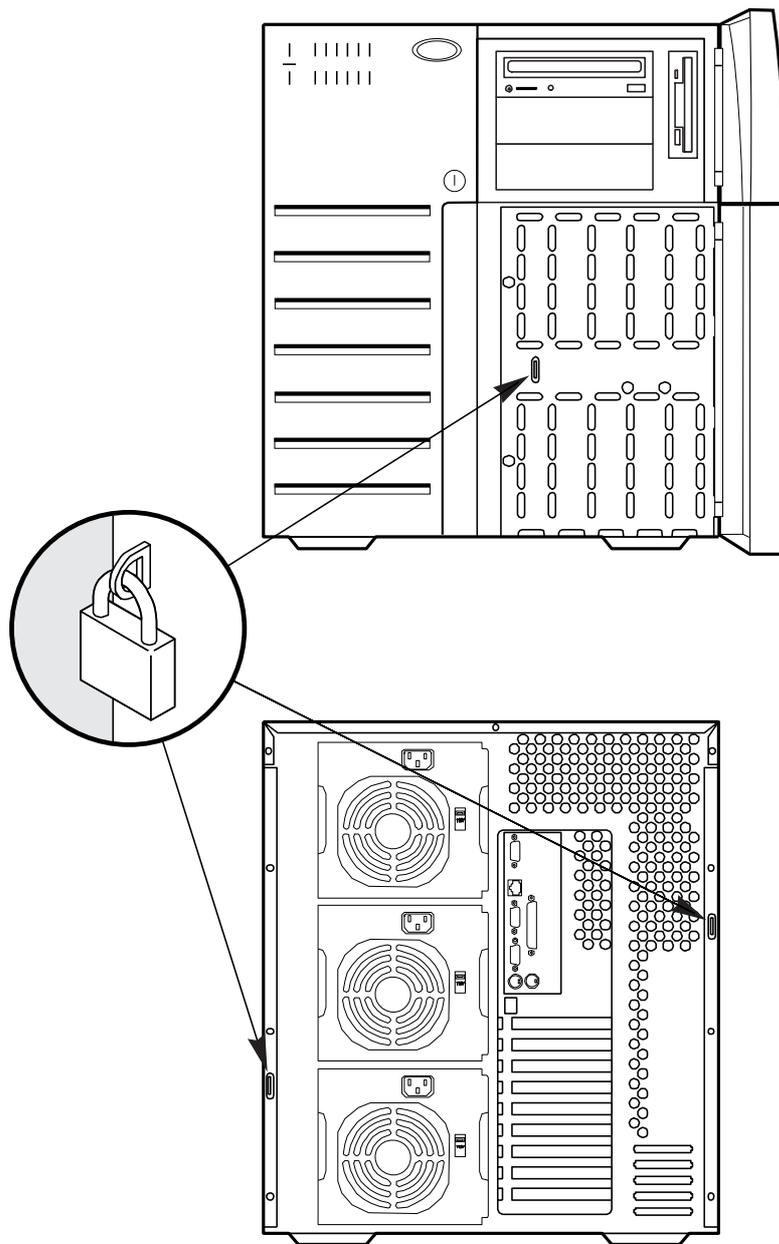


Figure 1-4. Server Security Padlocks

Password Protection

If you set the user password, but not the administrative password, the BIOS requires you to enter the user password before you can boot the server or run the SCU. If you set both passwords, entering either one lets you boot the server or enable the keyboard and mouse. Only the administrative password lets you change the system configuration with the SCU.

Secure Boot Mode

The secure boot mode allows the server to boot and run the operating system (OS). However, you cannot use the keyboard or mouse until you enter the user password.

You can use the SCU to put the server into the secure boot mode. If the BIOS detects a CD in the CD-ROM drive or a diskette in floppy drive A at boot time, it prompts you for

a password. When you enter the password, the server boots from the CD-ROM drive or floppy drive and disables the secure mode.

If there is no diskette in floppy drive A, or CD in the CD-ROM drive, the server boots from the drive C drive and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.

If you set a hot-key combination, you can secure the server immediately.

Boot Sequence Control

The BIOS security features determine the boot devices and the boot sequence. They also control disabling writes to the floppy drive in secure mode. You can use the SCU to select each boot device. The default boot sequence is floppy, hard disk, CD-ROM, and Network.

Boot Without Keyboard

The server can boot with or without a keyboard. Before the server boots, the BIOS displays a message whether it has detected a keyboard or not. During POST, the BIOS automatically detects and tests the keyboard if it is present.

Power Switch Lock

The power switch is locked when the server is in the secure mode. To exit from the secure mode, enter your user password.

Floppy Write Protection

If enabled with the SCU, floppy writes are disabled when the system is in the secure mode. Floppy write protection is only in effect while the system is in the secure mode. Otherwise, write protection is disabled.

Video Blanking

If enabled with the setup or SCU, the video screen goes blank when the system is in secure mode.

- ◆ Further information on all of the topics mentioned on this page and correct methods of their setup can be found in chapter 3, 'Configuration'.

Power System

The power system in the server may be configured with one, two, or three 360 watt power supplies.

- ◆ An entry level *nonredundant* power system contains one power supply.
- ◆ An entry level *redundant* power system contains two power supplies.
- ◆ A maximum level *nonredundant* power system contains two power supplies.
- ◆ A maximum level *redundant* power system contains three power supplies.

The 360 watt power supply provides sufficient power for an entry level server. The power supply accepts these input voltage ranges:

- ◆ 100-120 VAC at 50/60Hz; 6A maximum current
- ◆ 200-240 VAC at 50/60Hz; 3A maximum current

If a single power supply fails in a redundant power system, the yellow power supply failure LED on the front panel will flash. When it is safe to shut down the server, you can replace the defective power supply. Further information is given in chapter 5, 'Server Power'.

Server Cooling

Two fans inside the chassis provide cooling for the processors and the memory module, plus add-in boards installed in the system. Two additional fans may be installed as redundant fans. If a fan fails, the server management subsystem notifies the system board and turns on a fan failure LED on the front panel. This signal is also available for server management functions.

The power supply fan plus an additional fan in the chassis provides cooling for the hard drives. Multiple power supplies provide redundant cooling for these drives. Further information on the system fans is given in chapter 10, 'System fans'.

Peripheral Drive Bays

User Accessible Floppy Drive Bay

The floppy diskette drive in the vertical peripheral bay supports 720 KB, 1.25 MB, and 1.44 MB media. The drive is accessible from the front of the server.

User Accessible Drive Bays

Three half-height bays provide space for removable media devices such as tape drives and CD-ROM drives. The top bay is conventionally fitted with an IDE CD-ROM drive. You can install IDE or SCSI devices in the remaining bays. You can convert any two adjacent bays to a single full-height bay. It is recommended that you do not use these bays for hard disk drives, as they can generate EMI and also ESD susceptibility increases.

Hot-swapping Drive Bays

The door on the front of the server covers a removable metal door. Two spring-loaded captive screws secure the metal door to the chassis. These doors are vented to allow air-flow and provide access to any fitted hard drives in the upper and lower hot-docking bays. Plastic drive carriers for easy hot swapping of drives in and out of these bays without shutting down the server.

Using industry standard 80-pin SCA connectors, the hot-docking backplane in the upper bay supports up to five industry standard Fast-20 SCSI III SCA hard disk drives. The hot-

docking bays accept peripherals that consume up to 11 watts of power and run at a maximum ambient temperature of 55°C.

You can install an additional hot-docking backplane in the lower hot-docking bay for five more drives. However, if you do, you must install an add-in SCSI host adapter to an expansion slot on the system board and an additional power supply in the chassis to support drives in the lower bay. The upper and lower hot-docking bays, when fully configured with ten hard disk drives, provide over 90 GB of hard disk drive space.

Onboard RAID option

With the optional RPX board installed on the system board, RAID software, and SCSI hard disk drives in the hot-docking bays, you can easily set up RAID applications. A two channel RAID solution can be constructed by installing an RPX module with RAID firmware resident in the RPX FLASH memory.

The server system supports two types of embedded RAID firmware packages: I2O compliant and vendor proprietary firmware. The RAID features are as follows:

- ◆ RAID levels 0, 1, 3, 5, 0+1, and JBOD
- ◆ Support for hot spares, hot plugs, and user selectable rebuild rate
- ◆ Support for multiple rebuilds across separate arrays and multiple consistency checks
- ◆ Write back cache support with battery backup
- ◆ Support for up to 2 terabytes per logical array and up to 64 terabytes of attached disk storage
- ◆ Support for SAF-TE and SMART

Server System Board

More detailed information about the server motherboard, setting up, installation etc., can be found in chapter 7, 'System boards'.

ISA Expansion Slots

The three ISA bus master slots on the system board provide for legacy expansion. One of the ISA slots shares a common chassis I/O expansion slot with a PCI slot; you can use either the ISA slot or the PCI slot, but not both.

The ISA bus operates at up to 8.33 MHz and provides

- ◆ 24-bit memory addressing
- ◆ Type A transfers at 5.33 MB per second
- ◆ Type B transfers at 8 MB per second
- ◆ 8- or 16-bit data transfers

System description

PCI Expansion Slots

The PCI bus master slots on the system board provide for expansion and performance enhancement. One of the PCI slots shares a common chassis I/O expansion slot with an ISA slot; you can use either the PCI slot or the ISA slot, but not both.

The PCI bus operates at up to 33 MHz and provides

- ◆ 32-bit memory addressing
- ◆ +5 V environment
- ◆ Burst transfers of up to 133 MB per second
- ◆ 8-, 16-, or 32-bit data transfers
- ◆ Plug-and-Play configuration
- ◆ Hierarchical bus to maximise connectivity

PCI Video Controller

The onboard, integrated Cirrus Logic CL-GD54M40 32-bit super video graphics array (SVGA) controller is fully backwards compatible with most popular video standards. The standard server configuration comes with 1 MB of onboard video memory.

The SVGA controller supports analogue VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace interlaced frequency of 87 Hz.

The buffer size of the onboard video memory can be increased from 512 KB to 1 MB with one 40-pin 256 K x 16, 60 Ns fast-page dynamic random access memory (DRAM). The controller supports 132-column text modes and high resolution graphics with 1280 x 1024 x 16 colours. 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.

SCSI Controller

The system board includes two wide/fast-20 SCSI controller chips integrated as PCI bus masters. These controllers support:

- ◆ An 8-bit (narrow SCSI) data path at a data transfer rate of 20 MB/sec.
- ◆ A 16-bit (wide SCSI) data path at a data transfer rate of 40 MB/sec.
- ◆ Data transfer rates of 133 MB/sec as PCI bus masters.
- ◆ The connection of a maximum of seven 8-bit narrow SCSI devices to each controller.
- ◆ The connection of a mixture of up to fifteen 16-bit wide and/or 8-bit narrow SCSI devices to each controller (maximum of seven 8-bit narrow devices).

The system board also includes a narrow SCSI controller integrated as a PCI bus master. You can connect a maximum of seven narrow SCSI devices to this controller.

The SCSI controllers provide active negation outputs, controls for external differential transceivers, and a disk activity output. 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.

IDE Controller

The PIIX3 multifunction device on the system board acts as a PCI-based Fast IDE controller that supports

- ◆ PIO and IDE DMA/bus master operations
- ◆ Mode 4 timings
- ◆ Transfer rates up to 22 MB/sec
- ◆ Buffering for PCI/IDE burst transfers
- ◆ Master/slave IDE mode

Server Management

During normal operation, server management receives information about the server's status and monitors the server's power supply voltages and operating temperature. If server management determines that the server is not operating within specified limits, it attempts to notify a supervisor or an administrator of the server's condition. Server management features are implemented with the following system board microcontrollers.

Baseboard Management Controller (BMC) does the following:

- ◆ Monitors the processor power supply voltage levels
- ◆ Monitors then processor thermal trip and internal error signals
- ◆ Monitors the fan sensors
- ◆ Manages two I²C thermal sensors located near each processor
- ◆ Manages fault resilient booting (FRB) that controls the ability to boot the server using either processor in the event of a catastrophic processor failure

Front Panel Processor (FPP) on the system board does the following:

- ◆ Manages power, reset, and front panel NMI buttons
- ◆ Monitors all power control sources on the front panel, server manager module, PIIX4, and RTC power control signals

An **EEROM** associated with the system board temperature sensor contains the following:

- ◆ Chassis ID
- ◆ System board ID
- ◆ Power state
- ◆ System board temperature
- ◆ Intrusion detection during both power on and off conditions

Pentium® II Processor

The system board has two connectors for Pentium II processors. The secondary processor requires a plug-in DC to DC converter on the system board to provide power to the processor.

In a symmetric multiprocessor (SMP) environment, all processors are equal and have no preassigned tasks. Distributing the processing loads between both processors increases system performance. This is particularly useful when application demand is low and the I/O request load is high.

In an SMP environment, both processors share a common bus, the same interrupt structure, and access to common memory and I/O channels. The SMP implementation conforms to the Multiprocessor Specification Version 1.4.

Memory Module

The EDO memory module has eight DIMM sockets. The module supports from 16 MB to 1 GB of extended data out (EDO) ECC memory 3.3V, 60 ns DRAMs, mounted on JEDEC DIMMs.

The SDRAM memory module has four DIMM sockets. This module supports from 16 MB to 512 MB of 3.3V, 66 MHz, unbuffered, 72 bit ECC SDRAM modules.

You may install mixed sizes and types of DRAM DIMMS in the EDO banks; however, the SDRAM modules should all be the same. In both cases the DIMM speeds must be the same. The BIOS automatically detects and initialises the memory array.

ECC memory detects and corrects single-bit errors from DRAM 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 PAC generates an SERR (system error) that usually halts the system. ECC is calculated on a 64 bit wide memory basis.

2 INSTALLATION

This chapter tells how to

- ◆ Select a site
- ◆ Connect input and output devices
- ◆ Turn on your server
- ◆ Create Installation and Utility software diskettes

Selecting a Site

CAUTION

Ensure that the power supply connection is through a properly grounded AC outlet.

The server operates reliably within the specified environmental limits (see below) and these should be observed for general installation purposes.

Choose a site that is:

- ◆ Clean and dust-free.
- ◆ Well ventilated and away from sources of heat.
- ◆ Isolated from strong electromagnetic fields and electrical noise caused by installations, such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high frequency security devices.
- ◆ Spacious enough to provide sufficient room behind and around the server, so that you can remove AC power from it by unplugging the power cable(s) from each power supply or wall outlet.
- ◆ Away from sources of vibration or physical shock.

NOTE

For cooling airflow and access to the server, allow about 31 cm of clearance at the rear, 60 cm on each side, and 22 cm at the front.

Physical Specifications

Approximate dimensions and weight:

Height	51.5 cm
Width	43.5 cm
Depth	53.5 cm
Weight	29 kg minimum configuration 44 kg maximum configuration

Environmental Specifications

Temperature	
Nonoperating	−40° to 70°C
Operating	5° to 35°C; derated 0.5°C for every 300 m above sea level
Humidity	
Operating wet bulb	Not to exceed 33°C (with diskette drive or hard disk drive)
Nonoperating	95% relative humidity (noncondensing) at 55°C
Operating	85% relative humidity (noncondensing) at 35°C
Shock	
Nonoperating	20 g, 11 ms, 1/2 sine
Operating	2.0 g, 11 ms, 1/2 sine
Altitude	
Nonoperating	To 15,000 m
Operating	To 3,000 m
Acoustic noise	Typically <50 dBA at 18° to 24°C with five internal hard disk drives (measured at 1 metre from the front of the system with the peripherals idle). The noise of the variable-speed system fan will increase with temperature and power load. Your selection of peripherals may change the noise level.
Electrostatic discharge (ESD)	Tested to 20 KV, no component damage.
AC Input Power	Single power supply, fully loaded
115 VAC	100 to 120 VAC, 6 A, 50/60 Hz
230 VAC	200 to 240 VAC, 3 A, 50/60 Hz

After Unpacking the Server

Check all the sides and top for physical damage and report it immediately to the carriers and your Mitsubishi Electric supplier.

Make a note, using the log provided in appendix B, of all the server serial numbers, including, if possible all the server's components. Check that the server is correctly configured with processors and memory plus any other specified parts and note this in the log also. If there are any discrepancies, contact your Apricot supplier immediately.

WARNING

The minimum server configuration weighs 29 Kg, and the maximum one weighs 44 Kg. To avoid personal injury, two persons should always be present to move the server.

Save the shipping boxes and packing materials in a safe place, to repack the server in the event you decide to move it to another site.

Connecting Peripheral Devices

If your system normally operates without a monitor or keyboard, for example as a network server, you must install them to configure the system. You may remove them after running the SCU. See chapter 3, 'Configuration' for information about running this utility.

Connect your keyboard, mouse, monitor, and other peripheral devices after installing all internal options and replacing the side cover. See Figure 2-2.

Keyboard

Insert the cable connector of a PS/2-compatible keyboard into the 6-pin miniature DIN connector on the system back panel. The keyboard port is overcurrent protected by a 1-amp positive temperature coefficient (PTC) resistor.

Mouse

Insert the cable connector of a PS/2-compatible mouse into the 6-pin miniature DIN connector on the system back panel. The mouse port is overcurrent protected by a 1-amp PTC resistor.

Monitor

Insert the cable connector of the video monitor into the 15-pin connector of the Super VGA port on the system back panel.

Other Devices

Connect other external peripheral devices, for example, a printer, or an external modem by following the instructions in the documentation included with the device. In addition to the keyboard, mouse, and monitor ports, the back panel also provides two serial ports, a parallel port, and an RJ45 10/100 TX Ethernet port.

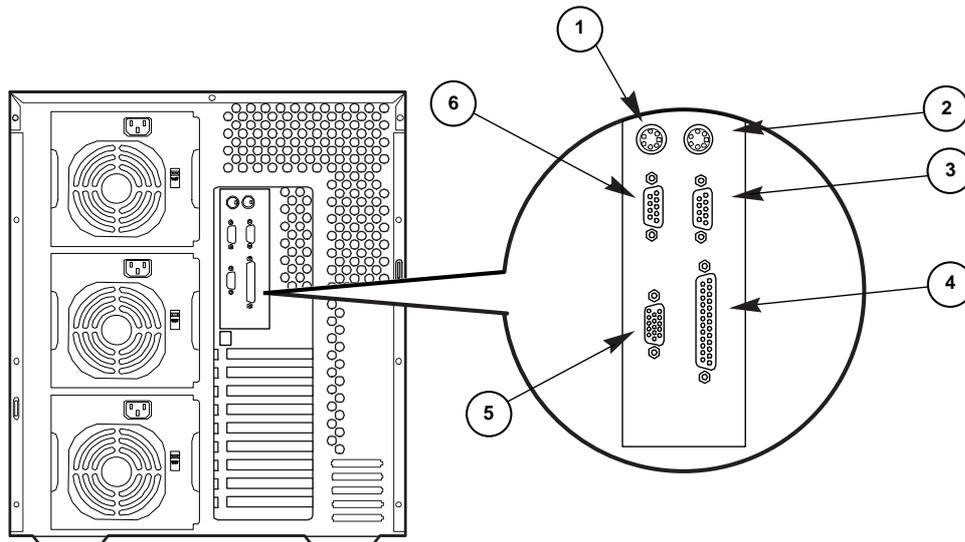


Figure 2-1 Server I/O Panel

- | | | | |
|---|---------------------------------------|---|---------------------------------------|
| 1 | PS/2 keyboard port, 6-pin connector | 4 | Parallel port (LPT), 25-pin connector |
| 2 | PS/2 mouse port, 6-pin connector | 5 | SVGA, 15-pin video connector |
| 3 | Serial port 1 (COM1), 9-pin connector | 6 | Serial port 2 (COM2), 9-pin connector |

Turning on Your Server

WARNING

The push-button on/off power switch on the front panel of the server does not turn off the AC power. To remove AC power from the server, you must unplug the AC power cord from each power supply or wall outlet.

1. Make sure all external devices, such as a monitor, keyboard, and mouse (optional) have been connected.
2. Remove drive protection cards (if present) from the diskette, CD-ROM and tape drives.
3. Turn on your video monitor.
4. Plug the female end of each AC power cable into each input receptacle on the back of the chassis (your server may be configured with one, two, or three power supplies).
5. Plug the male end of the cable into a grounded, AC power outlet. (Repeat for each power supply in the server.)
6. If the server doesn't come on when you plug it into the AC outlet, press the system power push-button on/off switch (Figure 2-3) on the front panel.
7. Verify that the power-on light on the front panel is lit. After a few seconds the power-on self-test (POST) begins. See below.

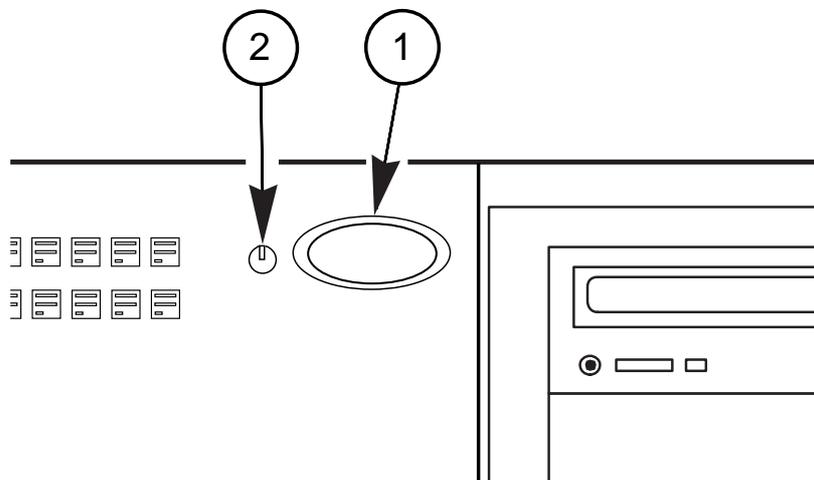


Figure 2-2 Server Power Switch and LED

- 1 Push-button on/off power switch
- 2 Power-on light (LED)

Power-on Self-Test

Each time you turn on the server the power LED on the front panel turns on and the power-on self-test (POST) starts running. It checks the system board, processor/memory module, keyboard, and most installed peripheral devices.

During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory installed on the processor/memory module, it may take several minutes to complete the memory test.

Creating Installation Software Diskettes

The task of configuring and setting up for your needs and the installation of an operating system software should follow. Configuration is required first, to optimise your server and to create a set of driver disks.

Supplied with the server is a bootable CD-ROM containing the setup and configuration utilities.

Place the CD into the drive, turn off the server and switch on to reboot from this CD.

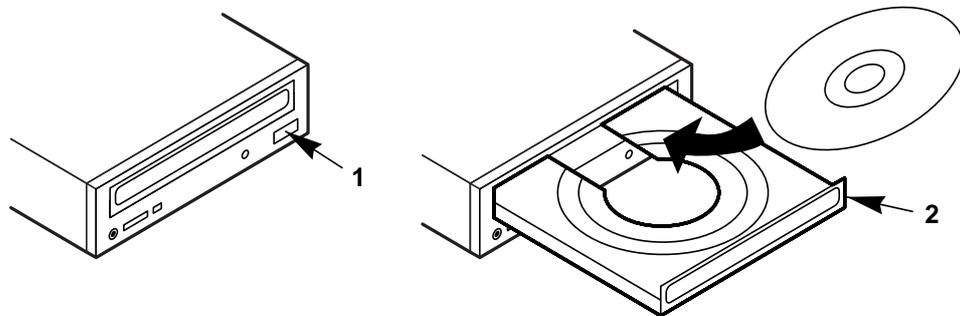


Figure 2-3 Insert bootable configuration CD

- 1 Press drive eject button 2 Insert bootable CD-ROM

Latest Drivers

One option available to you is to create drivers disks for the various devices in the server. It is recommended to create these disks before installing your operating system, as they are the very latest versions from the device manufacturers.

These disks will be used later during the installation of, for example, Windows NT, when you can select 'have disk' from the available installation options.

Further information can now to be found in the following chapter, concerning the setting up and configuration your server.

3 CONFIGURATION

This chapter tells how to run the configuration utilities and install video drivers.

Configuration Utilities

- ◆ Symbios SCSI Utility is used to configure/view the settings of the SCSI host adapters and devices in the system.
- ◆ System Configuration Utility (SCU) is on the Configuration Software CD shipped with the system. See Chapter 2, 'Installation' for instructions on creating an SCU diskette.
- ◆ BIOS Setup Utility is stored in both flash memory and the battery-backed memory of the real-time clock (RTC) on the system board.

If the diskette drive is disabled or improperly configured, use Setup to enable it so that you can run the SCU. If necessary, disable the drive after exiting the SCU. Information entered using the SCU overrides any entered using Setup.

Power-on self test (POST)

Turn on the video monitor and system. After a few seconds the power-on self test (POST) begins.

Each time you turn on the system the power LED on the front panel turns on and the POST starts running. The POST checks the system board, processor, memory, keyboard, and most installed peripheral devices.

During the memory test, the POST displays the amount of memory that it is able to access and test. Depending on the amount installed on the memory module, the test may take several minutes to complete.

These screen prompts and messages appear after the memory test:

Press F2 key if you want to run SETUP

If you do not press <F2>, the boot process continues, and this message appears:

Press Ctrl C to start configuration Utility!

If you have installed SCSI devices in the system, press <Ctrl+C>. When the utility appears, follow the instructions on the monitor to configure the onboard SCSI host adapter settings and run the SCSI disk utilities. See "Using the Symbios SCSI Utility" on page 17 of this chapter.

When to Use the System Configuration Utility

The SCU lets you do the following:

- ◆ Add and remove boards
- ◆ Change the system configuration settings
- ◆ Save the system configuration
- ◆ View switch and jumper settings on the boards in the system

To install or remove an ISA add-in board in the system, you must run the SCU to reconfigure the system. Running the SCU is optional for a PCI add-in board. The SCU is PCI-aware and complies with the ISA Plug and Play specifications. The SCU works with any compliant configuration (.CFG) or overlay (.OVL) files supplied by peripheral device manufacturer.

