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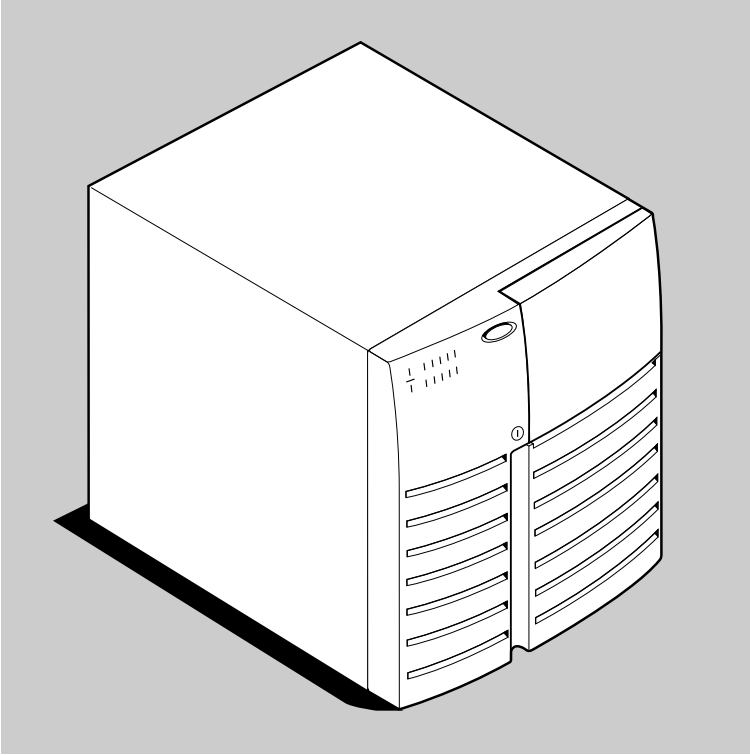
apricot

FT2400

Owner's Handbook



intel inside
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NATIONAL ACCREDITATION OF CERTIFICATION BODIES

APRICOT FT2400

OWNER'S HANDBOOK

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SAFETY AND REGULATORY NOTICES

Power

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.

To use the system with AC voltages between 100 and 120 VAC, you must set the line voltage selector switch on each power supply to 115V.

To use the system with AC voltages between 200 and 240 VAC, you must set the line voltage selector switch on each power supply to 230V.

WARNING

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

To prevent fire and electric shock, do not expose any part of the computer to rain or moisture. Site the computer in a clean, vibration free area.

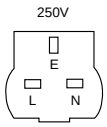
Unplug all fitted power supply cable(s) before moving the system unit, cleaning the computer or removing the side panels. An exception to this is opening the front panel before hot-plugging a hard disk drive.

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



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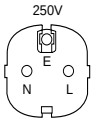
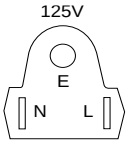


SHUCO

Austria Belgium Italy

Finland Holland Sweden

Norway France Germany

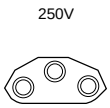


NEMA 5-15P

Taiwan Thailand

USA Canada

Japan



ASE 1011

Switzerland

Additional Power cable information - UK ONLY

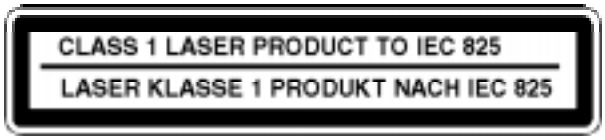
This equipment is supplied with an AC power cable that has a moulded, non-removable, 3-pin AC plug. There may be more than one cable if the server has more than one power supply.

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.

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 cool-ing and airflow, always replace the covers before turning on the server.

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.

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.

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 2

This product also complies with the following International EMC standards:

VCCI level 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.

Legalities

This equipment complies with the following European Directives:

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**

CAUTION

This system complies with the CE marking directive and its strict legal requirements. Use only Apricot tested and approved parts. Failure to do so may result in invalidating both the compliance and your warranty. All expansion cards or upgrade components must carry CE marking.

POWER CONNECTION INFORMATION

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 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 the AC power cable 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.

Notation conventions

The notational conventions listed below are used throughout this manual.

<F1>	A letter, number, symbol, or word enclosed in < > represents a key on your keyboard. For example, the instruction "press <F1>" means press the key labelled "F1" on your keyboard.
<Enter>	Other manuals refer to <Enter> as RETURN, CARRIAGE RETURN, <CR>, or use an arrow. All of these terms are interchangeable.
<x + y>	Two or three key names, separated by plus signs, indicate multiple-key entries. For example, <Ctrl + Alt + Del> means hold down <Ctrl> and <Alt> and press <Del>.

The special notices listed below are used throughout this manual to emphasise specific information:

WARNING

WARNING indicates a hazard that can *cause personal injury or equipment damage if the hazard is not avoided.*

CAUTION

CAUTION indicates a hazard that might *cause personal injury, damage to hardware, or software if the hazard is not avoided.*

NOTE

Notes provide information and may be used to emphasise a recommended sequence of steps.