The system board comes with .CFG and .OVL files. The .CFG file describes the board's characteristics and the system resources that the board requires. The configuration registers on PCI and ISA Plug and Play add-in boards contain the same type of information that is in a .CFG file. However, some ISA add-in boards do come with a .CFG file.

The SCU uses the information provided by the .OVL and .CFG files, configuration registers, NVRAM, and the information that you enter, to specify a system configuration. It configures the system by writing the configuration information to flash memory.

The SCU stores most of the configuration values in the battery-maintained memory (NVRAM) of the real-time clock (RTC), and it stores the rest of the values in flash memory. These values take effect when you boot the system. The POST checks the values against the actual hardware configuration; if they do not agree, it generates an error message. You must then run the SCU to specify the correct configuration before the system boots.

The SCU always updates a checksum for both areas so that the BIOS can detect any potential data corruption before the actual hardware configuration takes place. If the data is corrupted, the BIOS requests that the user configure the system before it can boot.

Pressing <F1> on the keyboard, in response to the BIOS prompt during the POST, activates the BIOS Setup Utility.

How to start the SCU

Before you can run the SCU from a diskette, you must copy the SCU from the Configuration Software CD to a DOS bootable diskette. For instructions on creating an SCU diskette, see Chapter 2, 'Installation'.

1. Turn on the video display monitor and system.
2. There are three ways to start the SCU.
 - ◇ After creating an SCU diskette from the CD: Insert the System Configuration Utility Disk in drive A, and press <Ctrl+Alt+Del> to reboot the system from the diskette.
 - ◇ After installing the operating system: Insert the System Configuration Utility Disk in drive A, and copy it to a directory on the hard drive. While in the directory, type **AMISCU** and press <Enter>.
 - ◇ From diskette after installing the operating system: Insert the System Configuration Utility Disk in drive A. At the MS-DOS prompt, type **a:** and press <Enter> to change to drive A. Type **AMISCU** and press <Enter> to start the SCU.

When you see this message:

MS-DOS Startup Menu

1. Execute AMISCU

2. Execute AMISCU for system with PNP OS

If the operating system in the system supports Plug and Play add-in boards, press <2> to start the SCU. If not, press <1> to start it.

3. When the SCU title appears on the screen, press <Enter> to continue.
4. From the main menu, press <↑> or <↓> to highlight an item and then press <Enter> to select it. If you are using a mouse, point to an item and double-click the left button to select it. Press <F1> at any time for help about a selection.
5. For information about setting up the system select "Step 1: About System Configuration" from the main menu.

System Board Settings Field Descriptions

Default values are in bold typeface.

Systems Group

System Identification and Version Information

Config and Overlay Version	Displays configuration and overlay version.
BIOS Version String	Displays BIOS version.
MP Spec. Version	MP Spec V1.1 MP Spec V1.4

System Processor Modules

Processor 1	Pentium II Processor at XXXMHz (Display only).
Processor 2	Pentium II Processor at XXXMHz (Display only).

Memory Subsystem Group

Shadowing ISA ROMs Options

Shadowing ISA ROM at C8000	Enable Disable
Shadowing ISA ROM at CC000	Enable Disable
Shadowing ISA ROM at D0000	Enable Disable
Shadowing ISA ROM at D4000	Enable Disable
Shadowing ISA ROM at D8000	Enable Disable
Shadowing ISA ROM at DC000	Enable Disable

Configuration

Extended Memory Options

Cache Mode	Disable Enable
Memory Gap Control	Disable Extended

On-Board Disk Controllers

On-Board Floppy Controller	Enable - Primary Enable - Secondary Disable
On-Board IDE Controller	Enable Disable

Onboard Communications Devices

Serial Port 1 Configuration	Port 1 Disable 3E8h - IRQ 4 3E8h - IRQ 3 3F8h - IRQ 4 3F8h - IRQ 3 2E8h - IRQ 4 2E8h - IRQ 3 2F8h - IRQ 4 2F8h - IRQ 3
Serial Port 2 Configuration	Port 2 Disable 3E8h - IRQ 4 3E8h - IRQ 3 3F8h - IRQ 4 3F8h - IRQ 3 2E8h - IRQ 4 2E8h - IRQ 3 2F8h - IRQ 4 2F8h - IRQ 3
Serial Port 2 Mode	Port 2 Normal Mode Port 2 IrDA Mode Port 2 ASK-IR Mode
Parallel Port Configuration	Parallel Port Disable 378h - IRQ 7 278h - IRQ 7 3BCh - IRQ 7 378h - IRQ 5 278h - IRQ 5 3BCh - IRQ 5
Parallel Port Mode	Output Only Parallel Port Bi-directional Parallel Port Enhanced Parallel Printer Port Extended Capabilities Parallel Port, DMA 1 Extended Capabilities Parallel Port, DMA 3

Floppy Drive Subsystems Group

Floppy drive A Options	3.5-inch 1.44/1.25 MB drive 5.25-inch 360 KB drive 5.25-inch 1.2 MB drive 3.5-inch 720 KB drive 3.5-inch 2.88 MB drive Disable or Not Installed
Floppy drive B Options	Disable or Not Installed 5.25-inch 1.2 MB drive 5.25-inch 360 KB drive 3.5-inch 2.88 MB drive 3.5-inch 1.44/1.25 MB drive 3.5-inch 720 KB drive

IDE Subsystem Group

IDE Configuration – Primary Master

Configuration Selection	None User Auto CD
-------------------------	-----------------------------------

If the Configuration Selection Field is set to Auto, the following fields can not be modified.

Multi-Sector Transfer	2 Sector/Block 4 Sector/Block 8 Sector/Block 16 Sector/Block Disable
Translation Mode	Standard CHS Logical Block Addressing
Transfer Mode	Standard PIO 1 PIO 2 PIO 3 PIO 4

IDE Configuration – Primary Slave

Configuration Selection	None User Auto CD
-------------------------	-----------------------------------

Configuration

IDE Drive Options - Primary Slave

If the Configuration Selection Field is set to Auto, the following fields can not be modified.

Multi-Sector Transfer	2 Sector/Block 4 Sector/Block 8 Sector/Block 16 Sector/Block Disable
Translation Mode	Standard CHS Logical Block Addressing
Transfer Mode	Standard PIO 1 PIO 2 PIO 3 PIO 4

Multiboot Group

Boot Device Priority

IPL Devices	Diskette Drive Hard Drive Removable media Any I ² O drives ATAPI CD-ROM Drive Diagnostic Boot
BCV Devices	IDE drives Other Bootable Device

KB and Mouse Subsystem Group

Typematic Speed	30 CPS 26 CPS 21 CPS 18 CPS 13 CPS 10 CPS 6 CPS 2 CPS
Typematic Delay	250 mS Delay 500 mS Delay 750 mS Delay 1000 mSec Delay
Mouse Control Option	Mouse Enabled Mouse Disabled

Console Redirection

COM Port for Redirection	Enable Redirection on Port 3F8h IRQ4 Enable Redirection on Port 2F8h IRQ3 Enable Redirection on Port 3E8h IRQ3 Disable
Serial Port Baud Rate	9600 Baud 19.2K Baud 38.4K Baud 115.2K Baud
Hardware Flow Control	None CTS/RTS Xoff/Xon CTS/RTS + CD
Select Terminal Type	PC-ANSI VT100

Security Subsystem

Administrative Password Option

Password Menu	Enter Password XXXXX
	Verify Password XXXXX

User Password Option

Password Menu	Enter Password XXXXX
	Verify Password XXXXX

Other Security Subsystem Options

Hot Key Option	Disable Enable
Lockout Timer	Disable 1 Minute 2 Minute 5 Minute 10 Minute 20 Minute 1 Hour 2 Hour
Secure Boot Mode	Disable Enable
Video Blanking	Disable Enable
Floppy Writes	Disable Enable

SCSI ROM BIOS Options Group

Embedded SCSI Option ROMScan	Enable Disable
------------------------------	--------------------------

Configuration

Management Subsystem Group

System Management Mode	Disable
	Enable
Event Logging	Disable
	Enable

When to Run the BIOS Setup Utility

The Setup utility lets you change the system configuration defaults. It does not let you enter or change information about PCI or ISA add-in boards; you must use the SCU instead. Setup stores most of the configuration values in the battery-backed memory of the RTC; the rest of the values are stored in flash memory. The values take effect when you boot the system. The POST checks these values against the actual hardware configuration; if they do not agree, it generates an error message. You must then run Setup to specify the correct configuration.

You can run the Setup utility with or without an operating system being present.

Since values entered using the Setup utility are overwritten when you run the SCU, you should only run Setup under the following conditions:

- ◆ To enable the diskette drive
- ◆ If you do not have access to a diskette drive
- ◆ If you do not want to configure any ISA add-in boards in the system

Running the Setup Utility

Reset the system. When you see this message:

Press F2 key if you want to run SETUP

Press <F2> to run Setup. Setup provides six major menus and nine submenus:

- ◆ Main Menu
 - ◇ Primary IDE Master Submenu
 - ◇ Primary IDE Slave Submenu
 - ◇ Keyboard Features Submenu
- ◆ Advanced Menu
 - ◇ PCI Configuration Submenu
 - ◇ Integrated Peripheral Configuration Submenu
- ◆ Security Menu
- ◆ Server Menu
 - ◇ System Management Submenu
 - ◇ Console Redirection Submenu
- ◆ Boot Menu
 - ◇ Boot Device Priority Submenu
 - ◇ Hard Drive Submenu
- ◆ Exit Menu

Use the following keys to navigate through the menus and submenus

<i>Press</i>	<i>To</i>
F1	Get help about an item
ESC	Go back to a previous item
Enter	Select an item
↑	Return to a previous item
↓	Move to the next Item
← →	Select a major menu
F5	Load Setup defaults
F6	Return to previous values
F10	Save and exit Setup

Main Menu

Default values are in bold typeface, and autoconfigured values are shaded.

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
System Time	Current Time	To change this field type the hour (this is a 24-hour clock), minutes, and seconds, each followed by <Enter>.
System Date	Current Date	To change this field type the month, day, and year, each followed by <Enter>.
Diskette A:	Disabled 360 KB 5¼” 1.2 MB 5¼” 720 KB 3½” 1.44/1.25 MB 3½” 2.88 MB 3½”	
Diskette B:	Disabled 360 KB 5¼” 1.2 MB 5¼” 720 KB 3½” 1.44/1.25 MB 3½” 2.88 MB 3½”	
Primary IDE Master	Press <Enter>	See IDE Submenu.
Primary IDE Slave	Press <Enter>	See IDE Submenu.
Keyboard Features	Press <Enter>	See Keyboard Features Submenu.
Memory Cache	Enabled Disabled	
CPU Speed Setting	133 MHz 233 MHz 266 MHz 300 MHz 333 MHz	To activate this field, see “System Board Jumpers” in the Motherboard chapter
Language	English (US) German French Italian Spanish	

Configuration

IDE Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Type	Auto None CD-ROM User	Use the <+> and <-> keys to cycle through the choices. Depending on the selection, some of the following fields will be visible.
Multi-Sector Transfers	Disabled 2 Sectors 4 Sectors 8 Sectors 16 Sectors	Determines the number of sectors per block for multiple sector transfers.
LBA Mode Control	Disabled Enabled	Disables/Enables Logical Block Access.
32 Bit I/O	Disabled Enabled	Disables/Enables 32-bit IDE data transfers.
Transfer Mode	Standard Fast PIO1 Fast PIO2 Fast PIO3 Fast PIO4	Selects the method for moving data to/from the drive.
Cylinders	0	
Heads	0	
Sectors/Track	0	
Maximum Capacity	X MB	The system calculates this number from the cylinders, heads, and sectors/track numbers.

Keyboard Features Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Numlock	Auto On Off	Selects the state for NumLock at power on.
Key Click	Disabled Enabled	
Keyboard auto-repeat rate	30/sec 26.7/sec 21.8/sec 18.5/sec 13.3/sec 10/sec 6/sec 2/sec	
Keyboard auto-repeat delay	1/4 sec 1/2 sec 3/4 sec 1 sec	

Advanced Menu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Plug & Play OS	No Yes	Select Yes if you are booting a Plug and Play capable operating system.
Reset Configuration Data	No Yes	Select Yes if you want to clear the System Configuration Data during the next boot. Automatically reset to 'No' during boot.
PCI Configuration	Press <Enter>	See PCI configuration Submenu.
Integrated Peripheral Configuration	Press <Enter>	See Integrated Peripheral Configuration Submenu.
Use Multiprocessor Specification	1.1 1.4	
Large Disk Access Mode	DOS Other	DOS - select DOS UNIX , Novell, NetWare, or other OS - select Other.
Enable Memory Gap	Disabled Extended	
Delay on Option ROMS	Disabled Enabled	
Clock control	Enabled Disabled	Enabled programs the clock drivers to optimum settings
IO processor	Enabled Disabled	Enables onboard IO processor (i960 RD)

PCI Configuration Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
PCI Device, Embedded SCSI Devices	Press <Enter>	See Embedded SCSI Device Submenu
PCI Device, Slot #1	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #2	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #3	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #4	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #5	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #6	Press <Enter>	See PCI Device Submenu
PCI Device, Slot #7	Press <Enter>	See PCI Device Submenu

Configuration

Embedded SCSI Device Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Option ROM Scan	Enabled	
	Disabled	
Narrow SCSI Latency Timer	Default	
	0020h	
	0040h	
	0060h	
	0080h	
	00A0h	
Wide SCSI A Latency Timer	Default	
	0020h	
	0040h	
	0060h	
	0080h	
	00A0h	
Wide SCSI B Latency Timer	Default	
	0020h	
	0040h	
	0060h	
	0080h	
	00A0h	

PCI Device Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Option ROM Scan	Enabled	
	Disabled	
Enable Master	Disabled	
	Enabled	
Wide SCSI A Latency Timer	Default	
	0020h	
	0040h	
	0060h	
	0080h	
	00A0h	

Integrated Peripherals Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Serial port A	Disabled	
	Enabled	
	Auto	
	PnP OS	
Serial port A: Base I/O address	3F8	
	2F8	
	3E8	
	2E8	
Serial port A: Interrupt	IRQ 3	
	IRQ 4	
Serial port B	Disabled	
	Enabled	
	Auto	
	PnP OS	
Serial port B: Mode	Normal	
	IrDA	
	ASK-IR	
Serial port B: Base I/O address	3F8	
	2F8	
	3E8	
	2E8	
Serial port B: Interrupt	IRQ 3	
	IRQ 4	
Parallel port	Disabled	
	Enabled	
	Auto	
	PnP OS	
Parallel port: Mode	Output only	
	Bi-directional	
	EPP	
	ECP	
Parallel port: Base I/O address	378	
	278	
Parallel port: Interrupt	IRQ 5	
	IRQ 7	
Parallel port: DMA Channel	DMA 1	
	DMA 3	
Floppy Disk Controller	Disabled	
	Enabled	
Floppy Disk Controller: Base I/O address	Primary	
	Secondary	

Configuration

Security Menu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
User Password is	Clear	When you enter a supervisor password, this field automatically changes to Set .
Administrator Password is	Clear	When you enter a user password, this field automatically changes to Set .
Set User Password	Press <Enter>	User password controls access to the system at boot. Password may be from one to seven characters. See Password Menu.
Set Administrative Password	Press <Enter>	Supervisor password controls access to the setup utility. Password may be from one to seven characters. See Password Menu.
Password On Boot	Disabled Enabled	Enabled requires password to boot the system. Password On Boot takes precedence over Secure Mode Boot.
Diskette Access	User Administrator	
Fixed Disk Boot Sector	Normal Write Protect	Write-protects hard disk boot sector to guard against viruses.
System Backup Reminder	Disabled Daily Weekly Monthly	
Virus Check Reminder	Disabled Daily Weekly Monthly	
Secure Mode Timer	Disabled 1 min 2 min 5 min 10 min 20 min 1 hr 2 hr	Select the period of keyboard inactivity before securing the system.
Secure Mode Hot Key	(CTRL-ALT-)	Enter a hot key. Press <CTRL + Alt> + <(hot key)> to place the system in the secure mode.
Secure Mode Boot	Disabled Enabled	Enabled lets the system boot before a password is required. However, the keyboard and mouse remain locked until the user password is entered.
Video Blanking	Disable Enable	
Floppy Write Protect	Disabled Enabled	

Password Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Enter New Password	(password field)	Type a password in this field, and press <Enter> or <Tab>. Press ESC to abort.
Confirm New Password	(confirm password field)	Type a password again, and press <Enter> or <Tab> to accept it. Press ESC to abort.

Server Menu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
System Management	Press <Enter>	See System Management Submenu.
Console Redirection	Press <Enter>	See Console Redirection Submenu.
PCI IRQs to IO-APIC mapping	Disabled Enabled	If enabled, BIOS will describe direct PCI interrupt connections to the IO APIC in MP Table. Do not enable if OS does not support this feature.
Processor Retest	No Yes	Selecting Yes will cause the BIOS to clear the historical processor status and retest all processors on the next boot.

System Management Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
System Management Mode	Disabled Enabled	Loads the embedded Server Management firmware.
System Event Logging	Disabled Enabled	When Enabled, system events will be logged by BIOS and the BMC.
Clear Event Log	No Yes	If set to yes, the event log will be cleared on the next boot.
Memory Scrubbing	Disabled Enabled	
PERR# Reporting	Disabled SMI Only SMI & NMI	
SERR# Reporting	Disabled Enabled	
Server Management Info	Press <Enter>	Displays board and firmware revision information.

Configuration

Console Redirection Submenu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
COM Port Address	Disabled 3F8 2F8 3E8	Uses the specified I/O port for console redirection.
IRQ #	4	Display only.
COM Port Baud Rate	9600 19.2 K 38.4 K 115.2 K	Uses the specified baud rate for console redirection. Cannot be set unless the COM Port Address field is set.
Flow Control	No Flow Control CTS/RTS XON/XOFF CTS/RTS +CD	Uses the specified flow control for console redirection. Cannot be set unless the COM Port Address field is set.

Boot Menu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Floppy check	Disabled Enabled	If Enabled, the system verifies floppy type on boot. Disable results in a faster boot.
Summary screen	Disabled Enabled	Displays system configuration on boot.
Boot Device Priority	Press <Enter>	See Boot Device Priority Submenu.
Hard Drive	Press <Enter>	See Hard Drive Submenu.

Boot Device Priority Submenu

These options may change depending on the system configuration.

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
	1 Diskette Drive	Select a device and use the <+> and <-> keys to move it up or down in the list.
	2 Hard Drive	
	3 ATAPI CD-ROM Drive	
	4 Diagnostic Boot	

Hard Drive Submenu

These options may change depending on the system configuration.

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
	1 Hard Drive	Select a device and use the <+> and <-> keys to move it up or down in the list.
	2 Other Bootable Card	Other bootable cards covers all the boot devices that are not reported to the system BIOS. It may or may not be bootable, and may not correspond to any device.

Exit Menu

<i>Feature</i>	<i>Option</i>	<i>Comments</i>
Exit Saving Changes	Press <Enter>	Saves the Setup data to CMOS, and exits the utility.
Exit Discarding Changes	Press <Enter>	Exits the utility without saving Setup data to CMOS.
Load Setup Defaults	Press <Enter>	Loads and displays the default Setup data.
Load Custom Defaults	Press <Enter>	Loads and displays settings from Custom Defaults.
Save Custom Defaults	Press <Enter>	Save the current settings to Custom Defaults.
Discard Changes	Press <Enter>	Loads the last values saved.
Save Changes	Press <Enter>	Saves the Setup data to CMOS without stopping the utility.

Using the Symbios SCSI Utility

The Symbios SCSI utility detects the SCSI host adapters on the system board. Use the utility to

- ◆ change default values
- ◆ check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

When this message appears on the video monitor:

Press Ctrl-C to run SCSI Utility...

Press <Ctrl+C> to run this utility. When it appears, choose the host adapter that you want to configure.

Hot Keys

Use the keyboard's numeric pad to enter numbers and symbols.

<i>To</i>	<i>Press these keys</i>
Clear memory and reload the operating system (this is a soft boot reset)	<Ctrl+Alt+Del>
Secure the server system immediately.	<CTRL + Alt> + <(hot key)> (Set the hot-key with the SCU)

Installing Video Drivers

After you have configured the system, you can install various video drivers to take full advantage of its onboard, integrated Cirrus Logic CL-GD54M40 super VGA video controller's enhanced features. The system may not operate properly without these video drivers installed.

For the most current information on which video drivers you need, read the README.TXT file on the Display Drivers and DOS Utilities diskette. To install drivers from the diskettes, follow the installation instructions in the README.TXT file.

The video drivers are on the Configuration Software CD. For instructions on creating Video diskettes, see Chapter 2, 'Installation'.

To install these video drivers:

1. Fully configure the system.
 - ◇ This may include adding video DRAM buffer memory, application software, or new ISA or PCI add-in boards
2. Insert disk 1 of the video drivers and utilities for MS-DOS and Windows into drive A.
3. At the DOS command prompt, type **A:install** and press <Enter>.
4. Follow the directions on the monitor to install the video drivers.
 - ◇ If the system does not operate as described in this chapter, follow the instructions in Chapter 11 'Troubleshooting'.

Installing SCSI Drivers

The SCSI drivers are on the Configuration Software CD. For instructions on creating SCSI diskettes, see Chapter 2, 'Installation' To install the SCSI drivers, follow the instructions in the README.TXT file on the first diskette.

4 OPENING UP THE SERVER

This chapter deals with removal and fitting of all of the covers and removable media drives that may be fitted to the server.

Warnings and Cautions

1. Observe the precautions in the Safety and Regulatory Notices, and particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed padlocks on the back of the server, unlock and remove them.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options and any other pertinent information specific to the server. Keep it in a safe place.

You may need this information when running the SCU.

Covers

The server comes with the following removable covers:

- ◆ The left side cover provides access to the system board and fans.
- ◆ The right side cover provides access to the power supplies, power-sharing board, vertical drive bay (floppy), half-height horizontal peripheral bays, and SCSI hot-docking backplanes.
- ◆ The top cover provides access to the front panel board.
 - ◇ You must remove both side covers before you can remove the top cover.
- ◆ The plastic front cover provides access to the front of the chassis and the half-height horizontal peripheral bays. You must remove both side covers and the top cover before you can remove the front cover.
- ◆ The snap-in peripheral bay cover provides access to the half-height peripheral bays without the need to remove other covers.

CAUTION

For proper cooling and airflow, do not operate the server with the covers removed. Always replace them before turning on the server.

Removing a Side Cover

The side covers are **not** interchangeable.

See Figure 4-1

1. Turn off all peripheral devices connected to the system.
2. Remove the three screws from the side cover.
 - ◇ Save them, you will need them later to reattach the cover.
3. Place your fingertips under the built-in handle on the back of the cover.
4. Place the fingertips of your other hand under the bottom of the cover, just behind the front system foot.
5. Using an even pull at both points, slide the cover backwards a short distance, until it stops.
6. Now pull the back end of the cover toward you to disengage its tabs from the slots in the chassis. Lift it clear and set it aside.
 - ◇ Be careful when placing the cover, the internal fixing hooks could scratch delicate surfaces.

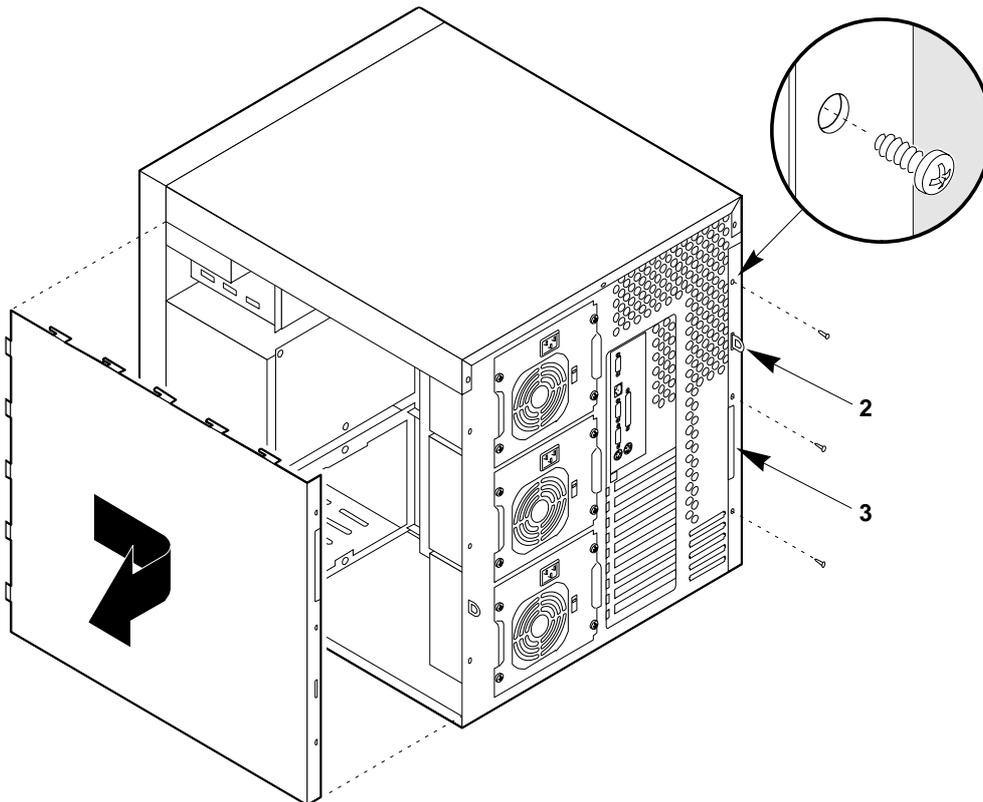


Figure 4-1. Side Covers

- | | |
|---|--------------------------|
| 1 | Retaining screw |
| 2 | Metal loop (for padlock) |
| 3 | Built-in handle |

Replacing a Side Cover

The side covers must be installed on the side of the server they were removed from.