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:

- a system board with six PCI expansion slots, three ISA expansion slots, and several embedded controller devices (PCI video, SCSI, Network, and IDE)
- a dual processor/memory module with two ZIF sockets for installing Pentium®Pro processors, a plug-in DC to DC converter, and eight DIMM sockets for up to 1 gigabyte (GB) of 3.3 V memory

The server chassis contains a floppy diskette drive, a CD-ROM drive and, depending on the server configuration, up to three 330 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 40 GB of storage. They allow hot-swapping of drives.

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

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

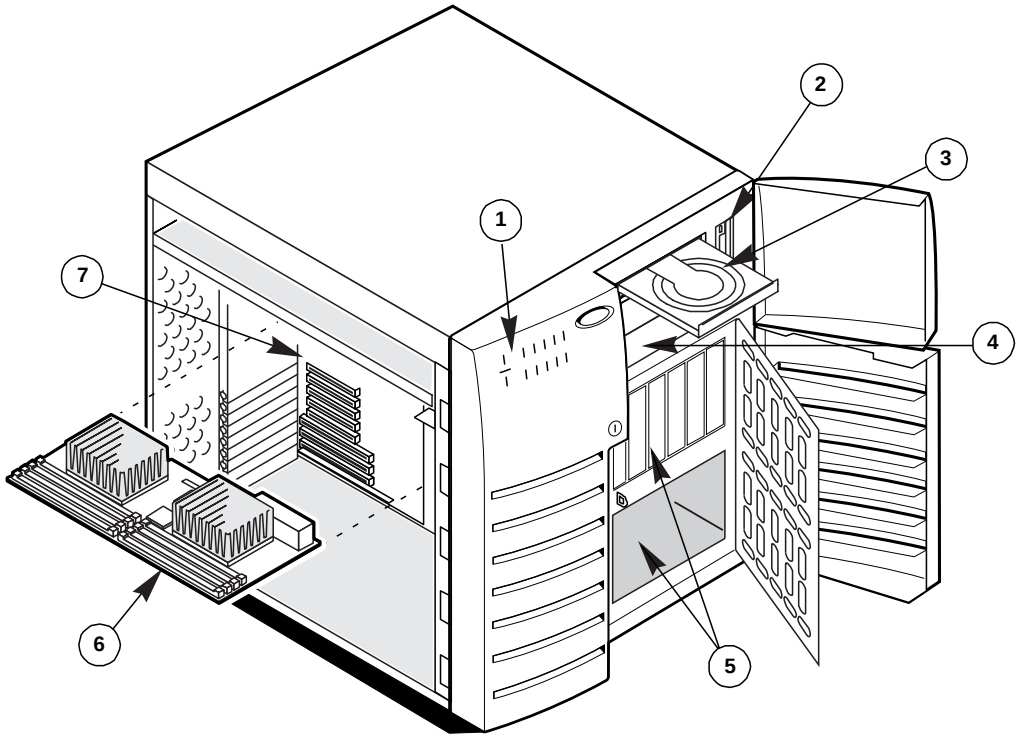


Figure 1-1. Server

1	Front panel	5	SCSI hot-docking bays
2	Floppy diskette drive	6	Dual Pentium Pro processor/memory module
3	CD-ROM drive	7	System board
4	5.25-inch external bays		

Server Features

Feature	Description
Power system with optional redundancy	330 watt power supply, switch-selectable for 115 or 230 VAC operation, includes an integrated fan for cooling (server may be configured with up to three power supplies) Detachable AC power cords
Processor/Memory Support	An expansion slot for an Intel Pentium Pro processor/memory module that supports up to two processors and up to 1 GB of memory
Server Chassis	1.44 MB, floppy diskette drive in the vertical bay Three half-height standard bays. Top bay usually contains a CD-ROM drive Two hot-docking bays; each bay has space for five half-height SCSI hard disk drives At least one SCSI hot-docking backplane. Depending on the server configuration, it may have two backplanes (with additional SCSI controller) Two fans cool and circulate air through the motherboard side of the server. Depending on the server configuration, there may be up to four fans Three integrated power supply fans cool and circulate air through the power supply side of the server. If it contains only one or two power supplies, an additional fan provides cooling and airflow
Server Management	Real-time clock/calendar (RTC) Front panel controls and indicators (LEDs) System Configuration Utility (SCU) and SCSI*Select*† Utility Basic Input/Output System (BIOS), Power-on Self-Test, and Setup stored in a flash memory device
Server I/O	Six 32-bit PCI expansion slots and three 16-bit ISA expansion slots (only eight slots available) one ISA slot shares a common chassis I/O expansion slot with a PCI slot; you can use either the PCI slot or the ISA slot, but not both Integrated Cirrus Logic CL-GD54M40 super video graphics array (SVGA) controller shipped with 512 kilobytes (KB) of video memory (expandable to 1MB) A SCSI-III (AIC-7880) controller for connecting up to seven 8-bit narrow SCSI devices. You can also connect a mixture of fifteen 8-bit narrow and 16-bit wide SCSI devices to the controller. Maximum of seven 8-bit narrow SCSI devices **Note that the chassis hard drive bay only accommodates five drives.** Diskette (floppy) controller that supports two drives PCI-enhanced Integrated Drive Electronics (IDE) hard disk interface that supports two hard disk or two CD-ROM drives PS/2-compatible keyboard/mouse controller PS/2-compatible keyboard and mouse ports PS/2-compatible parallel port Analog VGA, 15-pin video port Two PS/2-compatible, 9-pin serial ports An integrated Intel 82557 PCI LAN controller for 10 or 100 Mbps TX Fast Ethernet networks. RJ45 Ethernet port

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 1-2 and 1-3 show the major system components.

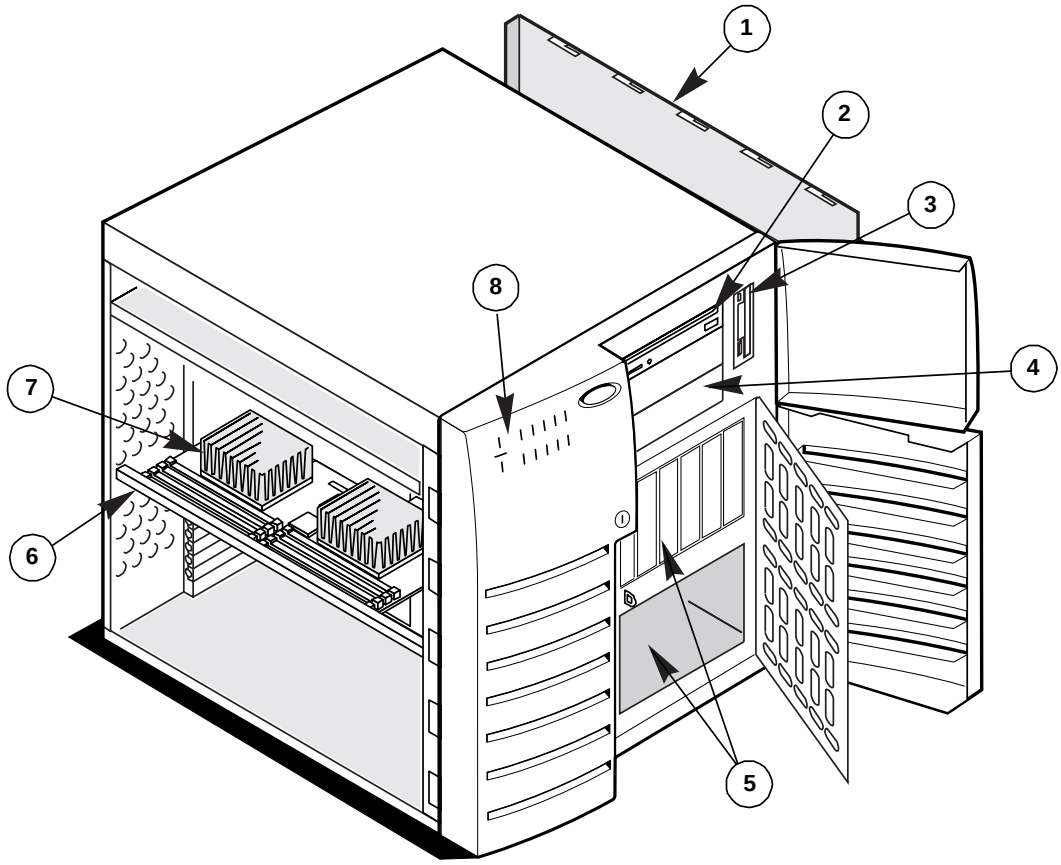


Figure 1-2. Server, Front/Left Side View

1	Right side cover	5	SCSI hot-docking bays
2	CD-ROM drive	6	Module retaining bracket
3	Floppy diskette drive	7	Processor/memory module
4	Full-width peripheral bays	8	Control panel and indicators

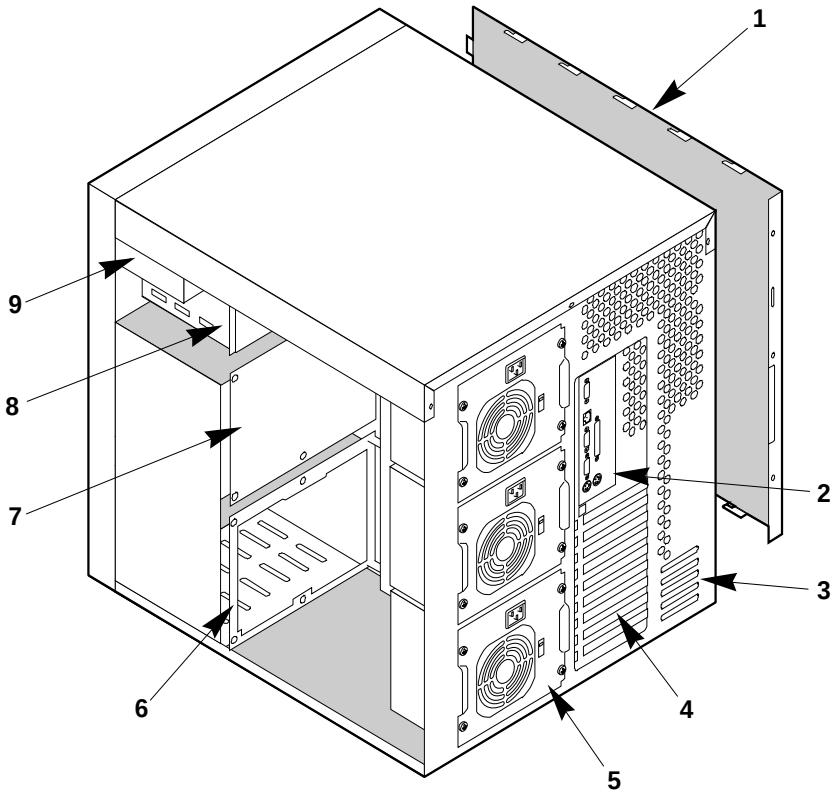


Figure 1-3. Server, Back/Right Side View

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.