See Figure 4-1.

1. Before replacing the side cover, make sure you did not leave any tools or loose parts inside the chassis and that the top cover is present.
2. Ensure that add-in boards are firmly seated in their respective slots, retaining brackets are firmly secured with screws tightened and interior cables are properly connected.
3. Position the side cover over the chassis so that the metal tabs across the top and bottom edges of the cover align with the slots in the top cover and bottom edge of the chassis.
4. Slide the cover toward the front of the server so that the tabs along the front edge of the cover firmly engage in the front slots of the chassis.

CAUTION

When you replace the side cover, be careful not to damage the small EMI gaskets mounted on the cover.

5. Attach the cover to the chassis with the three screws you removed earlier, and tighten them firmly (do not over-tighten as it may strip the threads).
6. For security, and to prevent unauthorised entry into the server system, insert a padlock through the metal loop protruding through the slot in the back of the side cover and lock it.
7. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.

Removing the Top Cover

See Figure 4-2.

1. Remove both side covers and put them to one side; see previous section.
2. Remove the three screws from the top cover.
 - ◇ Set them aside, you will need them later to reattach the cover.
3. While facing the back of the server, lift the back end of the top cover up about 15°.
4. Using an even pull, slide the cover backwards until the tabs along the front of the cover disengage from the slots in the chassis. Lift it clear and set it aside.
 - ◇ Be careful when placing the cover, the internal fixing hooks could scratch delicate surfaces.

Opening up the server

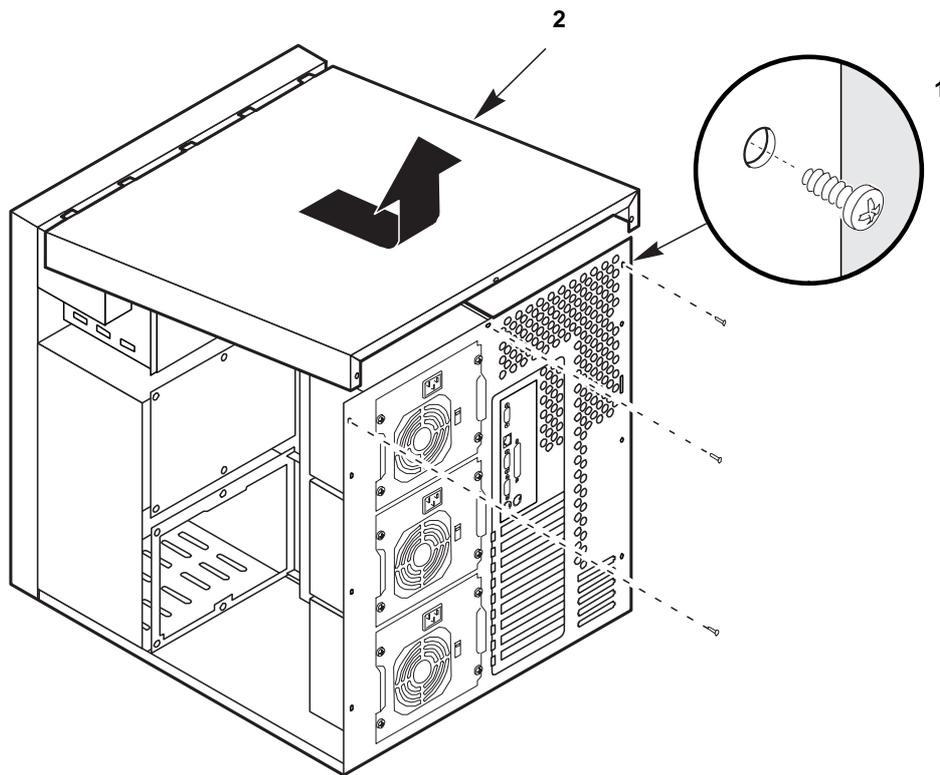


Figure 4-2. Top Cover

- | | |
|---|-----------|
| 1 | Screw |
| 2 | Top cover |

Replacing the Top Cover

See Figure 4-2

1. Before replacing the top cover, make sure you did not leave any tools or loose parts inside the chassis.
2. Ensure that interior cables are properly connected.
3. While facing the back of the server, position the top cover over the chassis so that the tabs along the front of the cover align with the slots in the top edge of the chassis.
4. Slide the cover toward the front of the server so that the tabs firmly engage in the slots in the chassis.
5. Attach the cover to the chassis with the three screws you removed earlier, and tighten them firmly (do not over-tighten as it may strip the threads).
6. Replace both side covers. For security, and to prevent unauthorised entry into the server system, insert a padlock through the metal loop protruding through the slot in the back of the side cover and lock it.
7. Connect all signal cables and power cable(s) to the system.
 - ◇ Some systems have more than one power cable.

Removing the Front Bezel

See Figure 4-3.

1. Remove both side covers and the top cover. See the previous sections.
2. Remove the two screws from the front bezel.
 - ◇ Save them, you will need them later to reattach the bezel.
3. Unsnap the front bezel from the server chassis, and place it on a smooth surface so that it doesn't get scratched.

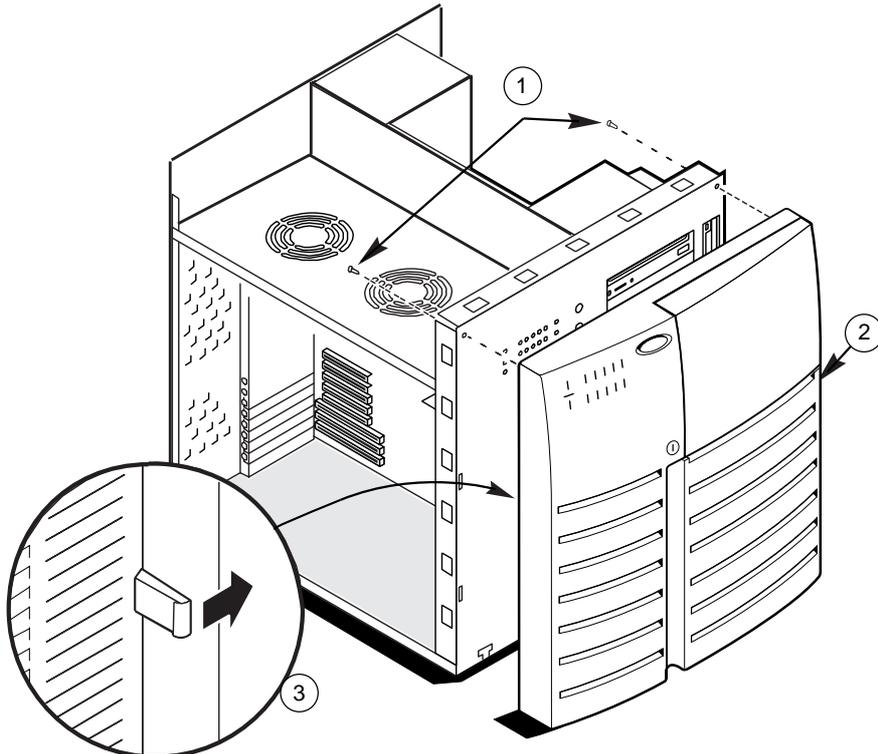


Figure 4-3. Front Bezel

- | | | | |
|---|-------------|---|-------------|
| 1 | Screws | 3 | Plastic tab |
| 2 | Front bezel | | |

Replacing the Front Bezel

See Figure 4-3.

1. Insert the T-shaped tabs on the bottom front bezel into the T-shaped notches along bottom of the chassis. Then gently press the cover onto the chassis until all tabs snap into place.
2. Attach the front bezel to the chassis with the two screws you removed earlier, and tighten them firmly (do not over-tighten as it may strip the threads).
3. Replace the top cover and both side covers. For security, and to prevent unauthorised entry into the server system, insert a padlock through the metal loop protruding through the slot in the back of the side cover and lock it.
4. Connect all external cables and power cable(s) to the system.
 - ◇ Some systems have more than one power cable.

Removing the Snap-in Plastic Peripheral Bay Cover

See Figure 4-4.

1. Remove the right side cover (when viewed from the front of the server) as previously described.
2. To remove the snap-in plastic peripheral bay cover, push up on the bottom flexible tab below the floppy diskette drive. Then push the tab toward the front of the server until you can grasp the lower right corner of the cover.

CAUTION

Do not try to remove the snap-in peripheral bay cover by inserting a screwdriver or other tool in the notch on the left side of the cover.

3. Pull the lower right corner of the cover toward you with an upward twisting motion to disengage the top flexible tab.
4. Remove the snap-in peripheral bay cover from the system, and place it on a flat surface.

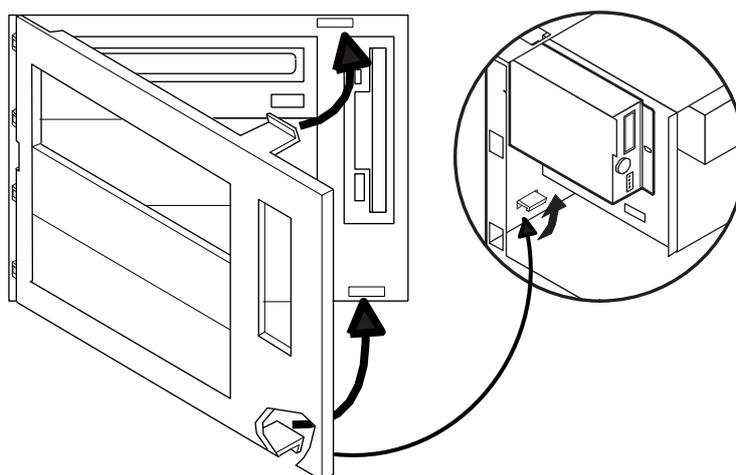


Figure 4-4. Snap-in Plastic Peripheral Bay Cover

Replacing the Snap-in Plastic Peripheral Bay Cover

See Figure 4-4.

1. Insert the rigid tabs on the plastic snap-in peripheral bay cover into the notches along the inside edge of the plastic front panel.
2. Push the top right corner of the cover toward the chassis with an inward twisting motion to insert the top flexible tab in the slot above the floppy diskette drive.
3. Gently press on the cover until both the top and bottom flexible tabs snap into place.
4. Replace the right side cover previously removed.
5. Connect all signal cables and power cable(s) to the system.
 - ◇ Some systems have more than one power cable.

Diskette Drive

The server comes with a floppy diskette drive installed in the vertical peripheral bay.

Contact your Apricot supplier for approved add-in peripheral devices.

Removing the Diskette Drive

See Figures 4-5 and 4-6.

1. Remove the right side cover as previously described.
2. Disconnect the power and signal cables from the diskette drive.
3. Remove the screw that secures the drive and carrier assembly to the chassis, and set it aside.
4. Slide the assembly toward the top power supply to disengage the tabs from the slots in the chassis wall.
5. Remove the assembly from the chassis, and place it component-side up on an antistatic surface.

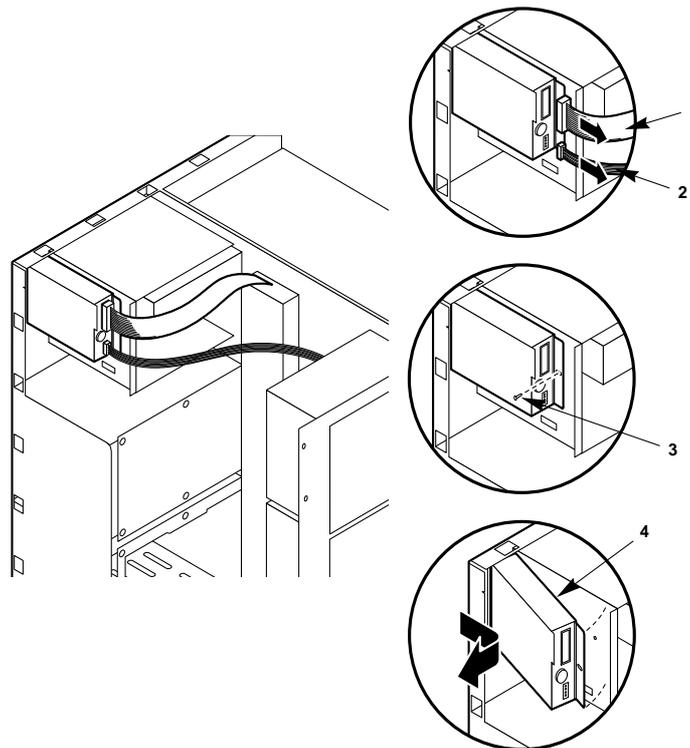


Figure 4-5. Removing the Diskette Drive

- | | |
|---|----------------------------|
| 1 | Signal cable |
| 2 | Power cable |
| 3 | Screw |
| 4 | Drive and carrier assembly |
6. Remove the four screws, and set them and the drive carrier aside. See Figure 4-6
 7. Place the drive in an antistatic protective wrapper.
 8. Replace the right side cover as previously described.

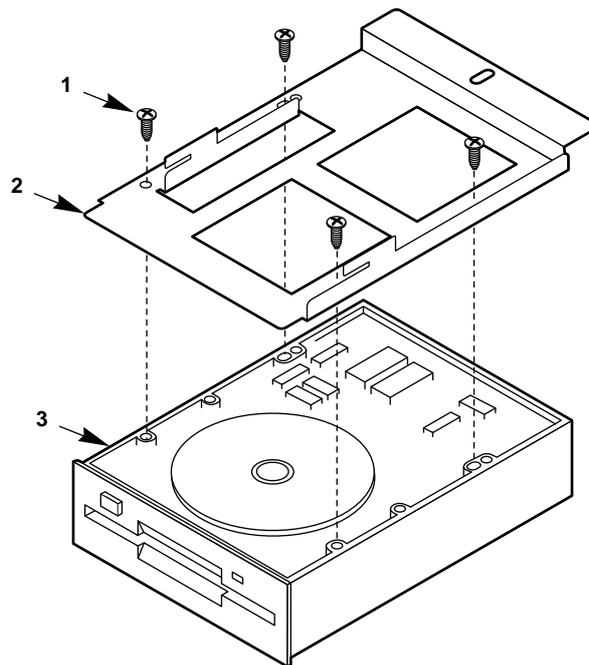


Figure 4-6. Diskette Drive and Carrier Assembly

- | | |
|---|----------------|
| 1 | Screw |
| 2 | Carrier |
| 3 | Diskette drive |

Installing a Diskette Drive

See Figures 4-5 and 4-6.

1. Remove the floppy diskette drive from its protective wrapper, and place it component-side up on an antistatic surface.
2. Record the model and serial numbers of the drive in your equipment log.
3. Set any jumpers or switches according to the drive manufacturer's instructions.
4. Place the drive carrier on the component-side of the drive, and align the four mounting holes.
5. Attach the carrier to the drive with four screws of the appropriate size and length (not supplied), and tighten the screws firmly (do not over-tighten as it may strip the threads).
6. Position the drive and carrier assembly over the slots in the chassis wall, and slide the assembly toward the front of the system to engage its tabs in the slots.
7. Secure the drive and carrier assembly to the chassis wall with the screw you removed earlier; tighten the screw firmly (do not over-tighten as it may strip the threads).
8. Connect the signal and power cables to the diskette drive. The red stripe on the signal cable must face toward the centre of the drive.
9. Replace the right side cover as previously described.
10. Run the SCU to specify that the diskette drive is installed in the server. For information about running this utility, see Chapter 3, 'Configuration'.

CD-ROM Drive

The server comes with a CD-ROM drive installed in the top half-height peripheral bay. The drive connects to the motherboard IDE interface via a ribbon cable.

Contact your Apricot supplier for approved add-in peripheral devices.

Removing a CD-ROM Drive

See Figures 4-7, 4-8, 4-9 and 4-10.

1. Remove both side covers and the top cover, and set them aside. As described at the beginning of this chapter.
2. Remove the snap-in plastic peripheral bay cover as described on page 4/5, and place it on a smooth surface so that it doesn't get scratched.
3. Disconnect the power cable and the signal cable from the drive.
4. While squeezing the protruding plastic snap-in rails attached to the drive toward each other, carefully slide the drive forward out of the bay, and place it on an antistatic surface.

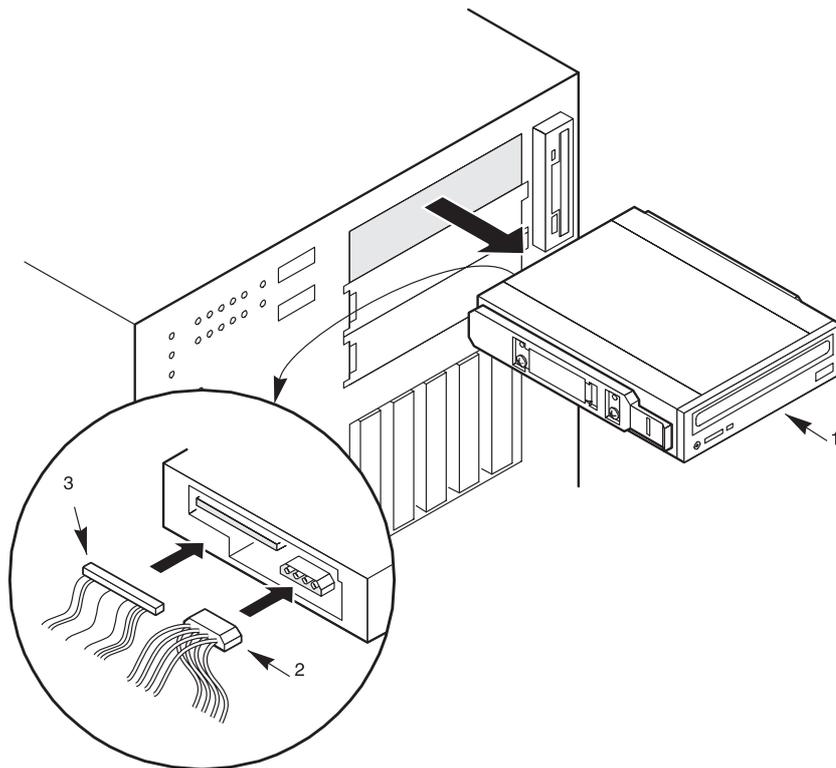


Figure 4-7. Removing the CD-ROM Drive (Bezel not shown for clarity)

- 1 Drive with plastic slide rails attached
 - 2 Power cable
 - 3 IDE signal cable
5. Remove and save the four screws and the two snap-in slide rails from the drive.
 6. If you intend to leave the bay empty, install a filler panel on the snap-in plastic peripheral bay cover (Figure 4-9) and a stainless steel EMI shield (Figure 4-10) on the bay for proper cooling and airflow.

Opening up the server

7. Replace the snap-in plastic peripheral bay cover, the top cover, and both side covers.

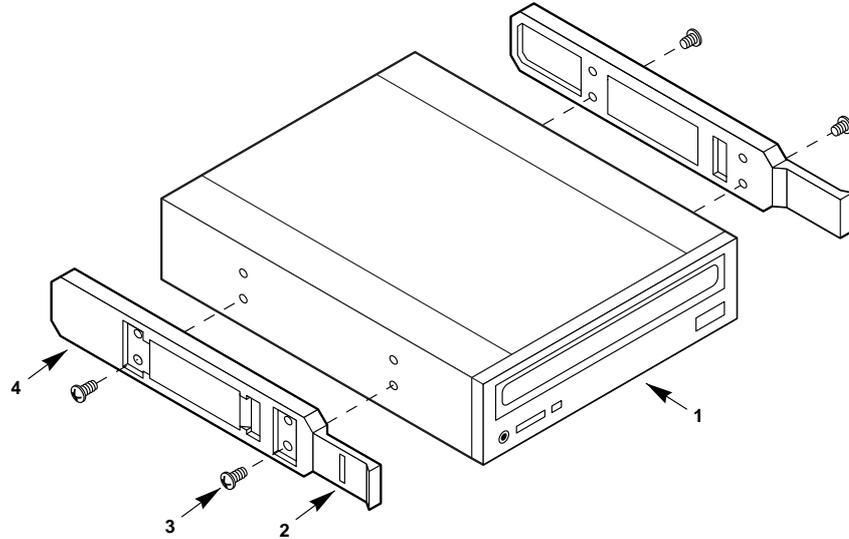


Figure 4-8. Snap-in Plastic Slide Rails

- | | |
|---|--------------|
| 1 | CD-ROM drive |
| 2 | Tab |
| 3 | Screw |
| 4 | Slide rail |

Installing a CD-ROM Drive

See Figures 4-7, 4-8, 4-9 and 4-10.

1. Remove both side covers and the top cover; see 'Covers' at the beginning of this chapter.
2. If you are installing an additional CD-ROM drive in your server, continue with step 4. If not, go to step 7.
3. Remove the snap-in plastic peripheral bay cover as described on page 4/6, and place it on a smooth surface so that it doesn't get scratched.
4. Remove the screws and filler panel (Figure 4-9), set them aside.
5. Push the tab on the left side of the EMI metal shield (Figure 4-10) to the right to disengage it from the chassis. Save the shield.
6. Remove the CD-ROM drive from its packaging and place it on an antistatic surface.
7. Record the model and serial numbers of the CD-ROM drive in your equipment log.
8. Set any jumpers and/or switches on the CD-ROM drive according to the manufacturer's instructions.
9. Using two screws of the appropriate size and length (not supplied), attach each plastic slide rail (Figure 4-8) to the CD-ROM drive.
10. Position the CD-ROM drive so that the plastic slide rails engage in the bay guide rails (Figure 4-7). Push the drive into the bay until the slide rails lock in place.
11. Connect the IDE cable and the power cable to the CD-ROM drive.
12. Replace the snap-in plastic peripheral bay cover, the top cover, and both side covers.

Other Mass Storage Devices

The two half-height bays below the CD-ROM drive provide space for tape backup or other removable media devices. They may be either SCSI devices or IDE devices.

To install devices in the half-height bays, you must remove the plastic filler panels and stainless steel EMI shields that cover the bays.

If you install a SCSI device in one of these bays, you will need to install a SCSI controller for it in one of the motherboard expansion slots.

Contact your Apricot supplier for approved add-in peripheral devices.

Installing a Mass Storage Device

See Figures 4-9, 4-10, 4-11 and 4-12.

1. Remove both side covers and the top cover; see 'Covers' at the beginning of this chapter.
2. Remove the snap-in plastic peripheral bay cover as described on page 4/6, and place it on a smooth surface so that it doesn't get scratched.
3. Remove the screws and filler panel, and set them aside.

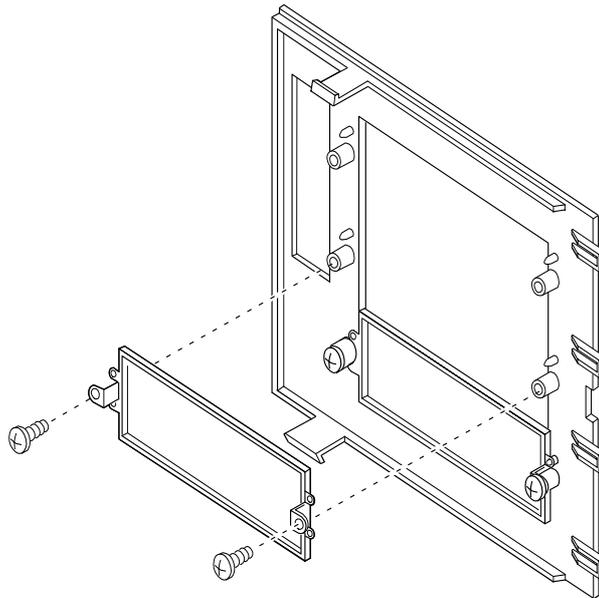


Figure 4-9. Filler Panels

4. Push the tab on the left side of the EMI metal shield to the right to disengage it from the chassis. Save the shield for refitting if you later remove device.
5. Remove the device from its packaging, and place it on an antistatic surface.
6. Record the model and serial numbers of the device in your equipment log.
7. Set any jumpers and/or switches on the device according to the manufacturer's instructions.
 - ◇ Each SCSI device must have a unique SCSI ID. If necessary, use the configuration jumpers on the back of the device to change the SCSI ID.

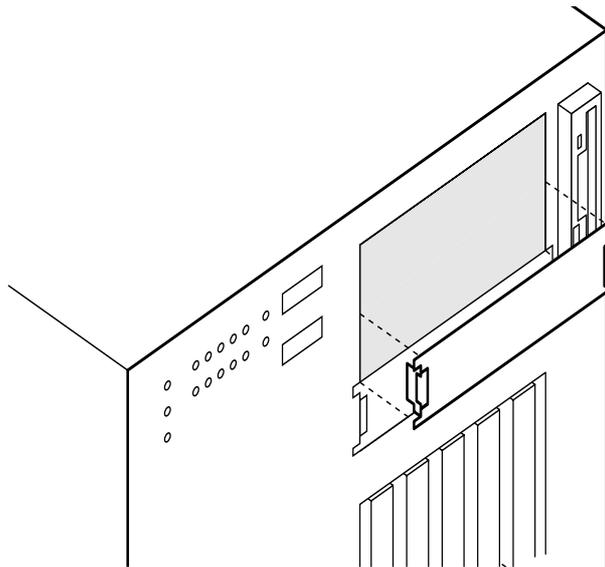


Figure 4-10. Removing the EMI Shield (Bezel not shown for clarity)

8. Using two screws of the appropriate size and length (not supplied), attach each plastic slide rail to the device.

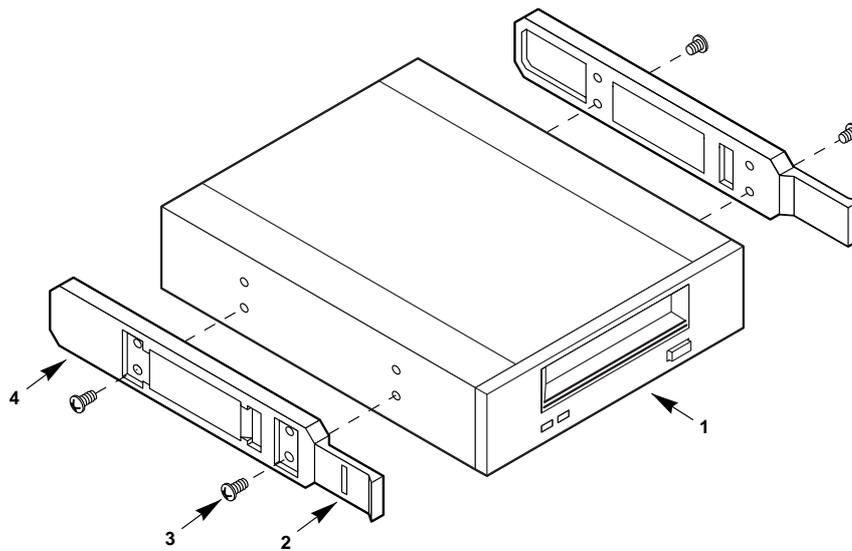


Figure 4-11. Snap-in Plastic Slide Rails

- 1 Tape drive or other device
- 2 Tab
- 3 Screw
- 4 Slide rail

9. Position the device so that the plastic slide rails on each side of it engage in the bay guide rails. Push the device into the bay until the slide rails lock in place.
10. Connect the appropriate signal cable and power cable to the drive.