Front Panel

- Green (HD ACT) LED: when lit, indicates hard drive activity.
- Yellow fan failure LED: when flashing, indicates the fan has failed.
- Yellow power supply failure LED: when flashing, indicates a power supply has failed.
- Ten yellow hard drive failure LEDs: when lit, indicates a drive failure.
  - ◊ In a RAID configuration: when flashing, drive re-building.
- 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.
- Server power push-button: when pressed, turns the server DC power on or off.

Peripherals

- Diskette drive activity LED: when lit, indicates the drive is in use.
- Diskette drive ejector button: when pressed, ejects the disk.
- CD-ROM headphone jack: used to connect headphones or speakers.
- CD-ROM volume control: used to adjust the volume of headphones or speakers.
- CD-ROM open/close button: used to open and close the CD tray.
- CD-ROM activity LED: when lit, indicates the drive is in use.

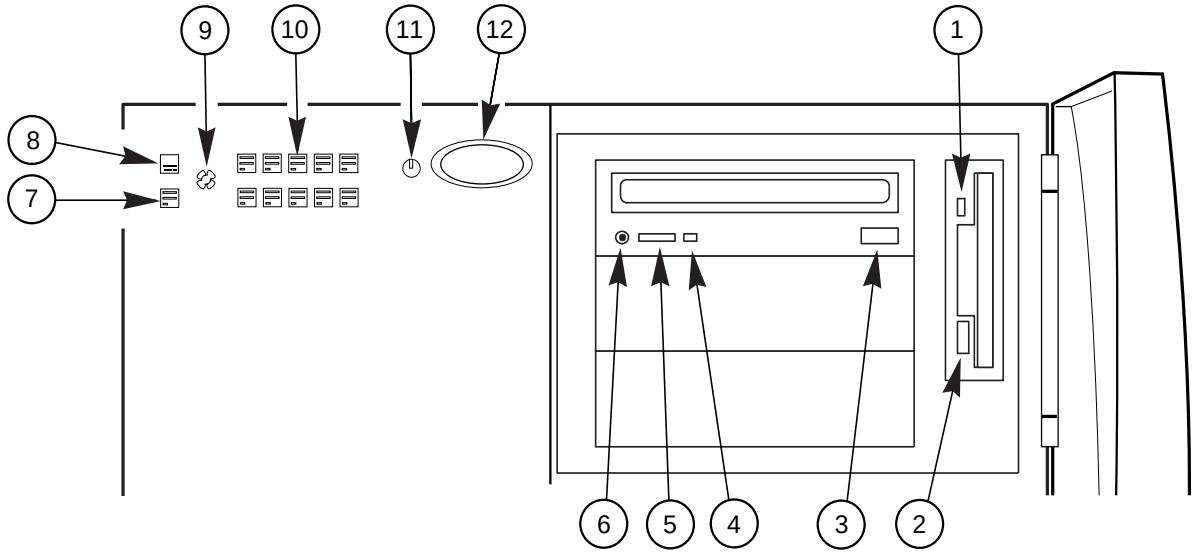


Figure 1-4. Server Controls and Indicators

1	Diskette drive activity LED	7	Power supply failure LED
2	Diskette drive ejector button	8	Hard drive activity LED
3	CD-ROM open/close button	9	Fan failure LED
4	CD-ROM power on LED	10	Drive failure LEDs for hot-docking bays
5	CD-ROM volume control	11	Server power on LED
6	CD-ROM headphone jack	12	Server power on/off push-button switch

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.
- 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.