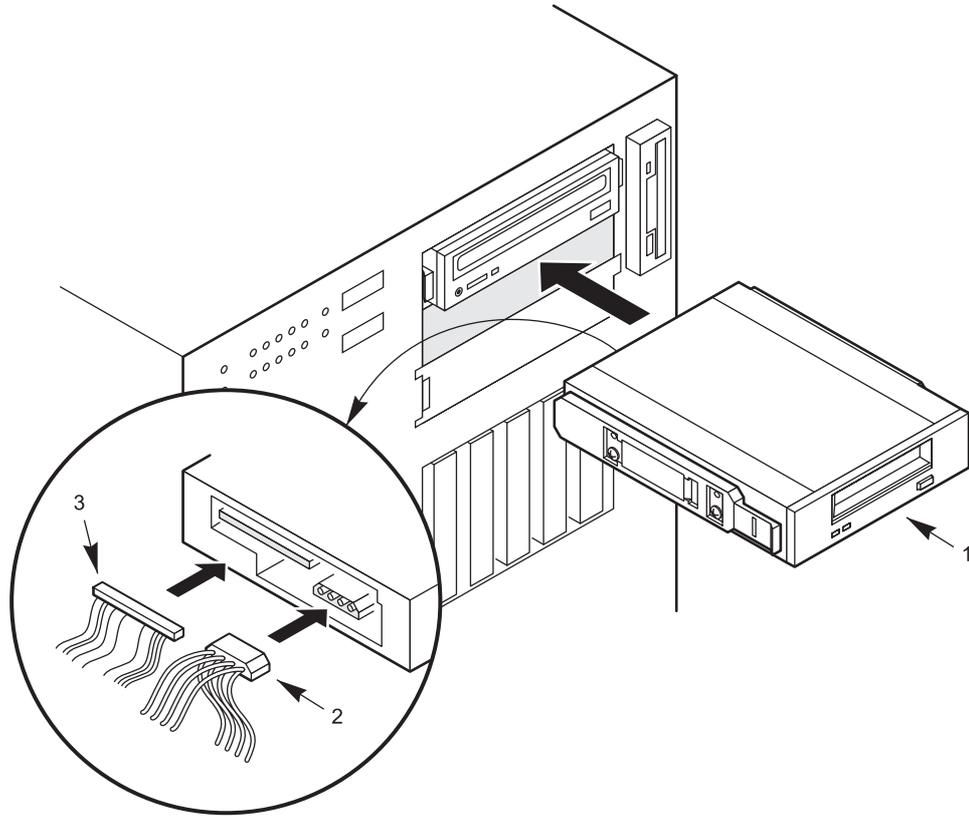


Figure 4-12. Installing a Mass Storage Device (Bezel not shown for clarity)

- 1 Tape drive or other device
 - 2 Power cable
 - 3 Signal cable
11. Replace the snap-in plastic peripheral bay cover, top cover, and both side covers.
 12. Make a note in the system log, Appendix 'B', of the details of the device installed, then run the SCU to reconfigure the system. For information about running this utility, see Chapter 3, 'Configuration'.

Removing a Mass Storage Device

See Figures 4-9, 4-10, 4-11, and 4-12.

1. Remove both side covers and the top cover; see 'Covers' at the beginning of this chapter.
2. Remove the snap-in plastic peripheral bay cover as described on page 4/6, and place it on a smooth surface so that it doesn't get scratched.
3. Disconnect the power cable and the signal cable from the drive.

Opening up the server

4. While squeezing the protruding plastic snap-in rails attached to the drive toward each other, carefully slide the drive forward out of the bay, and place it on an antistatic surface.
5. Remove and save the four screws and the two snap-in slide rails from the device.
 - ◇ Keep them in a safe place, you will need them to refit any drive into the same space.
6. If you intend to leave the bay empty, install a stainless steel EMI shield on the bay and a filler panel on the snap-in plastic peripheral bay cover for proper cooling and airflow.
7. Replace the snap-in plastic peripheral bay cover.
8. Replace the top cover and both side covers.
9. If you leave the bay empty, run the SCU to reconfigure the system. For information about running this utility, see Chapter 3, 'Configuration'.

5 SERVER POWER

Power System Configurations

The server contains a modular power system that may be configured with one, two, or three 360 watt power supplies.

<i>Configuration level</i>	<i>Redundancy</i>	<i>Number of supplies</i>
Entry	Nonredundant	1
Entry	Redundant	2
Maximum	Nonredundant	2
Maximum	Redundant	3

An entry level power system typically limits the server configuration to dual processors, 1 GB memory, five hard drives, and total power dissipated. A maximum level power system provides power for fully configured servers.

Each power supply has a built-in fan and its own power cord. For servers with redundant power systems, the loss of a single power supply will not affect the operation of the server.

<i>Power System Voltages</i>	<i>+3.3V</i>	<i>+5V</i>	<i>+12V</i>	<i>-5V</i>	<i>-12V</i>
One power supply, entry level nonredundant (Total combined output power of +3.3 V and +5 V should not exceed 178W)	13 A	32 A	15.5A	0.25 A	0.5 A
Two power supplies, entry level redundant	13 A*	30 A	13.5A	0.25A	0.5 A
Two power supplies, maximum level nonredundant	18 A**	46A	29A	0.5A	1.0 A
Three power supplies, maximum level redundant	18 A**	46 A	29 A	0.5 A	1.0 A

* No more than 5A to be used by PCI slots.

** No more than 10A to be used by PCI slots.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices, and particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed a padlock on the back of the server, unlock the padlock and remove it.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options, and any other pertinent information specific to the server. Keep it in a safe place.

You will need this information when running the SCU.

Power Supply, removal and replacement

See Figure 5-1

If a single power supply fails in a system with a power share board, the yellow power supply failure LED on the front panel starts flashing. At the rear of the server, each individual power supply has two LEDs that provide basic information as to the cause:

Indication of;	Top LED - 'I'	Lower LED - 'PS'
Power supply working	ON	ON
Power supply failed	OFF	OFF
Current limit trip	OFF	ON

1. Unplug the AC power cable(s) from each power supply or wall outlet.
 - ◇ In any redundant power supply configuration, a failed power supply can generally be replaced while the system is running, i.e. Hot swap.
2. Remove the screws that attach the power supply to the server chassis, and set them aside.
3. Slide the defective power supply out the back of the server.

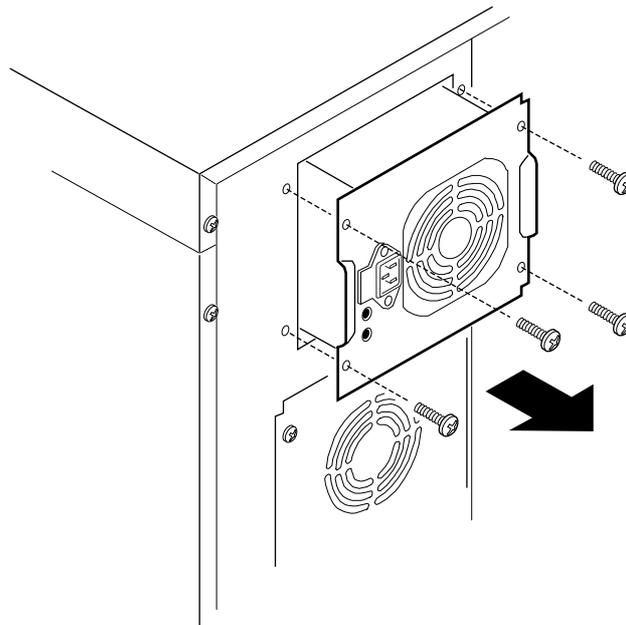


Figure 5-1 Removing a Power Supply

Replacing a Power Supply

See Figure 5-1

1. Slide the power supply in through the back of the server.
2. Attach the power supply to the server chassis with the four screws you saved. Tighten them firmly (do not over-tighten as it may strip the threads).
 - ◇ In a redundant power supply system, check that the power alarm has cleared.
 - ◇ In a non-redundant power supply system, connect the AC power cable and switch on the power.

Power Share Backplane

The power share backplane distributes the power load of the server among two or three power supplies. The backplane is mounted on two snap-on stand-offs and six threaded stand-offs on the centre wall inside the chassis.

WARNING

Hazardous voltage, current, and energy levels are present inside the power share backplane. There are no user serviceable parts inside it; servicing should only be done by technically qualified personnel.

Removing the Power Share Backplane

See Figures 5-2 and 5-3

1. Shut down the operating system, power down the server and unplug all of the AC power cables from each power supply or wall outlet.
2. Remove the right side cover. See chapter 4, 'Opening up the server'.
3. Label and disconnect the power and signal cables from the power share backplane.
4. If present, disconnect the auxiliary fan connector from the SCSI hot-docking backplane, and remove the fan cable from the cable clip on the power share backplane.
5. Remove all the fitted power supplies as previously detailed.
6. Remove the screws that attach the backplane to the threaded stand-offs on the inside chassis wall, and set them aside.
7. Pull the backplane carefully toward you to free it from the snap-on stand-offs.
8. Remove the backplane from the server, and set it aside.

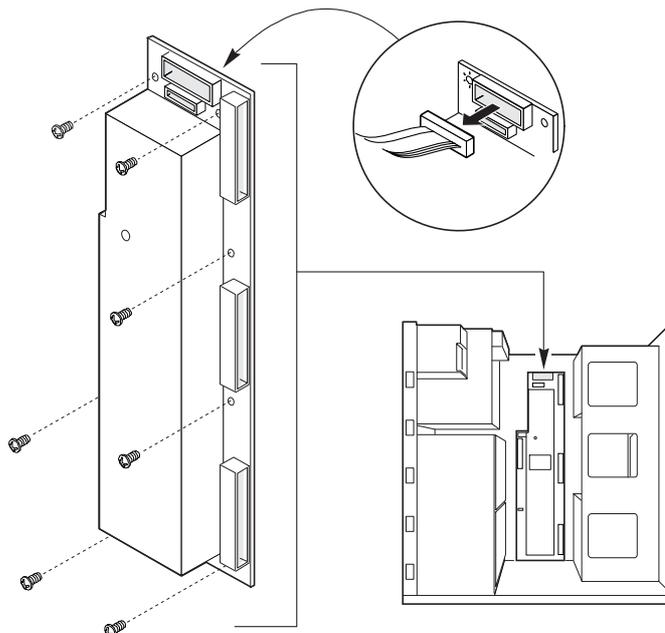


Figure 5-2 Removing the Power Share Backplane

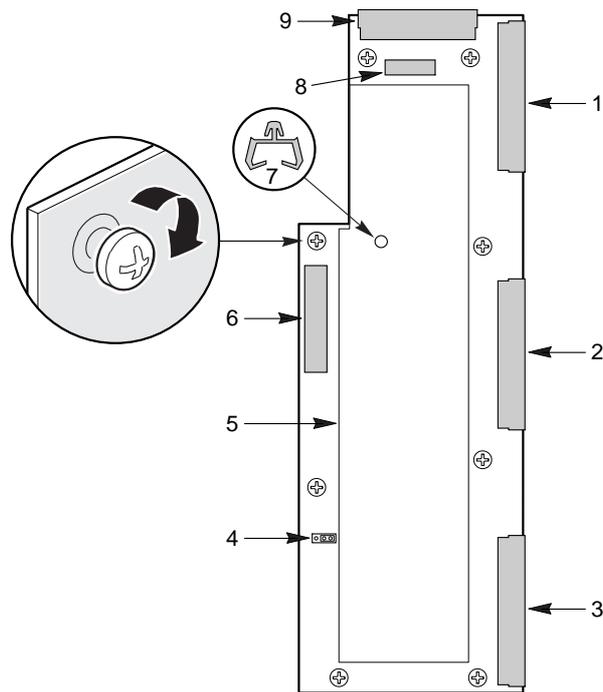


Figure 5-3 Power Share Backplane Connectors

- | | | | |
|---|--------------------------------------|---|------------------------------|
| 1 | Top power supply connector | 6 | Output to system peripherals |
| 2 | Centre power supply connector | 7 | PSU fan cable support clip |
| 3 | lower power supply connector | 8 | Aux power out to motherboard |
| 4 | Factory configured jumper (reserved) | 9 | Main output to motherboard |
| 5 | Non removable screen/cover | | |

Replacing the Power Share Backplane

See Figures 5-2 and 5-3

1. Remove the right side cover. See chapter 4, 'Opening up the server'.
2. Position the mounting holes in the power share backplane over the snap-on stand-offs and threaded stand-offs on the inside chassis wall.
3. While applying pressure at the snap-on stand-off locations, push the backplane toward the chassis wall until it snaps onto the snap-on stand-offs.
4. Insert the screws through the mounting holes in the backplane and into the threaded stand-offs on the inside chassis wall; tighten the screws firmly (do not over-tighten as it may strip the threads).
5. Connect the power and signal cables to the power share backplane.
6. If present, connect the auxiliary fan connector to the SCSI hot-docking backplane, and insert the fan cable in the cable clip on the power share backplane (shown in figure 5-4).
7. Return the power supplies to their original positions.
8. Replace the side cover. See chapter 4, 'Opening up the server'.
9. Connect all signal cables and power cables(s) to the system and switch on the power.

Installing a second Power Supply

If the power supply being installed is a **second** module you will need to fit a Power Share Backplane to the system. The kit of parts for this is supplied with complete fitting and installation instructions.

The existing first power supply will reconnect to this backplane and the accompanying power harness/wiring needs to be replaced for correct 'redundant' operation.

See Figure 5-1.

These instructions assume the presence of the Power Share Backplane.

1. If there is only a single power supply fitted: Unplug the AC power cable from the power supply.
2. If your server contains only the *top* power supply, remove the screws from the blank metal plate, below the fan assembly, on the back of the chassis.
 - ◇ Save the screws, and discard the metal plate.
3. If your server contains top *and* bottom power supplies, take off the side cover as detailed in chapter 4 and remove the fan that is mounted between the top and bottom power supplies. See chapter 10 'System Fans' for information.
4. Slide the power supply through the opening in the back of the server chassis.
5. Attach the power supply mounting plate to the back of the server chassis with the four screws you saved. Tighten the screws firmly (do not over-tighten as it may strip the threads).
6. Replace the side cover, connect up the AC power cables and restart the system.

If you have removed the fan from between the top and bottom power supplies, you will need to reconfigure the system to disable the fan sensor. See Chapter 3 'Configuration'.

Power System Control Signals

Power Enable/Disable (PON)

The PON control signal originates on the system board, and it is routed through the power share backplane microcontroller. If the +5 V and +12 V power going to the system board or the peripherals exceeds 240 VA, the backplane microcontroller will disassert the PON control going to each power supply (J4, J6, and J9). This signal is used to enable and disable the power supplies.

Remote Sense Connections

Individual remote sense outputs are provided to each +5 V and +3.3 V power supply sections. Remote voltage sense for +5 V and +3.3 V is done on the system board. The +5 V and +3.3 V remote sense lines are routed through the power share backplane and connect to the current sense circuitry.

The +12 V is not sensed remotely. Instead, it is sensed on the power share backplane.

Load Share Connection

In servers with two or three power supplies, the +5 V, +3.3 V, and +12 V outputs from each power supply are routed through the power share backplane.

The current from each power supply output is monitored with a current monitoring circuit. This current's value is used to adjust the load share of each power supply output.

Output Power Connections

The +12 V, +5 V, and +3.3 V output power is routed through J1 to the system board power connector. In addition, the +12 V and +5 V output power is also routed through J5 to the peripheral power connector.

The -12 V, -5 V, and +5 V standby outputs are joined together through an isolation circuit and connected to the system board through connector J1.

Power Good Circuit

The power good circuit looks at the levels of the power good (PGOOD) signals. When a PGOOD signal is sensed by the backplane PGOOD circuit, a system PGOOD is asserted after an approximately 550 ms delay. Only a single PGOOD signal assertion is required to cause the assertion of the system PGOOD.

240 VA Monitor Circuit

The total supply current that forms part of the load sharing circuit monitors +3.3 V as well as +5 V and +12 V on the system board. The microcontroller determines the current supplied to the system board by subtracting the peripheral current from the total current.

If either the system board power or peripheral power exceeds 240 VA, the backplane microcontroller disables the supply outputs by disasserting PON. The following table shows the maximum available current to each of the system connections. Resetting the circuit requires unplugging all of the power supplies.

Connectors	+5 V	+12 V
J1	44 A (+4 A)	16 A (+4 A)
J5	44 A (+4 A)	16 A (+4 A)

The maximum current number shown is the sum of the currents from all supplies.

I²C Communication Circuit

The power share backplane microcontroller communicates with a similar device on the system board through an I²C data link. This link reports the number of power supplies in the server, current and power to the system board and peripherals, and power supply status. The I²C signals are routed through J2 to the system board.

System Current Monitor

The system current monitor on the power share backplane sends a power usage report to the server via the I²C communications bus. The backplane microcontroller contains analogue-to-digital converters that monitors DC voltage levels supplied by the current sense circuits. They represent the current load on the +3.3 V output from the system board and the +5 V and +12 V load at both the system board and the peripheral bays.

If either the +5 V or +12 V load from the system board or the peripherals goes beyond the limit of 240 VA, the power is shut off immediately by deasserting PON. It is impossible to draw 240 VA from the 3.3 Volt power supply output even when three supplies are installed in the server. The following table shows the maximum current allowed by each voltage output for a server with three 360 watt power supplies.

Voltage	Maximum Current in Amperes	240 VA Limit
+3.3 V	33 A	N/A
+5 V	96 A	48 A
+12 V	36 A (or 48 A for 12 ns maximum)	20 A

A voltage level within the range of 0 to 5 V is supplied by the current sense circuits on the power share backplane. The current limit threshold is set to 44 A (± 4 A) for each +5 V channel and 16 A (+4 A) for each +12 V channel.

Power Supply FAULT

Each power supply provides a power good (PGOOD) signal that is asserted high. In the event of a power supply failure, the PGOOD signal goes low. The power supply outputs are enabled through assertion of the PON signal. If the PGOOD signal goes low, indicating a power bad condition while PON is asserted, a FAULT is generated and applied to one of the FAULT inputs of the backplane microcontroller.

Power Supply Presence DETECT

The DETECT signal senses the number of power supplies (operational or not) in the server. Each power supply presents a grounding connection to one of the backplane microcontroller input pins to show that a power supply is present. If a power supply is not present, the backplane microcontroller input pin will be pulled high through a pull-up resistor to +5 V standby.

Power Supply Output Voltages

The table below lists the total watts available for each voltage. Adjust your loads so that the combined total wattage for your server configuration is less than:

- ◆ 360 watts for an entry level non-redundant power system
- ◆ 318.5 watts for an entry level redundant power system
- ◆ 649 watts for a maximum level power system

<i>Voltage</i>	<i>Maximum Continuous Current</i>	<i>Minimum Load Current</i>	<i>Peak Current</i>	<i>Watts</i>
+3.3 V	13.0 A	0.5 A		39 W
+5.0 V	30.0 A	5.0 A		150.0 W
-5.0 V	0.25 A			1.25 W
5V Standby	0.1 A			
+12.0 V	15.5 A	2.5 A	16.0 A	186.0 W
-12.0 V	0.5 A			6.0 W

Server Current Usage

As an overall current usage limitation on the power supply, do not exceed its maximum output capacity of 32 amps at +5 volts (160 watts) and 11 amps at +3.3 volts (36.3 watts). The combined power output for the +5 and +3.3 volt outputs should not exceed 178 watts.

The maximum current allowed at +5 volts for each PCI and ISA slot on the system board is 2 amps (10 watts).

The cooling efficiency varies per slot; therefore, ensure that adequate cooling is available in the target slot, especially in an expansion slot drawing more than 2.0 amps.

Server power

Device	Current (maximum) at voltage levels:			
	+5 V	+3.3 V	+12 V	-12 V
System board (includes first processor)	1.8 A	3.0 A	5.5 A	0.05 A
Second processor	10A			
RPX board	3.0A		3.6 A	
Server monitor module	0.5A		0.8A	
Floppy diskette drive	0.3A			
SCSI hard disk drive (4 GB)	0.8A		0.8A	
SCSI tape drive (typical)	0.3A		2.0A	
CD-ROM drive (Typical)	0.4A		1.0A	
ISA bus slot	2.0A			
PCI bus slot	2.0A	2.0A		
Cooling blower 1, 97 mm			0.43 A	
Cooling blower 2, 97 mm			0.43 A	
Cooling fan 3, 92 mm			0.43 A	
Cooling fan 4, 92 mm			0.43 A	
Cooling fan 5, 92 mm			0.43 A	
SCSI hot-docking backplane	1.0A			

Calculating Power Usage

Use the worksheets in **Tables 5-1** and **5-2** to calculate the total DC power used by your system configuration. Some typical figures are shown. Where devices are not fitted the figure should not be included in the total.

NOTE

The figures given for some of the peripheral devices, such as drives are approximations and should be checked against the devices actually fitted.

The documentation that comes with each add-in board and peripheral device should specify its current and voltage requirements.

To calculate the total combined wattage for your system:

1. List the current for each board and device in the appropriate voltage level column in **Table 5-1**
2. Add the currents in each column of **Table 5-1**, and enter the total current for each column in **Table 5-2**.
3. Multiply the voltage by the total current to get the total wattage for each individual voltage level.
4. Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

NOTE

The total combined wattage for your system configuration must be less than 360 watts.

Table 5-1. Worksheet for Calculating DC Power Usage

<i>Device</i>	<i>Current (maximum) at voltage levels:</i>				
	<i>+3.3 V</i>	<i>+5 V</i>	<i>-5 V</i>	<i>+12 V</i>	<i>-12 V</i>
System board	3.0 A	1.8 A		0.1 A	0.1 A
Second processor		10 A			
RPX board		3.0 A			
Floppy diskette drive		0.3 A			
CD-ROM drive (typical)		0.4 A		1.0 A	
Cooling fan 1, 92 mm				0.43 A	
Cooling fan 2, 92 mm				0.43 A	
Cooling fan 3, 92 mm				0.43 A	
Cooling fan 4, 92 mm				0.43 A	
Cooling fan 5, 92 mm				0.43 A	
PCI-P slot 1					
PCI-P slot 2					
PCI-P slot 3					
PCI-S slot 1					
PCI-S slot 2					
PCI-S slot 3					
PCI-S slot 4					
ISA slot 1					
ISA slot 2					
ISA slot 3					
First SCSI hard disk drive (typical)		0.8A		0.8A	
Second SCSI hard disk drive					
Third SCSI hard disk drive					
Fourth SCSI hard disk drive					
Fifth SCSI hard disk drive					
Sixth SCSI hard disk drive					
Seventh SCSI hard disk drive					
Eighth SCSI hard disk drive					
Ninth SCSI hard disk drive					
Tenth SCSI hard disk drive					

Server power

<i>Device</i>	<i>Current (maximum) at voltage levels:</i>				
	<i>+3.3 V</i>	<i>+5 V</i>	<i>-5 V</i>	<i>+12 V</i>	<i>-12 V</i>
SCSI tape drive					
Total current					

Table 5-2. Total Combined Power Used by Your System

<i>Voltage Level and Total Current (V x A = W)</i>	<i>Total Watts for Each Voltage Level</i>
(+3.3 V) x (_____ A)	_____ W
(+5 V) x (_____ A)	_____ W
(-5 V) x (_____ A)	_____ W
(+12 V) x (_____ A)	_____ W
(-12 V) x (_____ A)	_____ W
Total Combined Wattage	_____ W

6 SCSI HARD DISK SUB-SYSTEM

This chapter provides information about the SCSI hard disks, the hot-swapping and the backplane used to provide this facility. The upper and lower hot-docking bays, when fully configured, provide over 90 GB of hard disk drive expansion.

The basic configuration is a single backplane which fits behind the top hard drive bays and can accommodate up to five hard disks. The second drive bay can accommodate another five hard disks, but this means fitting a second backplane.

The procedure for fitting a second backplane is similar to the first.

WARNING

Use of non-conforming or untested components may invalidate your system's compliance with EMC and other legislation. Damage caused by fitting of such components will not be covered by your warranty.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices, particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
 - ◇ This, plus steps 3 and 4, will not be necessary if a hard disk is to be hot-swapped or installed in a hot-docking drive bay.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed a padlock on the back of the server, unlock the padlock and remove it.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options, and any other pertinent information specific to the server. Keep it in a safe place.

You may need this information when running the SCU.

SCSI Hot-docking Backplane

The hot-docking backplane provides the following:

- ◆ Five SCA connectors for SCA-compatible SCSI drives
- ◆ Power control for each drive, including automatic slot power down upon removing a drive
- ◆ Signal for a fault indicator (LED) on the front panel for each drive
- ◆ Internal I²C bus
- ◆ +12 V connector for a fan with tachometer
- ◆ Local I²C-based temperature sensor

The SCSI hot-docking backplane provides control signals and power for five wide/fast SCA SCSI III hard disk drives. The backplane receives control signals from the Symbios SCSI controller on the system board through a cable connected to the wide SCSI connector on the backplane. It gets power from the power system through 4-conductor cables connected to the two power connectors.

The SCSI hard disk drives in the hot-docking bay get their control signals and power from the SCA connectors on the hot-docking backplane.

The fault indicators (LEDs) on the front panel indicate failure status for each drive in the hot-docking bay. These indicators get their signals through a cable connected to the front panel connector on the hot-docking backplane.

The temperature sensor on the backplane provides temperature information to other devices in the server through enclosure service messages.

The backplane power control provides powering down of a drive when a failure is detected and reported to the SCSI bus through enclosure service messages. When a new drive is inserted in the hot-docking SCA connector, the power control waits a short time for the drive to become fully seated and then applies power to the drive.

NOTE

Since the hard disk drives for your server 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.

WARNING

The single-ended SCSI hot-docking backplane requires installing single-ended SCSI devices in your system. Installing differential SCSI drive types can result in electrical damage to the system board and the peripherals.

Removing a Hot-docking Backplane

See Figure 6-1

1. Remove all the hard disk drives from the hot-docking bay. See page 9 of this chapter.

CAUTION

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

2. Remove the right side cover. See chapter 4, 'Opening up the server'.
3. Label and disconnect the power and signal cable connectors from the hot-docking backplane and, if present, disconnect the auxiliary fan connector.
4. Remove the four screws that attach the backplane to the back of the hot-docking bay, and set them aside.
5. Remove the backplane from the server, and place it on an antistatic surface.

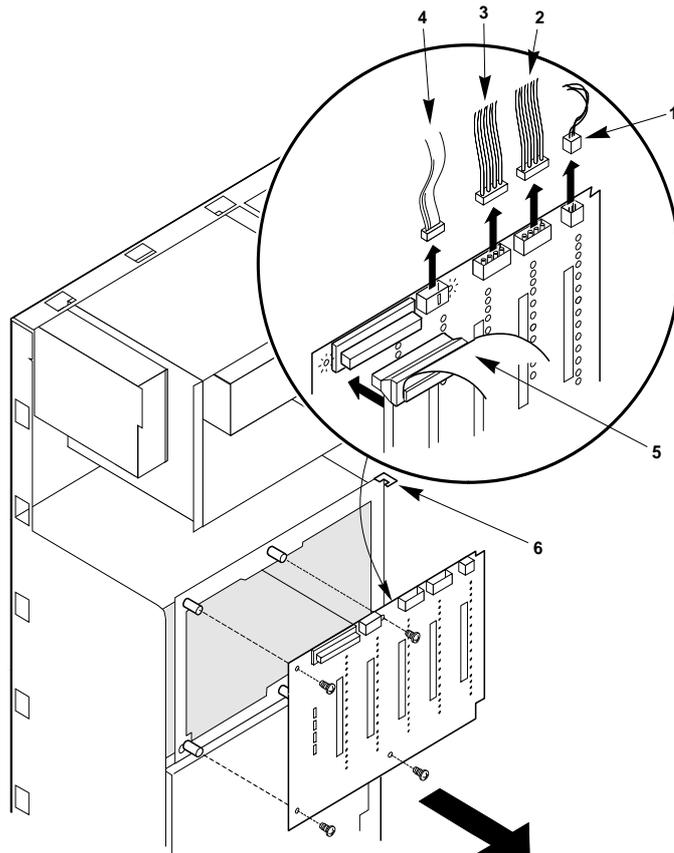


Figure 6-1 Removing a Hot-docking Backplane

- | | | | |
|---|----------------------------|---|--------------------|
| 1 | Fan cable if present | 4 | Front panel cable |
| 2 | Peripheral power connector | 5 | SCSI signal cable |
| 3 | Peripheral power connector | 6 | Notch in metal tab |

Installing a Hot-docking Backplane

See Figure 6-1

1. Slide the hot-docking backplane into the notches in the metal tabs on the back of the bay.
2. Position the screw holes in the backplane over the threaded stand-offs on the back of the bay.
3. While holding the backplane in place, insert the four screws through the holes in the backplane and into the threaded stand-offs. Tighten the screws firmly (do not over-tighten as it may strip the threads).
4. Connect the power and signal cables to the hot-docking backplane.
5. Install the hard disk drives in the hot-docking bay. See page 8 of this chapter.
 - ◇ Make sure you install the drives in the same places you removed them from.
6. Replace the right side cover. See chapter 4, 'Opening up the server'.
7. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.

Configuration Options

The hot-docking backplane contains only one configuration jumper: J8, the internal/external jumper.

Internal/External (INT/EXT) Jumper J8

When this jumper is in the "INT" position, jumper on pins 1 and 2, (default setting) the backplane assumes it is operating in an "internal" peripheral bay in the server chassis.

When this jumper is in the "EXT" position, jumper on pins 2 and 3, the backplane assumes it is operating in an "external" peripheral bay in a peripheral expansion chassis. *This option is not currently available with this computer and must not be selected.*

SCSI ID Configuration Options

The SCSI chip on the hot-docking backplane uses the SAF-TE protocol to communicate with the system board. This chip uses SCSI ID 6; therefore, other SCSI devices cannot use this address.

J10	J9	Drive 0	Drive 1	Drive 2	Drive 3	Drive 4
2-3	2-3	ID8	ID9	ID2	ID11	ID12
1-2 *	2-3 *	ID0	ID1	ID2	ID3	ID4
2-3	1-2	ID8	ID9	ID10	ID11	ID12
1-2	1-2	ID0	ID1	ID10	ID3	ID4

* Jumper default setting.

Changing SCSI Device ID Addresses

If you have a wide SCSI device ID conflict in your server configuration, you can resolve it by changing the default ID addresses of the drives in the hot-docking bays. See the jumper table on page 4 of this chapter.

See Figure 6-2

1. Remove the server right side cover. See chapter 4, 'Opening up the server'.
2. The jumpers are parallel with the hot-docking backplane surface, shown in Figure 6-2. To remove a jumper, use a jumper removal tool.
3. To install a jumper, position it over the two pins for the desired setting and press down firmly. Be careful not to bend the pins.
4. Replace the server right side cover. See chapter 4, 'Opening up the server'.
5. Connect all signal cables and power cable(s) to the system.
 - ◇ Some systems have more than one power cable.

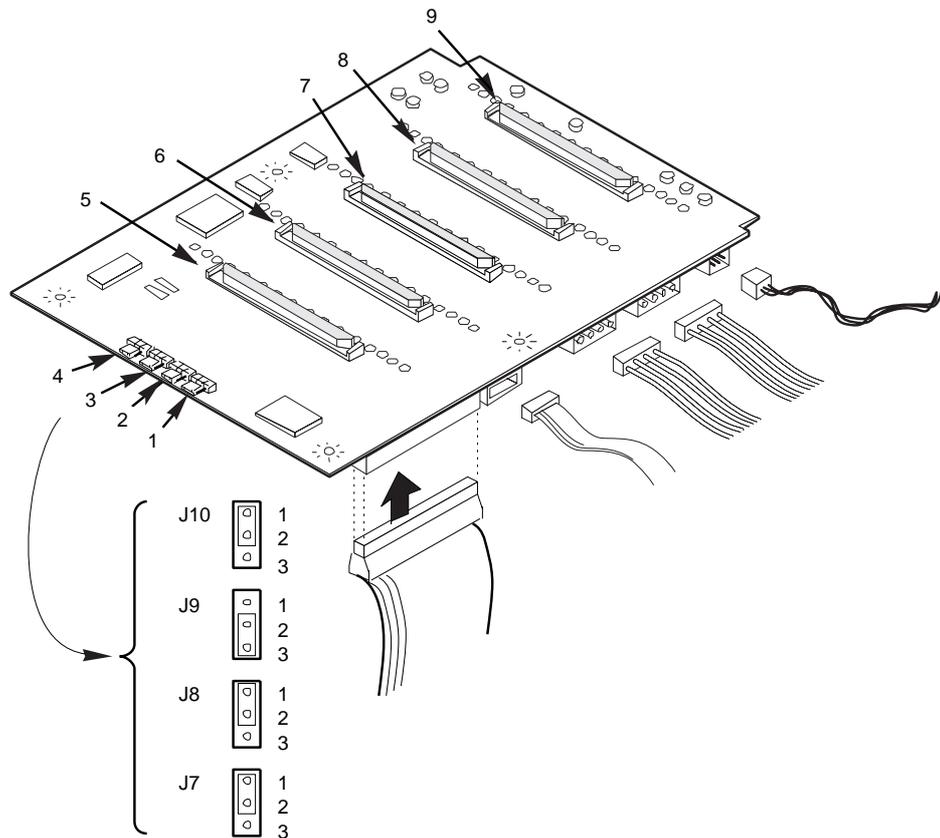


Figure 6-2 SCSI Backplane

1	SCSI ID B, J10	6	SCSI drive 3
2	SCSI ID A, J9	7	SCSI drive 2
3	Internal/external, J8	8	SCSI drive 1
4	Normal operation, J7	9	SCSI drive 0
5	SCSI drive 4		

Hot-swap SCSI hard disk drives

Hot-docking Bays

The front door of the server covers a removable metal door that is secured to the chassis with two screws. These doors provide proper cooling, air-flow, and easy access to the drives in the upper and lower hot-docking bays. Drive carriers for half-height drives allow easy hot swapping of drives in and out of these bays without shutting down the server.

The upper and lower bay each have a separate backplane. Each backplane uses industry standard 80-pin SCA connectors to support up to five industry standard wide/fast-20 SCSI III SCA hard disk drives. The bays accept peripherals that consume up to 11 watts of power and run at a maximum ambient temperature of 55 °C.

By installing an optional RPX board and appropriate software on the system board and SCSI hard disk drives in the hot-docking bays, you can easily set up Redundant Array of Inexpensive Disks (RAID) applications.

SCSI Hard Disk Drives

The server supports a variety of single-ended SCSI SCA devices. The basic configuration may consist of only a single drive.

Contact your Mitsubishi Electric supplier for additional single-ended SCSI SCA devices that can be installed in the server.

WARNING

The single-ended SCSI hot-docking backplane requires installing single-ended SCSI devices in your system. Installing differential SCSI drive types can result in electrical damage to the system board and the peripherals.

Mounting a SCSI SCA Hard Disk Drive in a Carrier

See Figure 6-3

1. Remove the hard disk drive from its protective wrapper, and place it on an antistatic surface.
2. Record the model and serial numbers of the drive in your equipment log.
 - ◇ Make a note also of the position it is to be installed into.
3. Orient the drive so that the connector is near the top surface of the drive, and place it on an antistatic surface. Handle with extreme care.
4. Place the drive carrier on top of the drive.
5. Using four screws of the appropriate size and length (not supplied), attach the carrier to the drive.

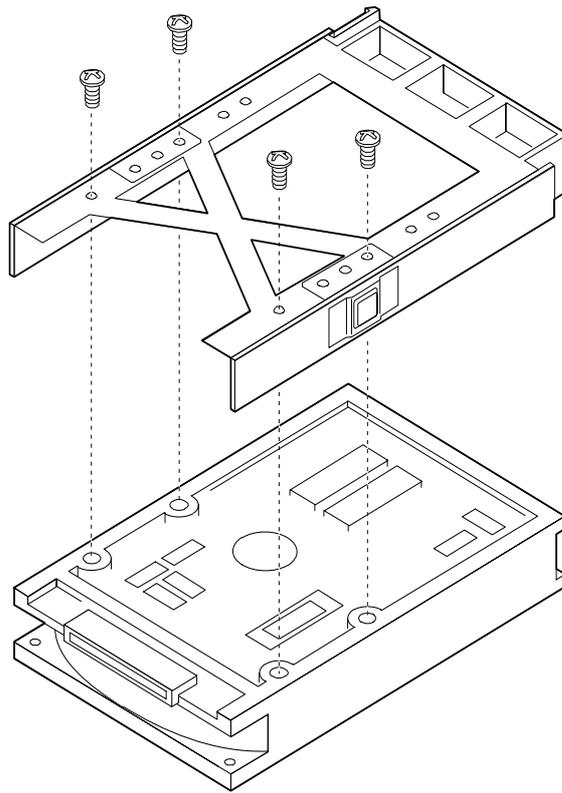


Figure 6-3 Hard Disk Drive and Carrier

Installing a SCSI SCA Hard Disk Drive in a Hot-docking Bay

See Figure 6-4

1. Open the plastic front door of the server.
2. If you installed a padlock on the metal door to the hot-docking bays, unlock the padlock and remove it.
3. Loosen the two spring-loaded, captive screws that secure the metal door to the chassis, and open the door.
4. Position the carrier and drive assembly so that it engages the hot-docking bay guide rails.
5. Gently push the drive into the bay until it docks with the hot-docking backplane connector, and snaps into place.
6. Gently close the metal door, and secure it to the chassis with the two spring-loaded, captive screws.
7. For security and to prevent unauthorised entry into the hot-docking bays, insert a padlock through the metal door and chassis and lock it.
8. Close the lower plastic front door of the server.
9. If you installed an optional RPX board in the system, run the Disk Array Controller Configuration utility supplied with the board. See the documentation provided with the board.

SCSI hard disk sub-system

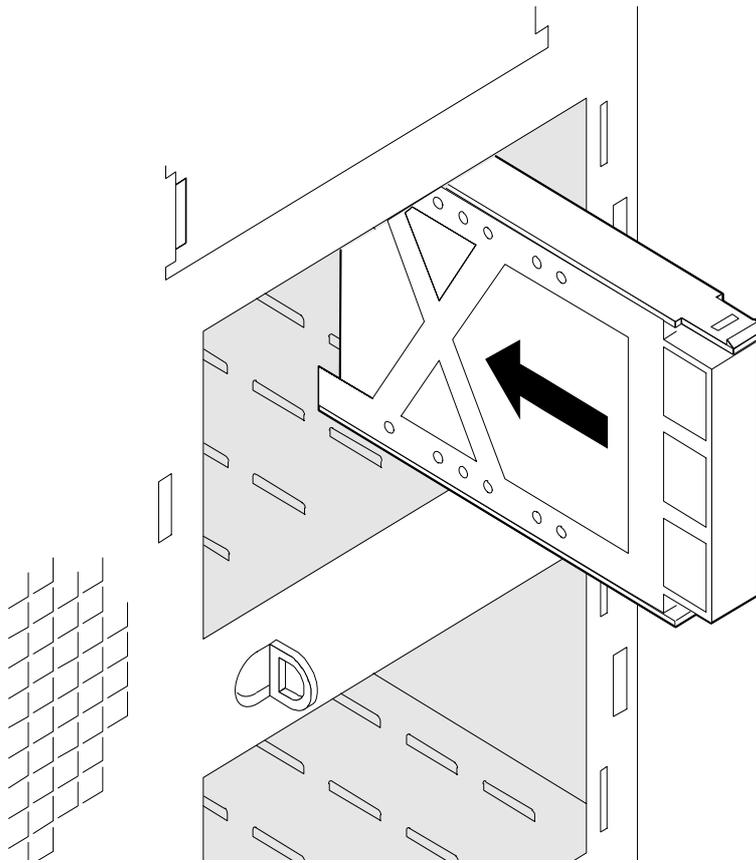


Figure 6-4 Installing a Hard Disk Drive (Bezel not shown for clarity)

Hot Swapping a SCSI SCA Hard Disk Drive

A bank of ten yellow LEDs on the server front panel monitors the drive status in the upper and lower hot-docking bays. When a yellow LED is on continuously, you can hot-swap a failed drive with a good one. The server does not need to be shut down.

See Figure 6-5

1. Open the front door of the server.
2. If you installed a padlock on the metal door to the hot-docking bays, unlock the padlock and remove it.
3. Loosen the two captive screws securing the metal door to the chassis and open it.
4. Look at the two banks of yellow LEDs on the front panel to determine which drive is bad. Grasp the handle of the drive carrier, press down on the tab, and pull the drive toward you to disengage it from the hot-docking backplane connector.
5. Slide the drive out of the bay and place it on an antistatic surface.
6. Position the new carrier and drive assembly so that it engages the bay guide rails.
7. Gently push the drive into the bay until it docks with the hot-docking backplane connector and snaps into place.
8. Close the metal door and secure it to the chassis with the captive screws.
9. For security and to prevent unauthorised entry into the hot-docking bays, insert a padlock through the metal loop protruding through the door and lock it.

10. Close the front door of the server.

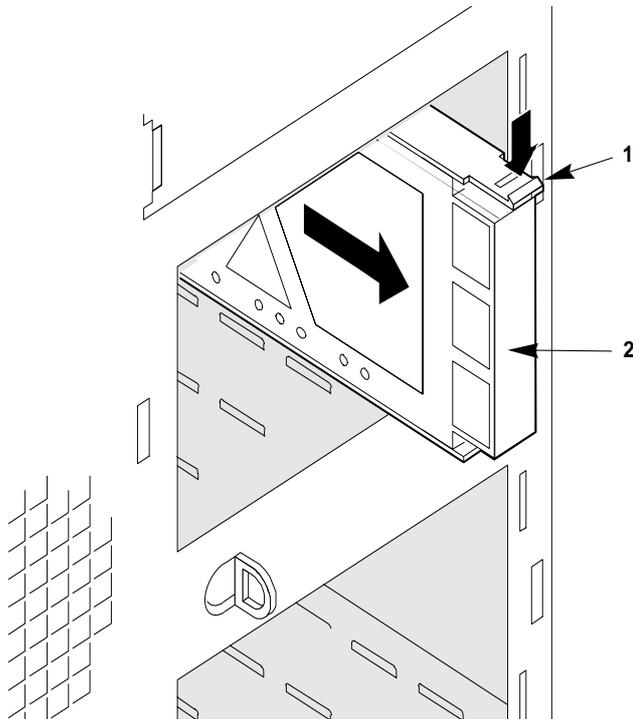


Figure 6-5 Hot-swapping a Hard Disk Drive (Bezel not shown for clarity)

- 1 Plastic tab
- 2 Handle

7 SYSTEM BOARDS

The motherboard is covered in its own chapter (8), which also gives detailed instructions about possible upgrades. The SCSI backplane is detailed in chapter 6 along with the hard drives connected to it.

This chapter covers these boards within the server:

- ◆ Motherboard sub-boards:
 - ◇ fitting and removing the memory module
 - ◇ fitting and removing the optional RPX module
- ◆ Front panel board:
 - ◇ Installation and removal
- ◆ Add-in expansion boards:
 - ◇ Installation and removal

All boards should be treated as highly susceptible to static at all times.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices, particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed a padlock on the back of the server, unlock the padlock and remove it.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options, and any other pertinent information specific to the server. Keep it in a safe place.

You may need this information when running the SCU.

CAUTION

All system boards and most components are highly susceptible to static damage. Take note of the antistatic precautions detailed in the 'Safety & Regulatory Notices' section.

Installing the Memory Module

See Figure 7.1

1. Remove the left side cover. See chapter 4,
2. Remove the rail.
3. Being careful not to touch the components or gold edge connectors on the memory module, remove it from its protective wrapper and place it socket-side up on a nonconductive, static-free surface.
4. Record the module serial number in your equipment log.
5. Hold the module by its top edge or upper corners, and firmly press it into the connector on the system board.
6. Install the rail.

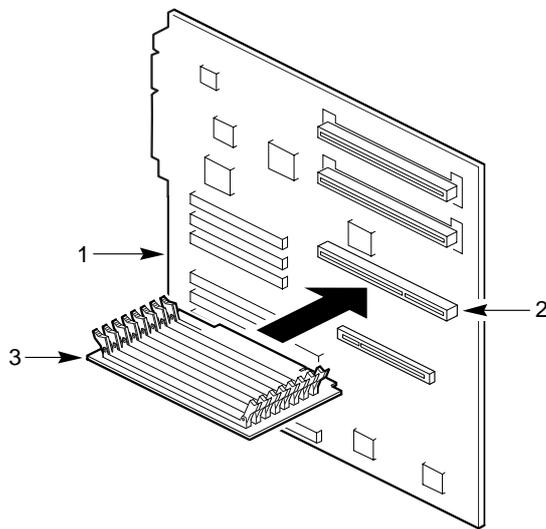


Figure 7.1 Installing the Memory Module

- | | |
|---|--------------|
| 1 | System board |
| 2 | Connector |
| 3 | Module |

7. Run the SCU to configure the system. For information about running the utility, see Chapter 3, "Configuring The System."

Removing the Memory Module

See Figure 7.1

1. Remove the left side cover, see chapter 4.
2. Remove the rail.
3. Holding the module by its top edge or upper corners, carefully rock it back and forth until the edge connector pulls free.
4. Store the module in an antistatic protective wrapper, or place it socket side up on a nonconductive, static-free surface.
5. Install the rail.

Installing the RPX Module (option)

See Figure 7.2

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove the RPX rail.
3. Being careful not to touch the components or gold edge connectors on the RPX module, remove it from its protective wrapper and place it component side up on a nonconductive, static-free surface.
4. Record the module serial number in your equipment log.
5. Hold the module by its top edge or upper corners, and firmly press it into the connector (Figure 4-9) on the system board.
6. Plug in the RPX board battery.
7. Return the RPX rail to its original position.

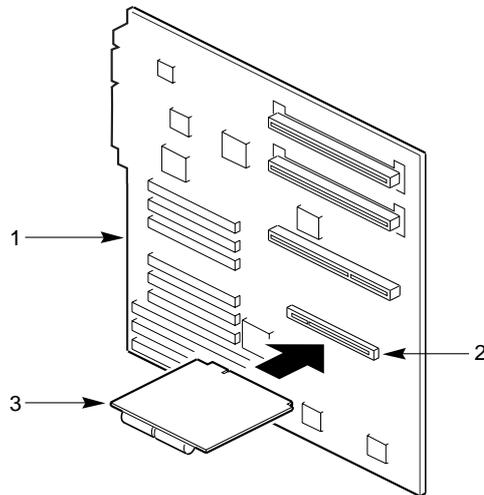


Figure 7.2 Installing the RPX Module

1	System board
2	Connector
3	Module

8. Run the SCU to configure the system. For information about running the utility, see Chapter 3, "Configuring The System."

Removing the RPX Module

See Figure 7.2.

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove the RPX rail.
3. Unplug the RPX board battery.
4. Holding the module by its top edge or upper corners, carefully rock it back and forth until the edge connector pulls free.
5. Store the module in an antistatic protective wrapper, or place it component side up on a nonconductive, static-free surface.
6. Install the rail.

Front Panel Board

The front panel board contains the system controls and indicators. It is mounted on a snap-on stand-off and a threaded stand-off inside the chassis.

Removing the Front Panel Board

See Figure 7-3

1. Remove both side covers and the top cover. See chapter 4, 'Opening up the server'.
2. Remove the screw from the threaded stand-off inside the chassis, and set it aside. You will need the screw later.
3. Grasp the front panel board, and gently pull it toward the back of the server until it clears the snap-on stand-off.
4. Label and disconnect all the cables connected to the front panel board.
5. Remove the board from the server, and place it on an antistatic foam pad or a grounded workstation.

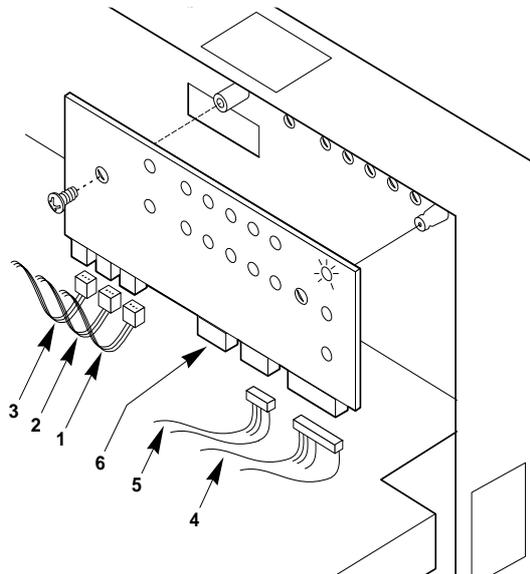


Figure 7-3 Removing the Front Panel Board

- | | |
|--|---|
| 1 J1, alarm switch cable for access door to hot-docking bays | 4 J4, system board control signal cable |
| 2 J2, alarm switch cable for right side panel | 5 J5, top SCSI hot-docking backplane cable |
| 3 J3, alarm switch cable for left side panel | 6 J6, connector for the bottom SCSI hot-docking backplane cable |

Replacing the Front Panel Board

See Figure 7-3

1. Place the front panel board on the chassis panel above the system board.
2. Reconnect the cables to the front panel board.
3. Carefully position the front panel board over the snap-on and threaded stand-offs inside the chassis.
4. Gently press the front panel board onto the snap-on stand-off until it snaps in place.

5. Replace and tighten firmly the screw that secures the front panel board to the chassis. (do not over-tighten as it may strip the threads).
6. Replace the top cover and the side covers.

Add-in/Expansion Boards

The system board provides seven PCI bus master slots and three ISA bus master slots. They accept the majority of current add-in PCI and ISA boards whether full or half-length. One PCI slot shares a common chassis I/O expansion slot with one ISA slot; you can use either the PCI slot or the ISA slot, but not both.

NOTE

While running the SCU is optional for a PCI add-in board, if you are installing or removing an ISA add-in board, you must run the SCU to reconfigure the server and manually allocate system resources to prevent the PnP from using the same memory, I/O or IRQ.