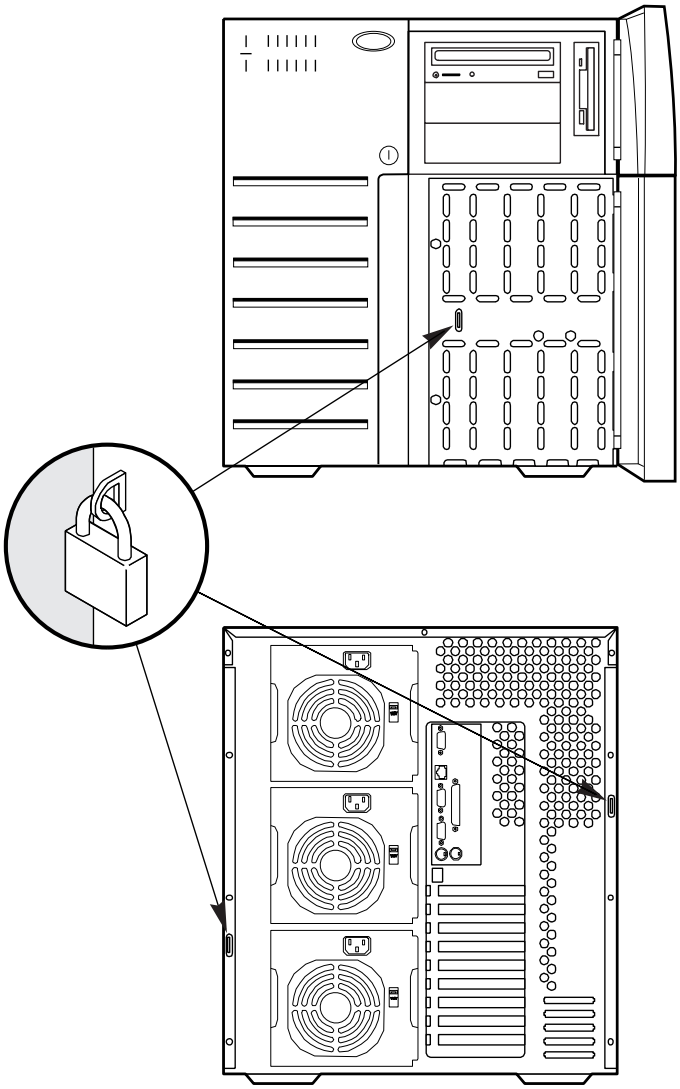


Figure 1-5. Server Security Padlocks

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 CD in the CD-ROM drive or diskette in floppy drive A, 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.

- 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 330 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 330 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; 9.5A maximum current
- 200-240 VAC at 50/60Hz; 5.5A 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 processor/memory module and add-in boards installed on the system board. 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 4 GB hard disk drives, provide over 40 GB of hard disk drive space.

By installing a Redundant Array of Independent Disks (RAID) controller, RAID software, and SCSI hard disk drives in the hot-docking bays, you can easily set up RAID applications.

Server System Board

More detailed information about the server motherboard, seting 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
- Interrupt sharing

PCI Expansion Slots

The six 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 512 KB of onboard video memory allowing pixel resolutions of up to 1024 x 768 and 16 colours.

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). This will allow the controller to support 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 an Adaptec AIC-7880 wide/fast-20 SCSI III controller chip that is integrated as a PCI bus master. The controller supports data path widths of 8-bit (narrow SCSI) at a data transfer rate of 20 MB/sec and 16-bit (wide SCSI) at a data transfer rate of 40 MB/sec. As a PCI bus master, the controller supports data transfer rates of 133 MB/sec.

You can connect a maximum of seven 8-bit narrow SCSI devices to the controller. You can also connect a mixture of up to fifteen 8-bit narrow and 16-bit wide SCSI devices to the controller (maximum of seven 8-bit narrow devices). For example, tape drives, printers, optical media drives, and other devices. However, the server only supports five SCSI hard disk drives in the internal bay and two additional ultra compliant SCSI devices in the half-height drive bays.

The SCSI controller provides 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.

No additional logic, termination, or resistor loads are required to connect up to seven 8-bit narrow SCSI devices, or up to seven 16-bit wide/fast-20 SCSI devices, to the SCSI controller on the system board. The SCSI hot-docking backplane terminates the SCSI bus with active terminators.

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

Network Controller

The system board includes an Intel 82557 Fast Ethernet PCI Bus Controller for 10 or 100 Mbps Fast Ethernet networks. A flash device on the system board stores the network ID. As a PCI bus master, the 82557 can burst data at up to 133 MB/sec. The 82557 contains two receive and transmit FIFO buffers that prevent data over runs or under runs while waiting for access to the PCI bus. The 82557 has the following:

- 32-bit PCI bus master interface
- Chained memory structure with improved dynamic transmit chaining for enhanced performance

- Programmable transmit threshold for improved bus utilisation
- Early receive interrupt for concurrent processing of receive data
- On-chip counters for network management
- Autodetect and autoswitching for 10 or 100 Mbps network speeds
  - ◊ Support for both 10 Mbps and 100 Mbps networks, full or half duplex-capable, with back-to-back transmit at 100 Mbps

In addition there are status LEDs on the system board that indicate, transmit/receive activity on the LAN, a valid link to the LAN and which mode (10/100 Mbps) is active.

LED	***Indication***	***Meaning***
ACT	On or flashing	The 82557 is sending or receiving network data. The frequency of flashes varies with the amount of network traffic.
	Off	The 82557 is *not* sending or receiving network data.
LNK	On	The 82557 and hub are receiving power; the cable connection between the 82557 and hub are good.
	Off	The 82557 and hub are *not* receiving power; the cable connection between the 82557 and hub is faulty; or you have a driver configuration problem.
100	On	The 82557 is operating at 100 Mbps.
	Off	The 82557 is operating at 10 Mbps.

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.