Installing an Add-in Board

See Figures 7-4, 7-5 and 7-6

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove and save the expansion slot screw and cover.
 - ◇ The screw will be needed to retain the add-in board, the cover should be retained for refitting if you remove the add-in board later.
3. Avoid touching the components or gold edge connectors on the board, remove it from its protective wrapper and set any links according to the manufacturer's instructions.
4. Record the serial number and type of board in your equipment log.
5. Hold the board by its top edge or upper corners, and firmly press it into an expansion slot on the system board (Figure 7-5 or Figure 7-6).
 - ◇ The retaining bracket fits into the space that was occupied by the slot cover.

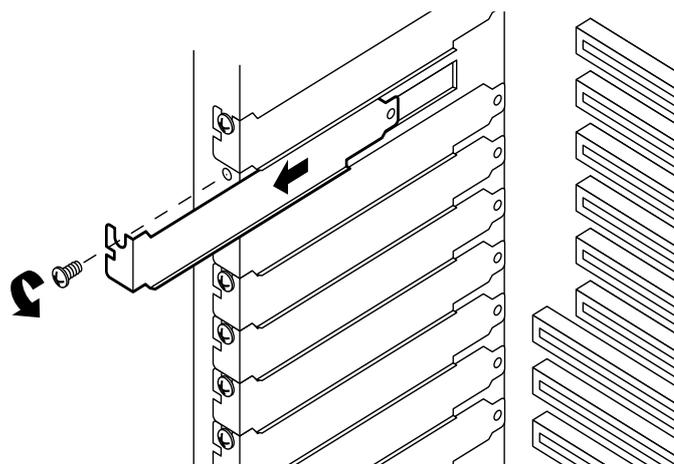


Figure 7-4 Expansion Slot Cover

6. Insert the screw you removed earlier in the threaded hole, and push the rounded notch up against the screw.
7. Replace the left side cover.

System boards

8. If you installed an ISA add-in board, run the SCU to reconfigure the server. Running the SCU is optional for a PCI add-in board. For information about running this utility, see chapter 3, 'Configuration'.

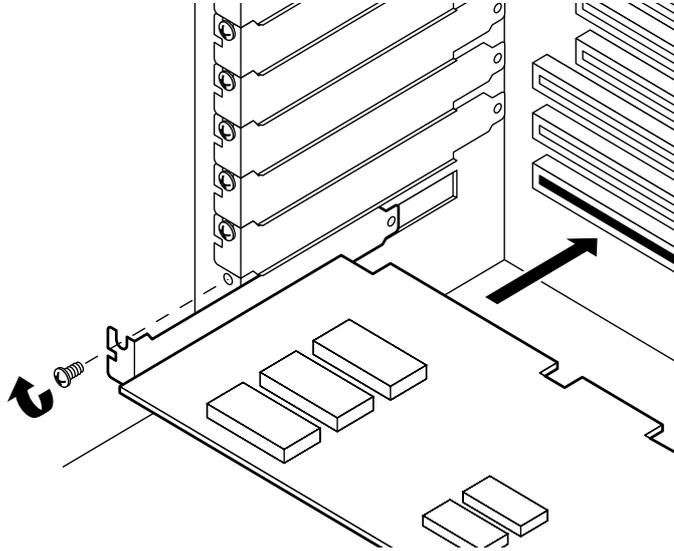


Figure 7-5 Installing an ISA Add-in Board, Component-side Up

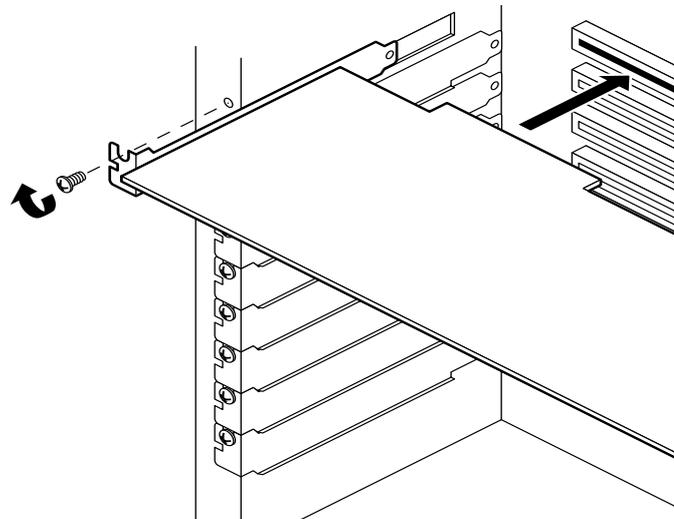


Figure 7-6 Installing a PCI Add-in Board, Component-side Down

CAUTION

Do not overload the system board by installing add-in boards that draw excessive current. For expansion slot current limitations, see Chapter 6, "Power System."

Removing an Add-in Board

CAUTION

Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the server and to ensure proper cooling of the server components.

See Figures 7-4, 7-5 and 7-6

1. Remove the side cover. See chapter 4, 'Opening up the server'.
2. Disconnect any cables attached to the board you are removing.
3. Remove and save the add-in board retaining bracket screw.
4. Holding the board by its top edge or upper corners, carefully rock it back and forth until the edge connector pulls free. Make sure that you do not scrape the board against other components.
5. Store the board in an antistatic protective wrapper.
6. Install an expansion slot cover (Figure 7-4) over the vacant slot. The tapered foot of the cover must fit into the mating slot in the bottom of the expansion slot frame.
7. Insert the screw you removed earlier in the threaded hole, and push the rounded notch up against the screw. Tighten it firmly (do not over-tighten as it may strip the threads).
8. Replace the side cover.
9. If you removed an ISA add-in board, run the SCU to configure the system. For information about running this utility, see chapter 3, 'Configuration'.

8 MOTHERBOARD AND UPGRADES

WARNING

Use of non-conforming or untested components may invalidate your system's compliance with EMC and other legislation. Damage caused by fitting of such components will not be covered by your warranty.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices and particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed a padlock on the back of the server, unlock the padlock and remove it.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options, and any other pertinent information specific to the server. Keep it in a safe place.

You may need this information when running the SCU.

CAUTION

All system boards and most components are highly susceptible to static damage. Take note of the antistatic precautions detailed in 'Safety & Regulatory Notices'.

Server System Board

The system board contains both PCI and ISA I/O systems with several embedded devices for video, network, and disk control. The board also provides:

- ◆ server management/monitoring hardware support
- ◆ interrupt control (I/O APIC and standard PC)
- ◆ a primary PCI bus segment (PCI-0) with four expansion connectors and two embedded devices
- ◆ an ISA bus segment with three expansion connectors (one slot shared with PCI-0)
- ◆ a National Semiconductor Super I/O chip providing all PC-compatible I/O and Xbus interfaces

System Board Layout

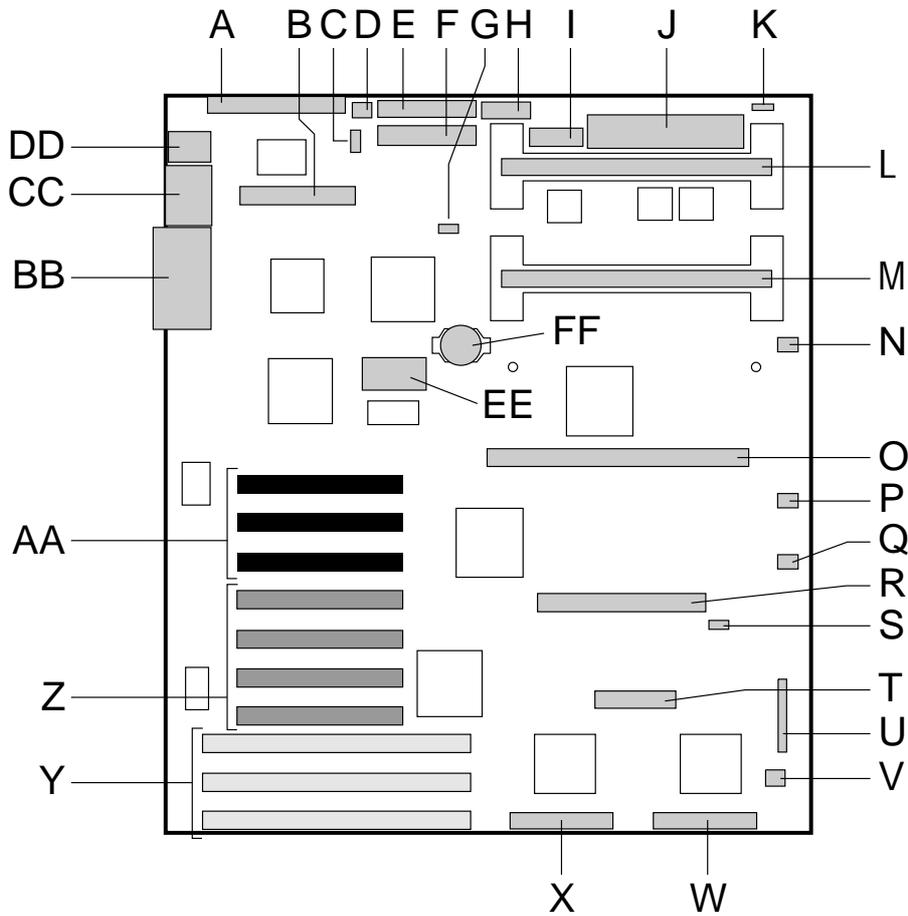


Figure 8-1 System Board Layout

A	Narrow SCSI connector	Q	Fan 3 connector
B	IDE connector	R	RPX connector (option)
C	I ² C connector	S	I ² C connector
D	Fan 0	T	Server management connector
E	Floppy drive connector	U	Jumper block J2J1
F	Power connector	V	Fan 4 connector
G	Hard disk activity input	W	Wide SCSI channel B
H	Auxiliary power connector	X	Wide SCSI channel A
I	Front panel connector	Y	ISA bus slots
J	VRM connector	Z	Secondary PCI bus slots
K	Speaker connector	AA	Primary PCI bus slots
L	Secondary processor connector	BB	Parallel and Video connectors
M	Primary processor connector	CC	Serial port 1 and Serial port 2 connectors
N	Blower 1 connector	DD	Keyboard and mouse connectors
O	Memory Module connector	EE	Video memory upgrade socket
P	Blower 2 connector	FF	Back-up battery

Configuration Jumpers

To change a jumper setting, use a jumper removal tool, needle-nosed pliers, or your fingers to remove the jumper 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 figure below shows the default jumper settings.

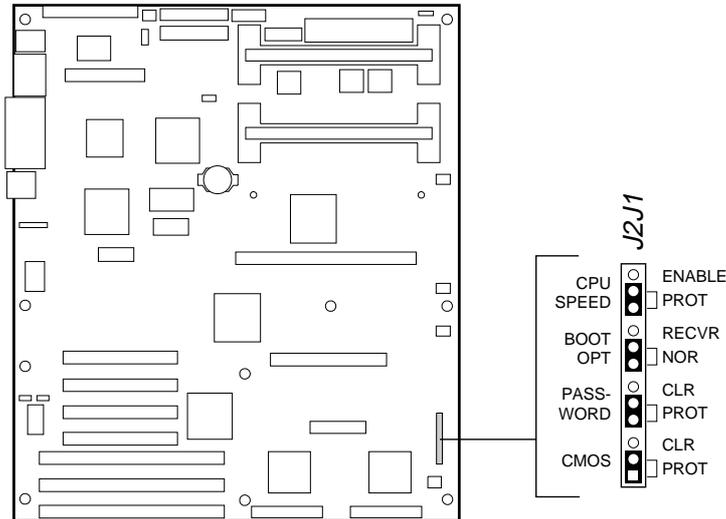


Figure 8-2 System Board Jumpers

<i>Jumper</i>	<i>Pins (default in bold)</i>	<i>Description</i>
CPU Speed	Enable	Permits changing the processor speed in the BIOS setup program.
	Protect	Prevents changing the processor speed.
Boot Option	Recovery Boot	Prevents inverting address A16. Allows the system to boot from the Recovery BIOS when the normal BIOS gets corrupted if you are unable to reload a fresh copy from the diskette.
	Normal Boot	Inverts address A16 so the Normal BIOS does not reside at the top of Flash memory where the write-protected Recovery BIOS region is located.
Password	Clear	Clears the password.
	Protect	Maintains the current system password.
CMOS	Clear	Replaces the contents of NVRAM with the manufacturing default settings.
	Protect	Preserves the contents of NVRAM.

Chassis Intrusion Detection

The chassis contains alarm switches that get activated if a cover is removed.

To bypass the chassis intrusion switches:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper on J3J1, Chassis INTR Detect from the ENA pins to the DIS pins.
3. Replace the left side cover, and connect the power cord(s) to the system.
4. Turn the system on, and wait for POST to complete; for instructions on running POST, see Chapter 3, 'Configuration'.
5. Run the SCU to configure your system. For information on running the SCU, see Chapter 3, 'Configuration'.

Fault Resilient Booting (FRB)

The jumper on the J3J1 FRB ENA pins allows the system to boot from processor 1 if processor 0 fails. Moving the jumper to the DIS pins lets the system boot only from processor 0.

To boot only from processor 0:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper on the J3J1, FRB from the ENA pins to the DIS pins.
3. Replace the left side cover, and connect the power cord(s) to the system.
4. Turn the system on, and wait for POST to complete; for instructions on running POST, see Chapter 3, 'Configuration'.
5. Run the SCU to configure your system. For information on running the SCU, see Chapter 3, 'Configuration'.

Flash Memory

The jumper on the J3J1, Flash PROG pins applies +12 V power to the VPP pin on the flash memory device. This allows you to update the BIOS in flash memory with a special Flash Memory Update Utility. Moving the jumper to the PROT pins protects the contents of flash memory.

For a copy of the latest system BIOS release, contact your Mitsubishi Electric supplier.

Updating the BIOS

Before you can update the system BIOS from the Flash Memory Update Utility diskette, you must make it MS-DOS bootable. You must have either MS-DOS version 5.00 (or greater) installed on C:\DOS.

To prevent accidentally installing a BIOS for a different type of system, the update utility ensures that the BIOS matches the target system.

CAUTION

To avoid memory conflicts, do not run the update utility with extended memory managers.

To update the BIOS:

1. Insert the update diskette into drive A, and turn on the monitor and system. The update process starts automatically when the system boots. Follow the screen prompts.
2. When the update process completes, remove the diskette, and reset the system. Wait for POST to complete; for instructions on running POST, see Chapter 3, 'Configuration'.
3. If you want to protect the contents of flash memory, turn the system off and remove the left side cover as described in Chapter 4.
4. Move the jumper on the J3J1, Flash PROG pins to the PROT pins to write protect the flash memory device.
5. Replace the left side cover, and connect the power cord(s) to the system.

NOTE

If the system BIOS becomes corrupted during the update process—for example, a power outage occurs—follow the "Recovering the BIOS" procedure on the following page.

CPU Speed

CAUTION

Over-clocking the processor may damage it and your data.

To set the processor speed:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper on the J2J1, CPU Speed PROT pins to the Enable pins to activate the CPU Speed Setting field in the BIOS Setup Utility.
3. Replace the left side cover, and connect the power cord(s) to the system.
4. Run the BIOS Setup Utility as described in Chapter 3, 'Configuration'.
5. Select the proper speed for your processor.
6. Repeat step 2 above.
7. Move the jumper on the J2J1, CPU Speed Enable pins to the PROT pins.
8. Repeat step 4 above.

Boot Option

Moving the boot option jumper on the J2J1, Boot Opt NOR pins to the REC pins 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. However, 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 automatically recover the system BIOS 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 before completing a recovery procedure or physically remove the board from the system. You do not have to remove add-in boards for normal BIOS updates.

Recovering the BIOS

To recover the BIOS:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper from the J2J1, Boot Opt NOR pins to the REC pins to allow the system to boot from the recovery BIOS.
3. Replace the left side cover, and insert the Flash Memory Update Utility diskette in drive A.
4. Connect the power cord(s) to the system, and turn it on. After the system boots, the speaker emits a single beep and the recovery process starts—it takes about three minutes. When the recovery process completes, the speaker emits two beeps.
 - ◇ While in the recovery mode, there is no screen display on the monitor. The keyboard is disabled as the system automatically recovers the BIOS. The beep codes overleaf describe the recovery status.
5. Turn the system off, disconnect the power cord(s) from the system, and remove the left side cover.

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 jumper is in the wrong position.

5. Move the jumper from the REC pins to the NOR pins to enable the normal boot mode.
6. Replace the left side cover, remove the diskette from drive A, and connect the power cord(s) to the system.
7. After running the special recovery mode, run the SCU to specify a new password. For information on running the SCU, see Chapter 3, 'Configuration'.

Password

The jumper on the J2J1, Password PROT pins protects the system password during system reset. Moving the jumper to the CLR pins clears the system password during system reset.

To clear and enter your password:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper on the J2J1, Password PROT pins to the CLR pins.
3. Replace the left side cover, and connect the power cord(s) to the system.
4. Turn the system on, and wait for POST to complete. This automatically clears the password. For instructions on running POST, see Chapter 3, 'Configuration'.
5. Turn the system off; disconnect the power cord(s), and remove the left side cover.
6. Move the jumper on the J2J1, Password CLR pins to the PROT pins.
7. Replace the left side cover, and connect the power cord(s) to the system.
8. Run the SCU to specify a new password. For information on running the SCU, see Chapter 3, 'Configuration'.

CMOS

The jumper on the J2J1, CMOS PROT pins preserves the CMOS settings during system reset. Moving the jumper to the CLR pins clears CMOS and sets it and the real-time clock (RTC) to the manufacturing default settings during system reset.

To reset the system's CMOS and the RTC to factory default values:

1. Remove the left side cover as described in Chapter 4.
2. Move the jumper on the J2J1, CMOS PROT pins to the CLR pins.
3. Replace the left side cover, and connect the power cord(s) to the system.
4. Turn the system on, and wait for POST to complete. This automatically reprograms CMOS and RTC to their default settings. For instructions on running POST, see Chapter 3, 'Configuration'.
5. Turn the system off, disconnect the power cord(s) from the system, and remove the left side cover.
6. Move the jumper on the J2J1, CMOS CLR pins to the PROT pins.
7. Replace the left side cover, and connect the power cord(s) to the system.
8. Run the SCU to configure your system. For information on running the SCU, see Chapter 3, 'Configuration'.

Back-up Battery

The lithium battery on the system board powers the real-time clock (RTC) for up to 10 years in the absence of power. The RTC contains 256 bytes of general purpose RAM that stores the system BIOS configuration information, clock registers, and general purpose control registers. When the battery starts to weaken, it loses voltage, and the system settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong.

Replacing the Back-up Battery

1. Remove the left side cover, see chapter 4.
2. Locate the battery from the diagram of the motherboard on page 2 of this chapter, where it is identified as 'FF'.
3. Insert the tip of a small plastic tool, or equivalent, under the plastic tab on the snap-on plastic retainer. Gently lift up and pull back on the retainer to remove it from the lithium battery socket.

WARNING

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, it may cause the battery to explode.

4. Remove the battery from its socket.
5. Dispose of the old lithium battery according to the battery manufacturer's instructions.
6. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it into the battery socket.
7. Install the snap-on plastic retainer on the socket and make sure it holds the battery firmly.
8. Replace the left side cover.
9. Run the SCU to restore the configuration settings to the RTC. For information about running this utility, see Chapter 3, 'Configuration'.

Upgrades

Processors

In a symmetric multiprocessor (SMP) environment all processors are equal and have no preassigned tasks. Distributing the processing loads between both processors increases system performance. This is particularly useful when application demand is low and the I/O request load is high. In an SMP environment, both processors share a common bus, the same interrupt structure, and access to common memory and I/O channels. The SMP implementation conforms to the Multiprocessor Specification Version 1.4.

If the supplied system is fitted with only a single processor, a second processor and DC converter (VRM) may be fitted. The second processor must be identical to the one already installed. The second processor slot, if unused **must have a termination board fitted**.

Removing the Termination Board

CAUTION

Do not remove this board unless you are about to install a second processor.

See Figure 8-3

1. Remove the left side cover. See chapter 4.
2. Press the latches on the Terminator Latching Assembly (TLA) inward.
3. Pull the TLA out of the module retention bracket.
4. Holding the terminator board by its top edge, carefully rock it back and forth until the edge connector pulls free.

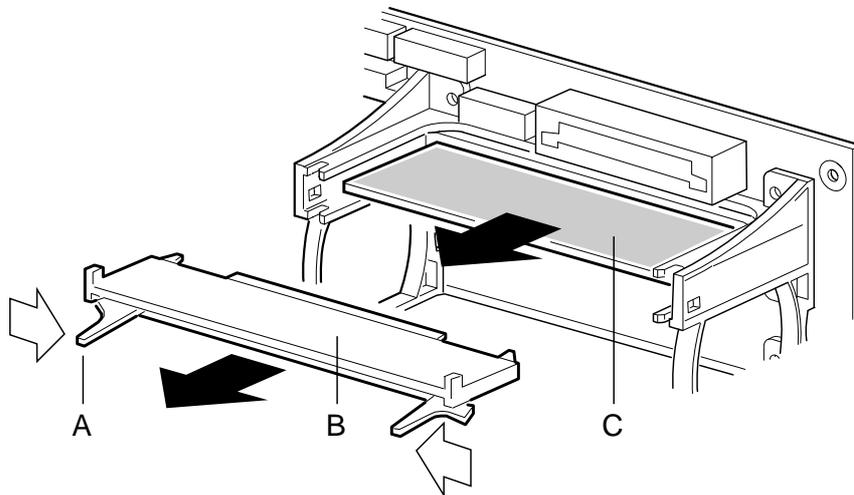


Figure 8.3 Removing a Termination Board

A	Latch
B	Terminator Latching Assembly
C	Terminator Board

Installing a Voltage Regulator Module

See Figure 8.4

1. Remove the left side cover. See chapter 4.
2. Being careful not to touch the components or connector on the voltage regulator module, remove it from its protective wrapper and place it on a nonconductive, static-free surface.
3. Record the module ID information (may be a date code) in your equipment log.
4. Hold the module by its top edge or upper corners and firmly press it into the connector on the system board until the lock tabs click into place.

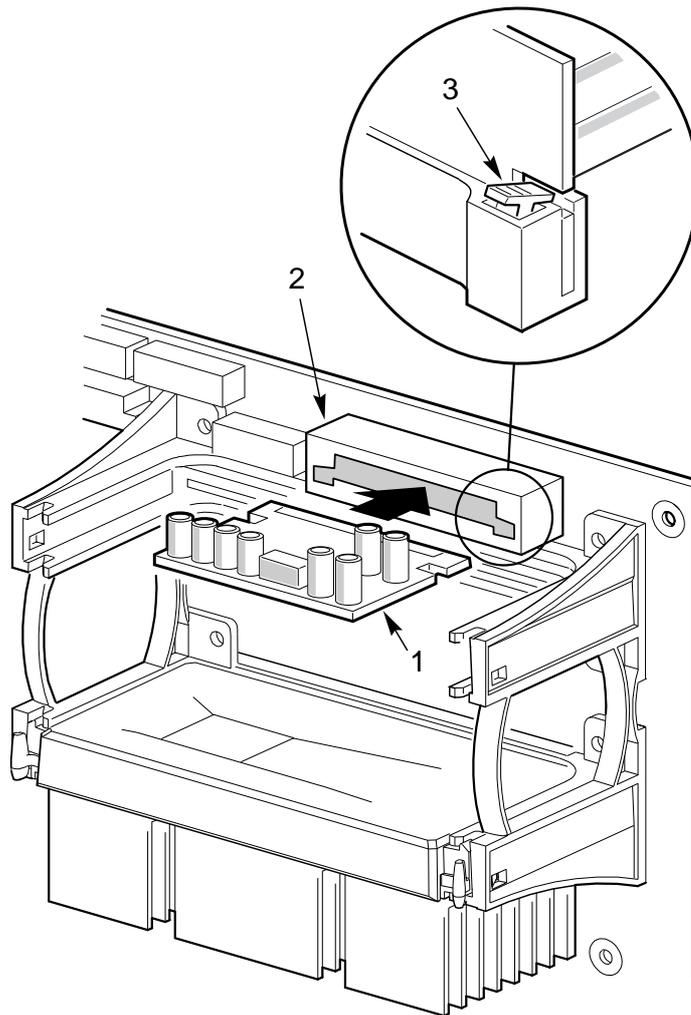


Figure 8.4 Installing a Voltage Regulator Module

1	Module
2	Connector
3	Lock Tab

Installing a second Pentium II Processor

See Figure 8-5

1. Remove the left side cover. See chapter 4.
2. Remove the termination board as previously described.
3. Fit the VRM as previously described.
4. Being careful not to touch the components or gold edge connectors on the processor module, remove it from its protective wrapper and place it heat-sink side down on a nonconductive, static-free surface.
5. Record the module serial number in your equipment log.
6. Press the locking tabs inward until they remain retracted.

7. Hold the module by its top edge or upper corners, and firmly press it into the connector (Figure 4-7) on the system board. Press the locking tabs outward so they engage the support bracket.