System Board Management Controller (SBMC) monitors system temperature sensors using the I^2C management bus. An EEROM associated with the system board temperature sensor contains

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

Processor Board Management Controller (PBMC) on the processor/memory/PCI bridge module does the following:

- Monitors processor power supply voltage levels
- Determines the DIMM configuration
- Monitors processor thermal trip and internal error signals
- Manages two I^2C 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 Controller (FPC), powered by the +5 V standby power, on the system board does the following:

- Manages server power on/off control and front panel NMI buttons
- Monitors all power control sources on the, front panel, server manager module, PIIX3, and RTC power control signals
- Stores power state and intrusion information in EEPROM

Distributed Integrated Server Management Interface Chip (DISMIC), I^2C bus does the following:

- Provides communications between the microcontrollers
- Functions as a bridge between the microcontrollers and the ISA bus
- Provides communications between the microcontroller network, SMI handler, and server management software running on the server

Dual Processor/Memory Module

Further information on the Processor/memory board can be found in chapter 7, 'System boards', and information about upgrading can be found in chapter 8, 'Upgrading the server'.

The dual processor/memory module contains two zero insertion force (ZIF) sockets for installing one or two processors and eight DIMM sockets for installing memory. A plug-in DC to DC converter on the module provides power for the secondary processor. The onboard PCI and memory controller (PMC) supports from 16 MB to 1 GB of ECC memory, either fast page mode (FPM) or extended data out (EDO) 3.3 V 60 ns DRAMs, mounted on JEDEC DIMMs. You may install mixed sizes and types of DRAM DIMMS in the eight memory banks; however, their speeds, 60 ns, must be the same. Always install the DIMMs in sequence by starting with bank 0 (socket J1), then bank 1 (socket J2), and so on with bank 7 (socket J8) as the last one. The PMC automatically detects and initialises the memory array, depending on the type, size, and speed of the devices.

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 PMC generates an SERR (system error) which usually halts the system. ECC is calculated on a 64 bit wide memory basis.

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.

2 INSTALLATION

This chapter tells how to

- select a site
- set the line voltage selector switch and check the power cables(s)
- connect input and output devices

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 msec, 1/2 sine
Operating	2.0 g, 11 msec, 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 meter 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 115 VAC	Single power supply, fully loaded 100 to 120 VAC, 11 A, 50/60 Hz
230 VAC	200 to 240 VAC, 6 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 Apricot 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 repackage the server in the event you decide to move it to another site.

Setting the Line Voltage

Before connecting a power cable to each power supply, make sure that each power supply line voltage selector switch is set to the correct AC line source voltage.

WARNINGS

To use the system with line source voltages between 100 and 120V AC, you must set the line voltage selector switch on each power supply to 115V.

To use the system with line source voltages between 200 and 240V AC, you must set the line voltage selector switch on each power supply to 230V.

If you do not make this change when it is required, the power supply will be damaged when you plug the power cord into an AC outlet.

If you need to change the line voltage setting:

1. Insert the tip of a small flat-bladed screwdriver or equivalent into the slot on the line voltage selector switch.
2. Slide the selector switch toward the top of the server to select 115V or toward the bottom of the server to select 230V. See Figure 2-1.
3. Ensure that the correct voltage, 115V or 230V, is visible on the switch.
4. Repeat this for each power supply fitted.

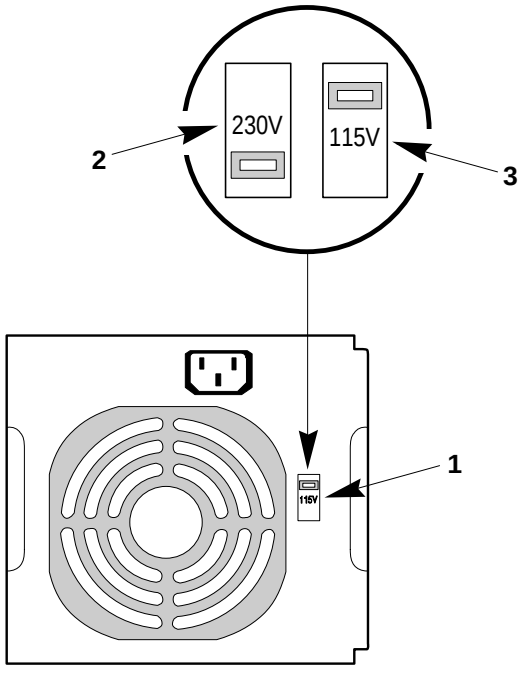


Figure 2-1. Line Voltage Selector Switch

1	Selector switch
2	Selector switch set to 230V
3	Selector switch set to 115V

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.

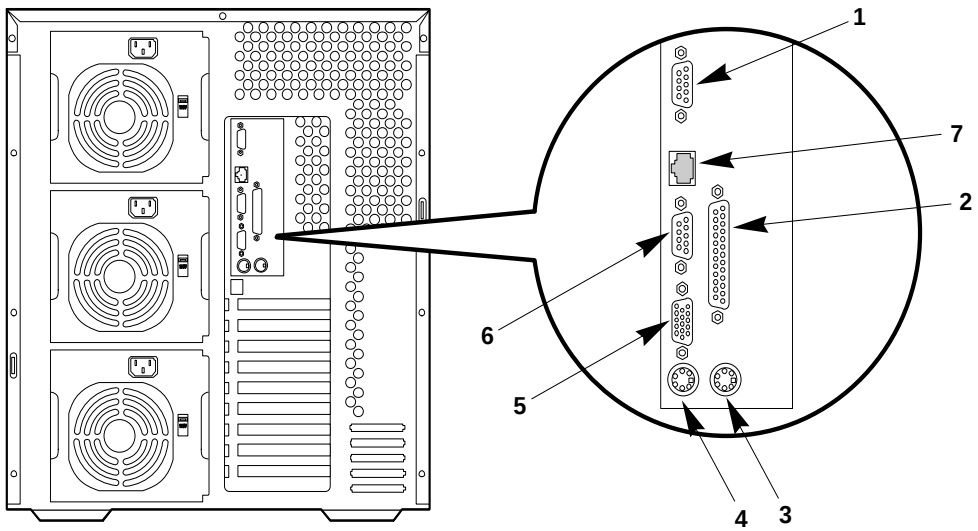


Figure 2-2. Server I/O Panel

1	Serial port 2 (COM2), 9-pin connector	5	SVGA, 15-pin video connector
2	Parallel port (LPT), 25-pin connector	6	Serial port 1 (COM1), 9-pin connector
3	PS/2 mouse port, 6-pin connector	7	RJ45 Network controller port
4	PS/2 keyboard port, 6-pin connector		

Turning on Your Server

WARNING

Ensure that the line voltage selector switch on each power supply is set to the correct line source voltage If the setting is incorrect, the power supply will be damaged when you plug the power cord into an AC outlet.

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 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 push-button on/off switch (Figure 2-3) on the front panel.

   that the power-on light on the front panel is lit. After a few seconds the power-·test (POST) begins. See below.

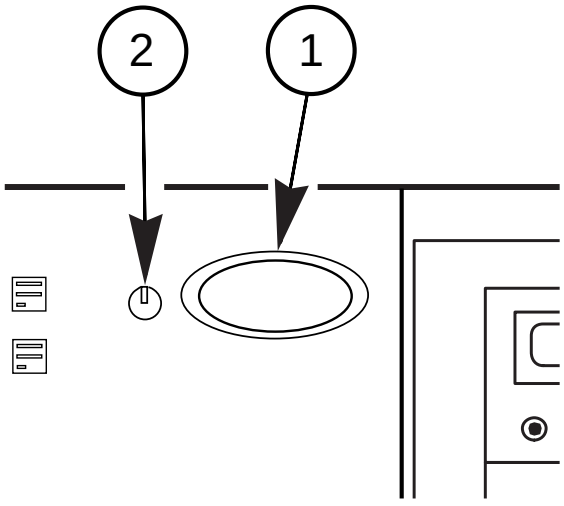


Figure 2-3. Server Power Switch and LED

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.

These screen prompts and messages appear after the memory test:

```
Press F1 key if you want to run SETUP

Keyboard.....Detected
Mouse........Detected
```

Do not press <F1>. The above message remains for a few seconds, and POST continues. The server beeps once, and this message appears:

```
Insert bootable media in the appropriate drive
```

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

- SCSI*Select* Utility is used to configure/view the settings of the AIC-7880 SCSI host adapters and devices in the server system.
- BIOS Setup Utility is stored in both flash memory and the battery-backed memory of the real-time clock (RTC) on the system board.
- Load File Program Utility is used to program the EEPROMs and desktop management interface (DMI). You must run the utility each time you *upgrade or replace* the hardware in your server.
- Configuring the Network Controller is used to configure the Fast Ethernet PCI Bus Controller on the system board.

If your server does not have a floppy drive, or it is disabled/improperly configured, use Setup to configure your system and enable the floppy diskette drive. Otherwise, use the SCU to configure it. If necessary, you can disable the drive after you exit the SCU.

CAUTION

Information entered using the SCU overrides any entered using Setup.

Power-on Self-Test

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

Each time you turn on the server the power LED on the front panel turns on and 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.

These screen prompts and messages appear after the memory test:

```
Press F1 key if you want to run SETUP
Keyboard.....Detected
Mouse........Detected
```

If you do not press <F1>, POST continues, and this message appears:

```
Press <Ctrl><A> for SCSISelect(TM) Utility!
```

If you have installed SCSI devices in your server, press <Ctrl+A>. When the utility appears, follow the instructions on your monitor to configure the onboard Adaptec AIC-7880 wide/fast-20 SCSI III host adapter settings and run the SCSI disk utilities.

If POST detects an error, it displays the error code, the server beeps once, and this message appears:

```
Press <F1> for Setup, <ESC> to Boot
```

If you want to enter Setup, Press <F1>. When the Setup utility appears, follow the instructions on your monitor.