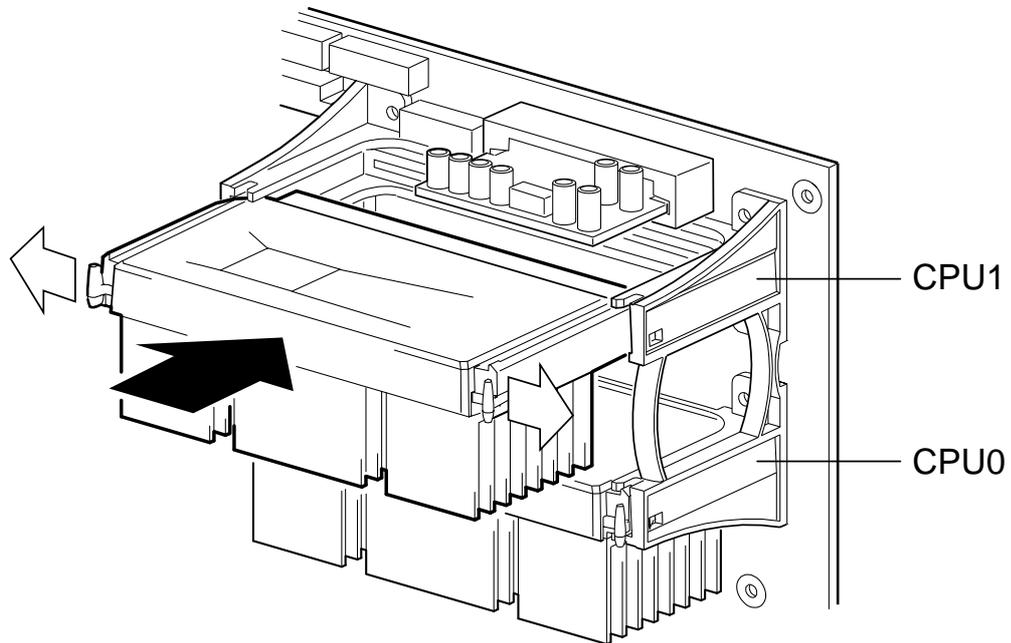


Figure 8-5 Installing a Pentium II Processor

8. Replace the left side cover.
9. Run the SCU to configure the system. For information about running the utility, see Chapter 3, 'Configuration'.

Memory

The EDO memory module contains eight DIMM sockets for installing memory. It supports from 16 MB to 1 GB of EDO ECC 3.3 V 60 ns DRAM, mounted on JEDEC DIMMs. You may install mixed sizes and types of DIMMs in the eight memory banks; however, their speeds must be the same. Always install the DIMMs in sequence by starting with bank 0 (socket J1, closest to the system board), then bank 1 (socket J2), and so on with bank 7 (socket J8) as the last one.

The SDRAM memory module has only four DIMM sockets. This module supports from 16 MB to 512 MB of 3.3V, 66 MHz, unbuffered, 72 bit ECC SDRAM modules. On this module it is recommended that all the DIMMs be of the same type. The installation of DIMMS follows the same basic procedure.

To avoid potential memory problems, use only DIMMs from JEDEC-compatible manufacturers that have been tested for compatibility with the memory module. Contact your sales representative or dealer for a list of approved DIMMs.

The server supports both base (conventional) and extended memory. Base memory is located at addresses 00000h to 9FFFFh (the first 640 KB). Extended memory begins at address 0100000h (1 MB) and extends to FFFFFFFFh (4 GB) which is the limit of addressable memory. The top of physical memory is a maximum of 1 GB.

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 Regions

DOS Compatibility Region

The DOS compatibility region covers 1 MB of memory from addresses 0000_0000h to 000F_FFFFh.

Address Range (hex)	Amount	Function
0000_0000h–0007_FFFFh	512 KB	DOS region, base system memory (fixed)
0008_0000h–0009_FFFFh	128 KB	ISA window memory
000A_0000h–000B_FFFFh	128 KB	PCI/ISA Video or SMM
000C_0000h–000D_FFFFh	128 KB	Add-in card BIOS and buffer area
000E_0000h–00EF_FFFFh	64 KB	Extended system BIOS
000F_0000h–000F_FFFFh	64 KB	System BIOS

Extended Memory Region

The extended memory region covers 4 GB of memory from addresses 010_0000h to FFFF_FFFFh.

Address Range (hex)	Amount	Function
0100_0000h–3FFF_FFFFh	1 GB	Local DRAM space
3FFF_0000h–FFFF_FFFFh	3 GB	PCI memory space

CAUTION

Mixing dissimilar metals may cause failures. Install DIMMs with gold-lead alloy plated edge connectors only in gold-lead alloy plated sockets.

Sample DIMM Size Combinations - EDO module

<i>Banks Filled</i>								<i>Total Memory</i>
<i>0, J1</i>	<i>1, J2</i>	<i>2, J3</i>	<i>3, J4</i>	<i>4, J5</i>	<i>5, J6</i>	<i>6, J7</i>	<i>7, J8</i>	
8	16							24 MB
16	32	8						56 MB
16	32	8	8					64 MB
32	64	64	128	128				416 MB
64	16	32	32	8	128			280 MB
8	16	16	32	64	64	128	128	456 MB
64	64	64	64	64	64	64	64	512 MB
128	128	128	128	128	128	128	128	1024 MB

Sample DIMM Size Combinations - SDRAM module

<i>Banks Filled</i>				<i>Total Memory</i>
<i>0, J1</i>	<i>1, J2</i>	<i>2, J3</i>	<i>3, J4</i>	
16	16			32 MB
16	16	16		48 MB
32	32	32		96 MB
32	32	32	32	128 MB
64	64	64	64	256 MB
128	128	128	128	512 MB

Installing DIMMs

CAUTION

Use extreme care when installing a DIMM. Applying too much pressure can damage the socket slot. DIMMs are keyed and can be inserted only one way.

See Figures 8-6 and 8-7

1. Remove the server left side cover. See chapter 4.
2. Remove the memory module as previously described and place on an antistatic surface.
3. Remove a DIMM from its antistatic package by holding the DIMM only by its edges.
4. Beginning with bank 0, socket J1, orient the DIMM so that the two notches in the bottom edge of it align with the keyed DIMM socket.
5. Insert the bottom edge of the DIMM into socket J1, and press down firmly on the DIMM until it seats correctly.

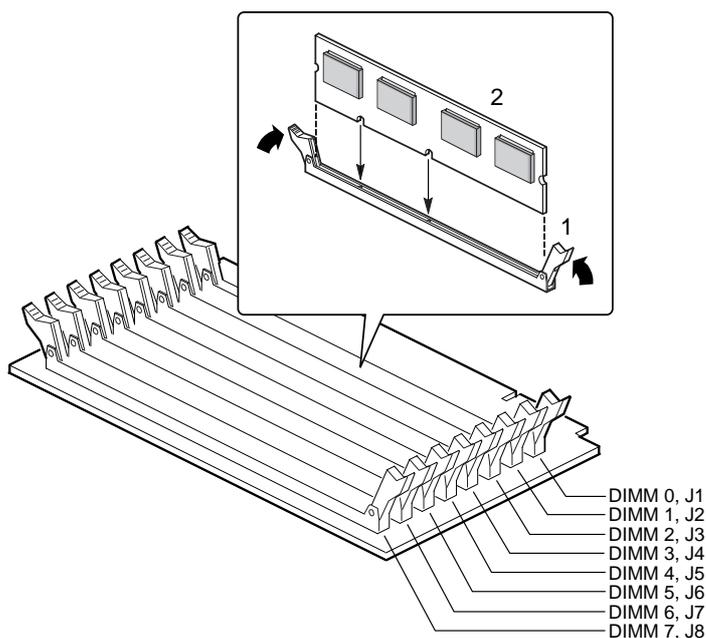


Figure 8-6 DIMM Orientation

- | | |
|---|----------------------------------|
| 1 | DIMM (observe connector indents) |
| 2 | DIMM retaining clips |
7. Gently push the plastic ejector levers (Figure) on the socket ends to the upright position.

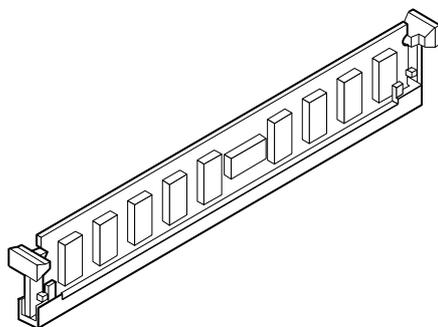


Figure 8-7 Properly Seated DIMM

8. Repeat the above steps to install additional DIMMs. Always install them in sequence by installing the next DIMM in bank 1, socket J2, and so on with the last one in bank 7, socket J8.
9. Install the memory module and replace the server left side cover.
10. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.
11. Turn on your monitor and then your server.
12. Run the System Configuration Utility (SCU) to configure the server and to properly attribute ECC memory. Failure to do so may degrade the performance of your server. For information about running the SCU, see chapter 3, 'Configuration'.

Removing DIMMs

See Figure 8-8

1. Remove the server left side cover. See chapter 4.
2. Remove the memory module as previously described.
3. Hold the module only by its edges, being careful not to touch its components or gold edge connectors, and place it on an antistatic surface.
4. Remove the DIMMs one at a time.

CAUTION

Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM.

5. Gently push the plastic ejector levers out and down to eject (Figure 8-7) the DIMM from its socket.
6. Carefully lift the DIMM away from the socket and store it in an antistatic package.
7. Repeat the above steps to remove other DIMMs.

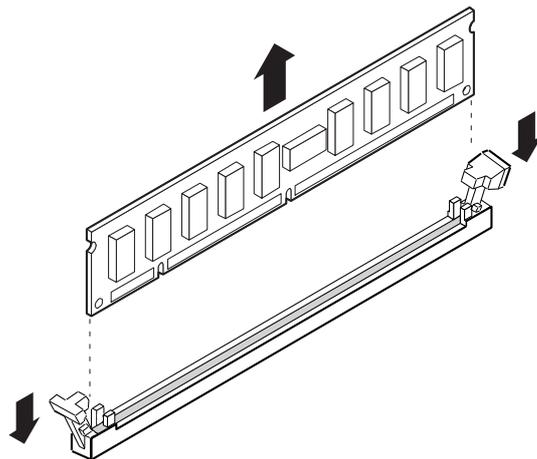


Figure 8-8 Removing a DIMM

8. Install the memory module and replace the server left side cover.
9. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.
10. Turn on your monitor and then your server.

Run the System Configuration Utility (SCU) to configure the server and to properly attribute ECC memory. Failure to do so may degrade the performance of your server. For information about running the SCU, see chapter 3, 'Configuration'.

9 MOTHERBOARD I/O & INTERRUPTS

I/O map

The I/O map in the following table shows the location in I/O space of all directly I/O accessible registers.

Address	Resource
0000h–000Fh	DMA Controller 1
0020h–0021h	Interrupt Controller 1
002Eh–002Fh	Super I/O Index and Data Ports
0040h–0043h	Programmable Timer
0060h, 0064h	Keyboard Controller
0061h	NMI Status & Control Register
0070h	NMI Mask (bit 7) & RTC Address (bits 6:0)
0071h	Real Time Clock (RTC)
0080h–0081h	BIOS Timer
0080h–008Fh	DMA Low Page Register
0092h	System Control Port A (PC-AT † control Port)
00A0h–00BFh	Interrupt Controller 2
00C0h–00DFh	DMA Controller 2
00F0h	Clear NPX error
00F8h–00FFh	x87 Numeric Coprocessor
0170h–0177h	Secondary Fixed Disk Controller (IDE)
01F0h–01F7h	Primary Fixed Disk Controller (IDE)
0200h–0207h	Game I/O Port
0220h–022Fh	Serial Port A
0238h–023Fh	Serial Port B
0278h–027Fh	Parallel Port 3
02E8h–02EFh	Serial Port B
02F8h–02FFh	Serial Port B
0338h–033Fh	Serial Port B
0370h–0375h	Secondary Floppy
0378h–037Fh	Parallel Port 2
03B4h–03BAh	Monochrome Display Port
03BCh–03BFh	Parallel Port 1 (Primary)
03C0h–03CFh	Video Display Controller
03D4h–03DAh	Color Graphics Controller

Continued:

Installation

Address	Resource
03E8h–03EFh	Serial Port A
03F0h–03F5h	Floppy Disk Controller
03F6h–03F7h	Primary IDE - Secondary Floppy
03F8h–03FFh	Serial Port A (Primary)
0400h–043Fh	DMA Controller 1, Extended Mode Registers
0461h	Extended NMI / Reset Control
0462h	Software NMI
0480h–048Fh	DMA High Page Register
04C0h–04CFh	DMA Controller 2, High Base Register
04D0h–04D1h	Interrupt Controllers 1 and 2 Control Register
04D4h–04D7h	DMA Controller 2, Extended Mode Register
04D8h–04DFh	Reserved
04E0h–04FFh	DMA Channel Stop Registers
0678h–067Ah	Parallel Port (ECP)
0778h–077Ah	Parallel Port (ECP)
07BCh–07BEh	Parallel Port (ECP)
0800h–08FFh	NVRAM
0CA4	PCI to IRQ rerouter control (PCI_INTB_L, PCI_INTA_L)
0CA5	PCI to IRQ rerouter control (PCI_INTD_L, PCI_INTC_L)
0CA6h–0CA7h	Reserved
0CA9h	DISMIC Data Register
0CAAh	DISMIC Control/Status Register
0CABh	DISMIC Flags Register
0C84h	Board Revision Register
0C85h–0C86h	BIOS Function Control
0CF8h	PCI CONFIG_ADDRESS Register
0CF9h	PMC Turbo and Reset control
0CFCh	PCI CONFIG_DATA Register
46E8h	Video Display Controller
xx00–xx1F*	SCSI registers

- SCSI I/O base address is set using the configuration registers.

Interrupts

The following table shows the logical interrupt mapping of interrupt sources on the system board.

Interrupt	Description (active-low signals have an “_L” symbol following them)
INTR	Processor interrupt.
NMI	NMI from DISMIC to processor.
IRQ0/MIRQ0	System board interrupt request 0 connected to input 2 of the I/O Apic. (For proper operation, the BIOS must set the IRQ0 enable bit in PIIX3 register 70h during initialization.)
IRQ1	RTC.
IRQ3	Serial port A or B interrupt from 87307VUL device, user configurable.
IRQ4	Serial port A or B interrupt from 87307VUL device, user configurable.
IRQ5	Parallel port.
IRQ6	Floppy diskette.
IRQ7	Parallel port.
IRQ8_L	
IRQ9	
IRQ10	
IRQ11	
IRQ12	Keyboard/mouse interrupt from 87307VUL.
IRQ14	Compatibility IDE interrupt from primary IDE devices 0 and 1.
IRQ15	
IDE_IRQ	Tied to IRQ14; hard wired from PIIX3.

The following signals will be rerouted to the above interrupts:

PCI_INTA_L	PCI Interrupt signal A from PIIX3. Wired to PCI-0 slot 1 INTA_L, PCI-0 slot 2 INTD_L, PCI-0 slot 3 INTC_L, PCI-0 slot 4 INTB_L, PCI-1 slot 1 INTA_L, and PCI-1 slot 2 INTD_L.
PCI_INTB_L	PCI Interrupt signal B from PIIX3. Wired to PCI-0 slot 1 INTB_L, PCI-0 slot 2 INTA_L, PCI-0 slot 3 INTD_L, PCI-0 slot 4 INTC_L, PCI-1 slot 1 INTB_L, and PCI-1 slot 2 INTA_L. This interrupt is also used by the SCSI controller.
PCI_INTC_L	PCI Interrupt signal C from PIIX3. Wired to PCI-0 slot 1 INTC_L, PCI-0 slot 2 INTB_L, PCI-0 slot 3 INTA_L, PCI-0 slot 4 INTD_L, PCI-1 slot 1 INTC_L, and PCI-1 slot 2 INTB_L. This interrupt is also used by the Network controller.
PCI_INTD_L	PCI Interrupt signal D from PIIX3. Wired to PCI-0 slot 1 INTD_L, PCI-0 slot 2 INTC_L, PCI-0 slot 3 INTB_L, PCI-0 slot 4 INTA_L, PCI-1 slot 1 INTD_L, PCI-1 slot 2 INTC_L. SMI_L System Management Interrupt. General-purpose error indicator from a control PAL that provides an SMI_L from nontraditional error sources (PERR_L, SERR_L, and others).

Flash ROM

An 8-bit flash memory device provides 512 K x 8 of BIOS and nonvolatile storage space. The device is addressed as 8-bit ISA memory.

You can load a new copy of the BIOS into flash memory by using the Flash Memory Update Utility (FMUP) diskette.

10 SYSTEM FANS

The server contains up to five fans for cooling and airflow.

- ◆ Some server configurations may have up to four fans in the motherboard side of the server.
- ◆ Servers with only one or two power supplies also have a fan on the power supply side of the server.
 - ◇ For servers with three power supplies, this fan is not installed. Instead, the integrated power supply fans provide cooling and airflow.

Replace a failed fan with the same type. Contact your Apricot supplier for replacement fans.

WARNING

Use of non-conforming or untested components may invalidate your system's compliance with EMC and other legislation. Damage caused by fitting of such components will not be covered by your warranty.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices, particularly the advice concerning antistatic precautions.
2. Turn the server off with the system power push-button on/off switch on the front panel of the server, and unplug all AC power cables.
3. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
4. If you installed a padlock on the back of the server, unlock the padlock and remove it.

Tools and Supplies You Need

- ◆ Phillips (cross-head) screwdriver (#1 bit and #2 bit)
- ◆ Small flat-bladed screwdriver
- ◆ Antistatic wrist strap (recommended)
- ◆ Pen or pencil

Equipment Log

Use the equipment log form provided at the rear of this handbook, to record the model and serial numbers of the server, all installed options, and any other pertinent information specific to the server. Keep it in a safe place.

You may need this information when running the SCU.

CAUTION

All system boards and most components are highly susceptible to static damage. Take note of the antistatic precautions detailed in Appendix A at the rear of this handbook.

Removing a Front Panel Fan

See Figures 10-1 and 10-2

The arrow on the fan indicates the direction of airflow. The front panel fans pull air into the server.

1. Remove the left side cover. See chapter 4.
2. Depending on which fan you are removing, disconnect the fan power cable connector from the fan header, Fan 2 or Fan 4, on the system board.
3. Press the left outer flexible tab on the plastic housing and fan assembly toward the fan until you can pull the tab through the slot in the chassis.
4. Pull the assembly toward you, remove it from the chassis, and place it fan-side up on a flat surface.

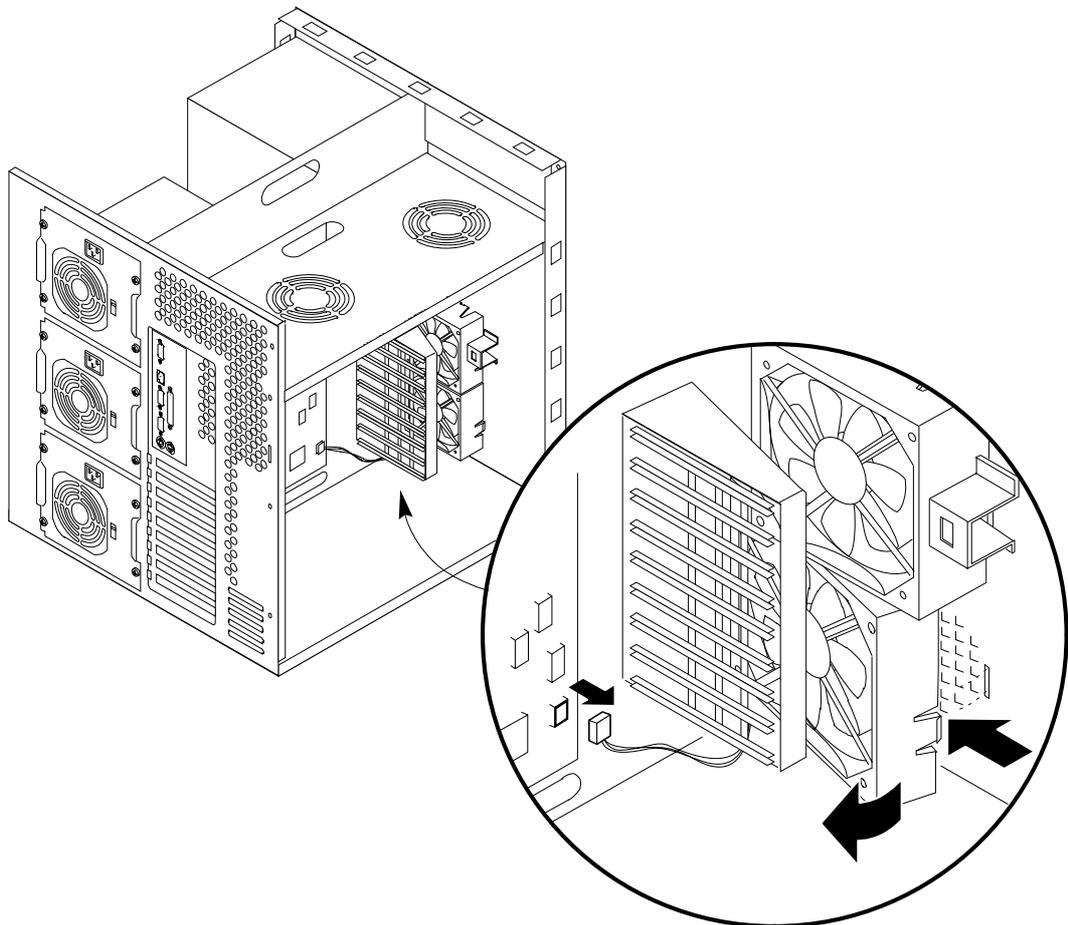


Figure 10-1 Front Panel Fans

5. Remove the fan from the plastic housing by pushing the inner flexible tabs on the housing away from the fan. Retain the housing. Figure 10-2.

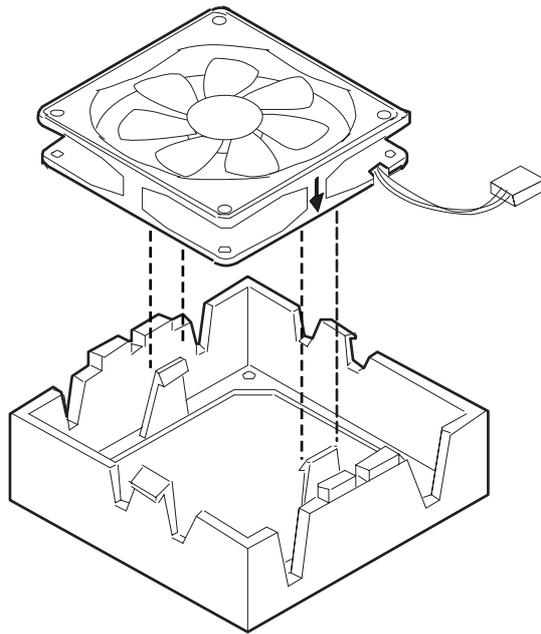


Figure 10-2 Front Fan Assembly

Replacing a Front Panel Fan

See Figures 10-1 and 10-2

The arrow on the fan indicates the direction of airflow. The front panel fans pull air into the server.

1. Place the plastic housing, flexible tabs facing up, on a flat surface.
2. With the power cable side of the fan facing down, place it inside the plastic housing. Route the cable through the slot in the side of the housing.
3. Press down on the fan until the inner flexible plastic tabs on the housing snap into place on the fan.
 - ◇ Make sure you do not pinch the cable between the housing and the fan.
4. Position the plastic housing and fan assembly inside the chassis in front of the card guide, and align the tabs with the slots in the front of the chassis.
5. Insert the right flexible tab through the right slot in the front of the chassis. Then press the left flexible tab through the left slot until it snaps into place.
6. Connect the fan power cable connector to the fan header on the system board. The bottom fan connects to connector Fan 2 and the top one connects to connector Fan 4 on the system board.
7. Replace the left side cover.
8. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.

Removing the Fan Below the Top Power Supply

See Figures 10-3 and 10-4

The arrow on the fan indicates the direction of airflow. The fan pulls air through the hot-docking bays and exhausts it out of the server.

1. Remove both side covers and the top cover. See chapter 4.
2. Disconnect the fan power cable connector from the fan header on the hot-docking backplane.
3. Press the top outer flexible tab on the plastic housing and fan assembly toward the fan until you can pull the tab through the slot in the chassis.
4. Pull the top of the assembly toward the hot-docking bays to disengage the bottom flexible tab.
5. Remove the assembly from the chassis, and place it, fan-side down, on a flat surface.

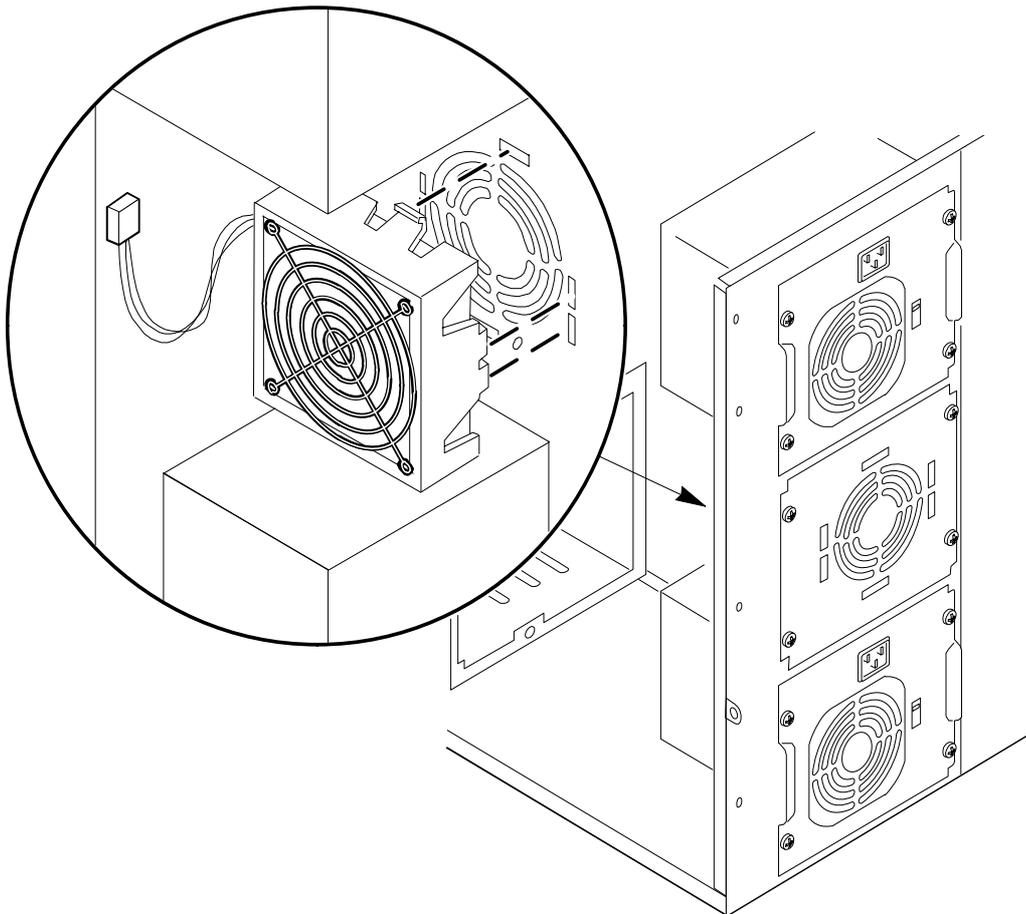


Figure 10-3 Fan Below the Top Power Supply

6. Remove the two screws that attach the finger guard to fan. Set the screws and finger guard aside.

7. Place the assembly, fan-side up, on a flat surface.
8. Remove the fan from the plastic housing by pushing the inner flexible tabs on the housing away from the fan. Retain the housing.

WARNING

When replacing a rear fan it is vital to remember to replace the metal fingerguard to prevent injury to personnel.

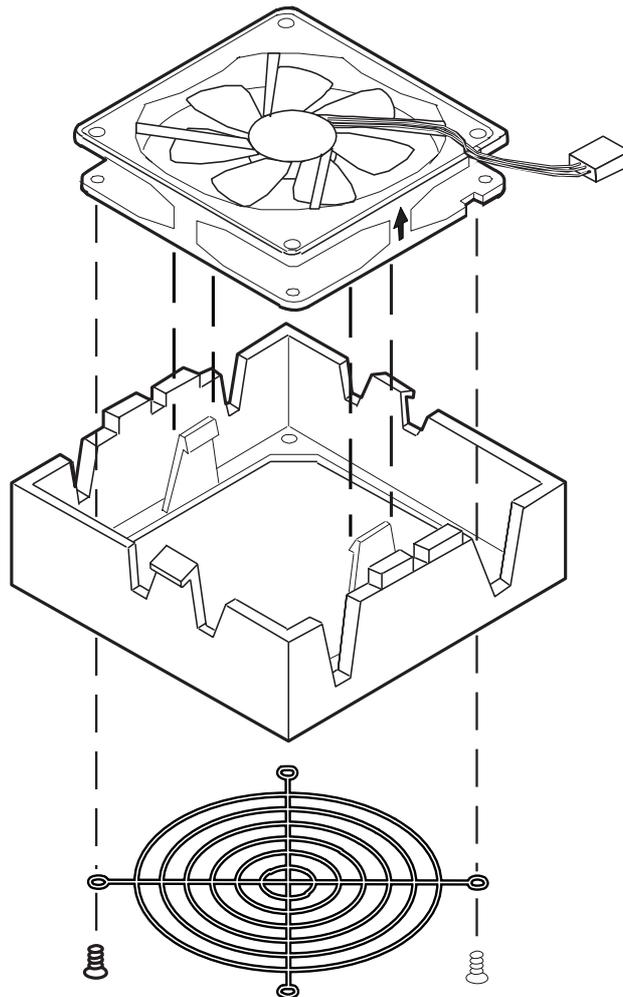


Figure 10-4 Rear Fan Assembly

Replacing the Fan Below the Power Supply

See Figures 10-3 and 10-4

The arrow on the fan indicates the direction of airflow. The fan pulls air through the hot-docking bays and exhausts it out of the server.

1. Place the plastic housing, flexible tabs facing up, on a flat surface.
2. With the power cable side of the fan facing up, place it inside the plastic housing. Route the cable through the slot in the side of the housing.

System fans

3. Press down on the fan until the inner flexible plastic tabs on the housing snap into place on the fan.
 - ◇ Make sure you do not pinch the cable between the housing and the fan.
4. Place the assembly, fan-side down, on a flat surface. Attach the finger guard to the fan with the screws you removed earlier.

WARNING

When replacing a rear fan it is vital to remember to replace the metal fingerguard to prevent injury to personnel.

5. Position the plastic housing and fan assembly inside the chassis below the top power supply, and align the tabs with the slots in the back of the chassis.
6. Insert the bottom flexible tab through the bottom slot in the back of the chassis. Then press the top flexible tab through the top slot until it snaps into place.
7. Connect the fan power cable connector to the fan header on the hot-docking backplane.
8. Replace the top cover and both side covers.
9. Connect all signal cables and power cables(s) to the system.
 - ◇ Some systems have more than one power cable.

If the fan is not to be replaced, but a third power supply is being installed, you must start the SCU immediately after switching on to remove the fan failure sensing from the configuration. Otherwise you will get a permanent fan fail alarm. For information about the SCU see chapter 3, 'Configuration'.

11 TROUBLESHOOTING

This chapter helps you identify and solve problems that might occur while using the server.

Resetting the Server

You can reset the server in two ways.

Manually

<i>Press</i>	<i>To</i>
<Ctrl+Alt+Del>	Clear system memory and reload the operating system. This is a "soft boot" reset.
Power off/on	Turn the system power off and then on. This is a "cold boot" reset; it has the same effect as pushing the reset button except that power is halted to all peripherals.

Programmed

You can reset the server with software.

Initial System Startup

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

Checklist

- ◆ Are all cables correctly connected and secured?
- ◆ Are the processors correctly seated in their slots?
- ◆ Is the memory module or the (optional) RPX fully seated and in its slot on the system board?
- ◆ Are all add-in ISA and PCI boards fully seated in their slots on the system board?
- ◆ Are all jumper settings on the system board correct? For information, see chapter 7, 'System boards'.
- ◆ Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. Check that no two add-in boards are sharing the same interrupt.
- ◆ Are all DIMMs on the memory module installed correctly? Refer to Chapter 8, 'Upgrading the server' for installation instructions.
- ◆ Are all add-in boards and peripheral devices installed correctly? Refer to chapter 7, 'System boards'.
- ◆ If the system has a hard disk drive, is it properly formatted or defined?
- ◆ If you have just added a second processor, more memory, hard disks, or add-in boards, do you have enough capacity in the power supply. See chapter 5, 'Server power'.
- ◆ Is the SCSI hot-docking backplane configured and terminated correctly? For information about the board, see chapter 6, 'SCSI hard disk sub-system'.

Troubleshooting

- ◆ Are all device drivers properly installed? For information about installing drivers, see chapter 3, 'Configuration'.
- ◆ Are the configuration settings made with the SCU correct? For information about running the SCU, see chapter 3, 'Configuration'.
- ◆ Is the operating system properly loaded? Refer to the operating system documentation.
- ◆ Did you press the system power on/off switch on the front panel to turn the server on (power-on light should be lit)?
- ◆ If more than one power supply is fitted, each power supply requires an AC supply cable. Are the power cables the correct type?
- ◆ Is AC power available at the wall outlet?

If the problem persists contact your Apricot supplier or approved maintainer.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly.

Checklist

- ◆ Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- ◆ Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- ◆ If you are running the software from a diskette, is it a good copy?
- ◆ If you are running the software from a CD-ROM disc, is the disc scratched or dirty?
- ◆ If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- ◆ Are the correct device drivers installed?
- ◆ Is the software correctly configured for the system?
- ◆ Are you using the software correctly?

If the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. Many situations that are easy to correct however, can also cause such problems.

Checklist

- ◆ If you are running the software from a diskette, try a new copy of the software.
- ◆ If you are running the software from a CD-ROM, try a different disc to see if the problem occurs on all discs.
- ◆ If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk drive.

- ◇ Reinstall the software on the hard disk drive, and try running it again. Make sure all the necessary files are installed.
- ◆ If a software application does not run correctly with the 'Boot Speed' set to turbo, try setting it to deturbo with Setup.
- ◆ If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- ◆ If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again.
- ◇ Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

NOTE

If you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppresser between the power outlet and the server power cable.

If the problem recurs after you have checked and corrected all the above items, contact your Apricot supplier or your software vendor.

- ◇ If you receive any error messages, refer to 'Error and Informational Messages' on page 7 of this chapter for an explanation of the messages and suggested corrective actions.

Additional Troubleshooting Procedures

This section provides a more detailed approach to identifying a problem and locating its source.

Preparing the System for Diagnostic Testing

CAUTION

Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all of them from the system, except the keyboard and video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet. Refer to chapter 2, 'Installation'.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power LED does not light, refer to 'Power Light Does Not Light' on page 4 of this chapter.

Monitoring POST

See Chapter 3, 'Configuration'.

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity light should turn on briefly. Check for the following:

- ◆ Does the diskette drive activity light turn on briefly? If not, refer to 'Diskette Drive Activity Light Does Not Light' on **page 6** of this chapter.
- ◆ If a second diskette drive is installed, does its activity light turn on briefly? If not, refer to 'Diskette Drive Activity Light Does Not Light' on **page 6** of this chapter.
- ◆ If there is a hard disk drive or a SCSI device installed in the system, does the drive activity light on the front panel turn on briefly? If not, refer to 'Hard Disk Drive Activity Light Does Not Light' on **page 6** of this chapter.

NOTE

See 'Controls and Indicators' in Chapter 2, 'Installation'.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, refer to 'Initial System Startup' on **page 1** of this chapter.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- ◆ Power light does not light.
- ◆ System cooling fans do not rotate or rotate slowly.
- ◆ No characters appear on screen.
- ◆ Characters on the screen appear distorted or incorrect.
- ◆ No beep or incorrect beep pattern.
- ◆ Activity light on the diskette drive does not light.
- ◆ Activity light on the hard disk drive does not light.
- ◆ Activity light on the tape drive does not light.
- ◆ Problems with application software.

Try the solutions in the order given. If you cannot correct the problem, contact your Apricot dealer or authorised maintainer for assistance.

Power Light Does Not Light

Check the following:

- ◆ Does the system appear to be operating normally? If so, the power LED may be defective or the cable from the front panel to the system board is loose.
- ◆ Are there other problems with the system? If so, check the items listed under, for example, 'System Cooling Fans Do Not Rotate Properly'.

- ◆ Is the yellow power supply failure LED flashing? If so, a power supply has failed.

If all items are correct and problems persist, contact your Apricot dealer or authorised maintainer for assistance.

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components will be damaged.

NOTE

The system has up to seven cooling fans, three of them are integral parts of the power supplies. There are no serviceable components in the power supply. If the power supply is opened, the warranty is voided.

Check the following:

- ◆ Is AC power available at the wall outlets?
- ◆ Are the system power cables properly connected to the system and the wall outlets?
- ◆ If present, are the fuses in the system AC power cable plugs okay?
- ◆ Did you press the power on/off push-button switch?
- ◆ Is the power-on light lit?
- ◆ Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- ◆ Are the fan power connectors properly connected to the system board?
- ◆ Is the cable from the front panel board connected to the system board?
- ◆ Are the power supply cables properly connected to the power share backplane?
- ◆ Are the power share backplane cables properly connected to the system board?
- ◆ Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlets, contact your Apricot dealer or authorised maintainer for assistance.

No Characters Appear on Screen

Check the following:

- ◆ Is the keyboard working?
- ◆ Is the video monitor plugged in and turned on?
- ◆ Are the brightness and contrast controls on the video monitor properly adjusted?
- ◆ Are the video monitor switch settings correct?
- ◆ Is the video monitor signal cable properly installed?
- ◆ Is the onboard video controller enabled?
 - ◇ If you are using an add-in video controller board, do the following:
 - I. Verify that the video controller board is fully seated in the system board connector.
 - II. Run the SCU to disable the onboard video controller and specify that an off-board VGA/EGA adapter is installed.
 - III. Reboot the system for changes to take effect.

Troubleshooting

- IV. If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative. See 'POST Beep Codes' on page 7 of this chapter.
- V. If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your Apricot dealer or authorised maintainer for assistance.

Characters Are Distorted or Incorrect

Check the following:

- ◆ Are the brightness and contrast controls properly adjusted on the video monitor? Refer to the manufacturer's documentation.
- ◆ Are the video monitor signal and power cables properly installed?

If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your Apricot dealer or authorised maintainer for assistance.

Incorrect or no Beep Codes

If the system operates normally, but there was no beep, the speaker may be defective. Verify that the speaker is enabled by running the SCU. For information about running the SCU, see chapter 3, 'Configuration'. If the speaker is enabled, but not functioning, contact your Apricot dealer or authorised maintainer for assistance.

Record the beep code emitted by POST, and refer to 'Error and Informational Messages' on page 7 of this chapter for information about beep codes and error messages.

Diskette Drive Activity Light Does Not Light

Check the following:

- ◆ Are the diskette drive power and signal cables properly installed?
- ◆ Are all relevant switches and jumpers on the diskette drive set correctly?
- ◆ Is the diskette drive properly configured?
- ◆ Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette controller, use the SCU to make sure that 'Onboard Floppy' is set to 'Enabled'. If you are using an add-in diskette controller, make sure that 'Onboard Floppy' is set to 'Disabled'. For information about running the SCU, see Chapter 3, 'Configuration'.

If the problem persists, there may be a problem with the diskette drive, system board, or drive signal cable. Contact your Apricot dealer or authorised maintainer for assistance.

Hard Disk Drive Activity Light Does Not Light

If you have installed one or more hard disk drives in your system, check the following:

- ◆ Are the power and signal cables to the hard disk drive properly installed?
- ◆ If your system contains a SCSI host adapter controller board, is it fully seated in the system board connector?
- ◆ Are all relevant switches and jumpers on the hard disk drive and controller board set correctly?
- ◆ Is the onboard IDE controller enabled?

NOTE

The hard disk drive activity light on the front panel lights when either an IDE hard disk drive or SCSI device is in use.

- ◆ Is the hard disk drive properly configured?
- ◆ If your system contains a SCSI host adapter controller board, is the hard disk activity LED cable connector plugged into the controller board and the system board?

If you received error messages, refer to 'Error and Informational Messages' on page 7 of this chapter for information about error messages.

If you did not receive error messages, run the SCU and make sure that the hard disk drive is configured with the correct parameters. For information about running the SCU, see chapter 3, 'Configuration'.

If the problem persists, there may be a problem with the hard disk drive, the add-in controller board, system board, drive signal cable, or LED connector.

Contact your Apricot dealer or authorised maintainer for assistance.

Problems With Application Software

If you have problems with application software, do the following:

1. Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
2. Verify that the software is properly configured for the system. Refer to the software installation and operation documentation for instructions on setting up and using the software.
 - ◇ Are the correct device drivers installed?
 - ◇ Are you using the software correctly?
3. Try a different copy of the software to see if the problem is with the copy you are using.
 - ◇ If you are running the software from a diskette, is it a good copy?
 - ◇ If you are running the software from a CD-ROM, is the disc scratched or dirty?
 - ◇ If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
4. Make sure all cables are installed correctly.
5. Verify that the system board jumpers are set correctly.
6. Try running the software in a different speed mode. Refer to chapter 3, 'Configuration'.
7. If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Error and informational Messages

When you turn on the system, POST displays messages that provide information about the system. If a failure occurs, POST emits beep codes that indicate errors in hardware, software, or firmware. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

POST Beep Codes

POST cannot display messages when an error occurs before the video display is initialised. Instead, it emits *one long and two short beeps*. Other beep codes are a series of individual beeps, each one equal in length. Write down the beep code you hear, plus any error messages that appear, this information is useful for your service representative.

Beeps	Error Message and Conditions
1-2	ROM checksum error; ROM checksum value does not match encoded value in BIOS
1-2-2-3	ROM checksum error; ROM checksum value does not match encoded value in BIOS
1-3-1-1	Refresh failure; memory refresh circuitry on the baseboard is faulty
1-3-1-3	Keyboard controller gate A20 is off; BIOS cannot switch to protected mode
1-3-4-1	Memory error
1-4-1-1	Memory error
2-1-2-3	ROM copyright notice failure
2-2-3-1	Unexpected interrupt

POST Codes and Countdown Codes

The BIOS indicates the current testing phase during POST after the video adapter has been successfully initialised by outputting a 2-digit hex code to I/O location 80h. If a port-80h ISA card is installed, it displays this 2-digit code on a pair of hex display LEDs.

Normal Port-80 Codes and Countdown Codes

These are the port-80 codes and countdown codes displayed during the normal BIOS POST process.

This table continues over a few pages.

Port 80 Code	Reason
02	Verify Real Mode
04	Get CPU type
06	Initialize system hardware
08	Initialize chipset registers with initial POST values
09	Set in POST flag
0A	Initialize CPU registers
0B	Enable CPU cache
0C	Initialize caches to initial POST values
0E	Initialize I/O
0F	Initialize the local bus IDE
10	Initialize Power Management

Continued:

Port 80 Code	Reason
11	Load alternate registers with initial POST values new
12	Restore CPU control word during warm boot
14	Initialize keyboard controller
16	BIOS ROM checksum
18	8254 timer initialization
1A	8237 DMA controller initialization
1C	Reset Programmable Interrupt Controller
20	Test DRAM refresh
22	Test 8742 Keyboard Controller
24	Set ES segment register to 4GB
28	Autosize DRAM
2A	Clear 512K base RAM
2C	RAM failure on address line xxxx*
2E	RAM failure on data bits xxxx* of low byte of memory bus
30	RAM failure on data bits xxxx* of high byte of memory bus
32	Test CPU bus-clock frequency
34	Test CMOS
35	RAMInitialize alternate chipset registers.
36	Warm start shut down
37	Reinitialize the chipset (MB only)
38	Shadow system BIOS ROM
39	Reinitialize the cache (MB only)
3A	Autosize cache
3C	Configure advanced chipset registers
3D	Load alternate registers with CMOS valuesnew
40	Set Initial CPU speed new
42	Initialize interrupt vectors
44	Initialize BIOS interrupts
46	Check ROM copyright notice
47	Initialize manager for PCI Option ROMs
48	Check video configuration against CMOS
49	Initialize PCI bus and devices
4A	Initialize all video adapters in system
4B	Display QuietBoot screen
4C	Shadow video BIOS ROM
4E	Display copyright notice
50	Display CPU type and speed
51	Initialize EISA board
52	Test keyboard
54	Set key click if enabled
56	Enable keyboard
58	Test for unexpected interrupts

Continued:

Troubleshooting

Port 80 Code	Reason
5A	Display prompt "Press F2 to enter SETUP"
5C	Test RAM between 512 and 640k
60	Test extended memory
62	Test extended memory address lines
64	Jump to UserPatch1
66	Configure advanced cache registers
68	Enable external and CPU caches
6A	Display external cache size
6C	Display shadow message
6E	Display non-disposable segments
70	Display error messages
72	Check for configuration errors
74	Test real-time clock
76	Check for keyboard errors
7A	Test for key lock on
7C	Set up hardware interrupt vectors
7E	Test coprocessor if present
80	Detect and install external RS232 ports
82	Detect and install external parallel ports
85	Initialize PC-compatible PnP ISA devices
86	Re-initialize on board I/O ports.
88	Initialize BIOS Data Area
8A	Initialize Extended BIOS Data Area
8C	Initialize floppy controller
90	Initialize hard-disk controller
91	Initialize local-bus hard-disk controller
92	Jump to UserPatch2
93	Build MPTABLE for multi-processor boards
94	Disable A20 address line
95	Install CD ROM for boot
96	Clear huge ES segment register
98	Search for option ROMs. One long, two short beeps on checksum failure
9A	Shadow option ROMs
9C	Set up Power Management
9E	Enable hardware interrupts
A0	Set time of day
A2	Check key lock
A4	Initialize typematic rate
A8	Erase F2 prompt
AA	Scan for F2 key stroke
AC	Enter SETUP
AE	Clear in-POST flag

Continued:

Port 80 Code	Reason
B0	Check for errors
B2	POST done – prepare to boot operating system
B4	One short beep before boot
B5	Display MultiBoot menu
B6	Check password (optional)
B8	Clear global descriptor table
BC	Clear parity checkers
BE	Clear screen (optional)
BF	Check virus and backup reminders
C0	Try to boot with INT 19
DO	Interrupt handler error
D2	Unknown interrupt error
D4	Pending interrupt error
D6	Initialize option ROM error
D8	Shutdown error
DA	Extended Block Move
DC	Shutdown 10 error

POST Error Codes and Messages

The following table defines POST error codes and associated messages. These codes may change in the future as the Phoenix BIOS matures and includes the support for POST error code display.

This table continues over a few pages.

Code	Error message
0002	Primary Boot Device Not Found
0010	Cache Memory Failure, Do Not Enable Cache
0015	Primary Output Device Not Found
0016	Primary Input Device Not Found
0042	ISA Config contains invalid info
0050	PnP Memory Conflict:
0051	PnP 32-bit Memory Conflict:
0052	PnP IRQ Conflict:
0053	PnP DMA Conflict:
0054	PnP Error Log is Full
0055	Bad PnP Serial ID Checksum:
0056	Bad PnP Resource Data Checksum:
0060	Keyboard Is Locked ... Please Unlock It
0070	CMOS Time & Date Not Set
0080	Option ROM has bad checksum
0083	Shadow of PCI ROM Failed
0085	Shadow of ISA ROM Failed
0131	Floppy Drive A:

Continued:

Troubleshooting

Code	Error message
0132	Floppy Drive B:
0135	Floppy Disk Controller Failure
0140	Shadow of System BIOS Failed
0170	Disabled CPU slot #
0171	CPU Failure – Slot 1, CPU # 1
0172	CPU Failure – Slot 1, CPU # 2
0173	CPU Failure – Slot 2, CPU # 1
0174	CPU Failure – Slot 2, CPU # 2
0175	CPU modules are incompatible or one is not present.
0176	Previous CPU Failure – CPU # 1
0177	Previous CPU Failure – CPU # 2
0180	Attempting to boot with failed CPU
0181	BSP switched, system may be in uniprocessor mode
0191	CMOS Battery Failed
0195	CMOS System Options Not Set
0198	CMOS Checksum Invalid
0289	System Memory Size Mismatch
0295	Address Line Short Detected
0297	Memory Size Decreased
0299	ECC Error Correction failure Code Error message
0301	ECC Single-bit correction failed, Correction Disabled
0302	ECC Double-bit Error
0303	ECC DIMMs incompatible
0310	ECC Address failure, Partition #
0313	ECC Memory Size Decreased, Bank #
0370	Keyboard Controller Error
0373	Keyboard Stuck Key Detected
0375	Keyboard and Mouse Swapped
0380	ECC DIMM failure, Board in slot 1 DIMM #
0392	ECC DIMM failure, Board in slot 2 DIMM #
0430	Timer Channel 2 Failure
0440	Gate-A20 Failure
0441	Unexpected Interrupt in Protected Mode
0445	Master Interrupt Controller Error
0446	Slave Interrupt Controller Error
0450	Master DMA Controller Error
0451	Slave DMA Controller Error
0452	DMA Controller Error
0460	Fail-safe Timer NMI Failure
0461	Software Port NMI Failure
0465	Bus Time-out NMI in Slot
0467	Expansion Board NMI in Slot

Continued:

Code	Error message
0501	PCI System Error
0510	PCI Parity Error
0511	PCI System Error
0710	System Board Device Resource Conflict
0711	Static Device Resource Conflict
0780	PCI Segment 1 memory request exceeds 998 MB
0781	PCI Segment 1 I/O requests exceeds 12K
0782	PCI I/O request exceeds amount available
0783	PCI memory request exceeds amount available
0784	Illegal bus for memory request below 1 MB
0785	Memory request below 1 MB exceeds 1 MB
0800	PCI I/O Port Conflict
0801	PCI Memory Conflict
0802	PCI IRQ Conflict
0803	PCI Error Log is Full
0804	PCI ROM not found, May Be OK For This Card:
0805	Insufficient Memory to Shadow PCI ROM
0806	Memory Allocation Failure for Second PCI Segment
0809	PCI Error Log is Full
0810	Floppy Disk Controller Resource Conflict
0811	Primary IDE Controller Resource Conflict
0812	Secondary IDE Controller Resource Conflict
0815	Parallel Port Resource Conflict
0816	Serial Port 1 Resource Conflict
0817	Serial Port 2 Resource Conflict
0820	Expansion board Disabled in Slot
0900	NVRAM Checksum Error, NVRAM Cleared
0903	NVRAM Data Invalid, NVRAM Cleared
0905	NVRAM Cleared By Jumper
0906	Password Cleared by Jumper
0982	I/O Expansion Board NMI in Slot
0984	Expansion Board Disabled in Slot
0985	Fail-safe Timer NMI
0986	System Reset caused by Watchdog Timer
0987	Bus Time-out NMI in Slot

EQUIPMENT LOG

Use this equipment log to record pertinent information about your server system. You will need some of this information when you run the System Configuration Utility (SCU).

Record the model and serial numbers of the server system and the system board. They are on the back panel of the server and along the left side of the system board near the expansion slots.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the manufacturer's name. Be sure to record the same information for any components added to the system, such as hard disk drives, add-in boards, or printers.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another.

Equipment Log

Component	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
System Board			
Processor/ Memory Module			
Power Share Backplane			
SCSI Hot-docking Backplane #1			
SCSI Hot-docking Backplane #2			
Video Display			
Keyboard			
Mouse			
Floppy Disk Drive A			
Floppy Disk Drive B			
Tape Drive			
CD-ROM Drive			

Equipment log

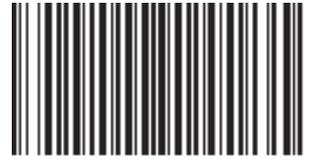
Component	Manufacturer Name and Model Number	Serial Number	Date Installed
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			
Hard Disk Drive 6			
Hard Disk Drive 7			
Hard Disk Drive 8			
Hard Disk Drive 9			
Hard Disk Drive 10			
VGA/EGA Adapter Board			
SCSI Host Adapter Board 1			
SCSI Host Adapter Board 2			
PCI RAID Controller Board			
Power supply ONE			
Power supply TWO			
Power supply THREE			

Equipment log

Notes

Use this area to jot down any additional notes about your server and your configuration.

Note down details such as Supplier (address and phone number), Authorised Maintainer, (address and phone number), plus any other information thought important.



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