If you want to boot the server, press <ESC>. However, if a drive with bootable media is not detected, the server beeps once, and this message appears:

```
Insert bootable media in the appropriate drive
```

If POST did not detect an error and you choose not to run the SCSI*Select* Utility, POST continues, the server beeps once, and this message appears:

```
Insert bootable media in the appropriate drive
```

If you have an operating system such as Windows NT loaded, this message appears:

```
OS Loader V3.5

Please select the operating system to start:

  Windows NT Workstation Version *.*
  Windows NT Workstation Version *.* [VGA mode]
  MS-DOS

Use ↑ and ↓ to move the highlight to your choice.
Press Enter to choose.

Seconds until highlighted choice will be started
automatically:  30
```

You have *thirty seconds* to choose your operating system (OS). If you do not choose one, the highlighted default OS will try to load. If it cannot load, this message appears:

```
Press spacebar now to invoke the Last Known Good menu
```

If you do not press the spacebar, this message appears:

```
INACCESSIBLE_BOOT_DEVICE
```

When the above message appears, you must restart your server. However, if you pressed the spacebar, this messages appears:

```
Configuration Recovery Menu (Last Known Good)
This menu allows you to switch to a previous system
configuration, which may overcome system startup
problems.

If the system starts correctly now, choose Use Current
Startup Configuration.  No changes will occur.

If the system does not start correctly, choose Use Last
Known Good Configuration.
Important:  System configuration changes made since the
last successful startup will be discarded.

  Use Current Startup Configuration
  Use Last Known Good Configuration
  Restart Computer

Use the up and down arrow keys to make your selection.
Press ENTER when you have made your selection.
```

If you select **Restart Computer**, the operating system loader reappears:

```
OS Loader V3.5

Please select the operating system to start:

Windows NT Workstation Version *.*
Windows NT Workstation Version *.* [VGA mode]
MS-DOS

Use ↑ and ↓ to move the highlight to your choice.
Press Enter to choose.
```

POST will not continue until you choose an OS. When you choose the correct OS and press <Enter>, it will load.

If the server halts before POST completes running, it emits a beep code indicating a fatal system error that requires immediate attention. If POST can display a message on the video monitor, it causes the speaker to beep twice as the message appears.

Note the screen display and write down the beep code you hear. For a listing of beep codes and error messages that POST can generate, see chapter 11,'Troubleshooting'

When to Run the SCSI*Select* Utility

The SCSI*Select* utility detects the number of AIC-7880 wide/fast-20 SCSI III host adapters in your system. 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
- perform a low-level format on SCSI devices installed in the server

Running the SCSI*Select* Utility

1. When this message appears on the video monitor:

   ```
   Press <Ctrl><A> for SCSISelect(TM) Utility!
   ```

2. Press <Ctrl+A> to run this utility. When it appears, choose the host adapter that you want to configure—each SCSI bus accepts up to fifteen devices.

NOTE

*If the SCSI*Select *utility detects multiple host adapters in your server, it displays the PCI bus number and PCI device number, 'Bus:Device xx:xxh' of the host adapters.*

Use the following keys to navigate through the menus and submenus.

Press	***To***
ESC	Exit the utility
Enter	Select an option
↑	Return to a previous option
↓	Move to the next option
F5	Switch between color and monochrome
F6	Reset to host adapter defaults

Main Menu

Host Adapter	***Option***	***Comment***
AIC-7880 Ultra/Ultra W at Bus:Device 01:05h	Configure/View Host Adapter Settings	Press <Enter> to view the Configuration Menu.
	SCSI Disk Utilities	Press <Enter> to view the SCSI Disk Utilities Menu.

Configuration Menu

Feature	***Option***	***Comment***
SCSI Bus Interface Definitions		
Host Adapter SCSI ID	0–7–15	Use this option to change the SCSI ID of the host adapter. Each device on the SCSI bus, including the adapter, must have a unique ID. The ID defines the device, and the priority of the ID determines which device controls the bus when two or more devices try to use it simultaneously. Each adapter on the bus, whether 8- or 16-bit, has a default ID of 7, the highest priority on the bus.
SCSI Parity Checking	Enabled Disabled	When enabled, the host adapter always checks parity when reading from the SCSI bus to verify the correct transmission of data from the SCSI devices. Select disabled if any attached devices do not support SCSI parity.
Host Adapter SCSI Termination	Low On/High On Low Off/High Off Low Off/High On	The system board does not support this feature. Low On/High On enables termination for both low and high bytes of the 16-bit Wide SCSI bus. (Bits 0 through 7 are the low byte, and bits 8 through 15 are the high byte).
Additional Options		
Boot Device Options	Press <Enter>	See Boot Device Configuration Menu.
SCSI Device Configuration	Press <Enter>	See SCSI Device Configuration Menu.
Advanced Configuration Options	Press <Enter>	See Advanced Configuration Options Menu.

Boot Device Configuration Menu

Feature	***Option***	***Comment***
Boot Target ID	0–15	The default boot device is at SCSI ID 0 with logical unit number (LUN) 0. To specify a different boot device, choose a different SCSI ID (0 through 7 on 8-bit adapters, 0 through 15 on 16-bit adapters).
Boot LUN Number	0–7	If the boot device has multiple logical units, you must also specify the boot LUN. It can be 0 through 7 (on 8-bit or 16-bit adapters). If you disable Multiple LUN Support in the Advanced Configuration menu, specifying a number here has no effect.

SCSI Device Configuration Menu

Feature	Option	Comment
SCSI Device ID	#0 - #15	
Initiate Sync Negotiation	yes no	When yes, the SCSI host adapter initiates synchronous negotiation with the SCSI device. When no, the adapter does not initiate synchronous negotiation. However, if the device initiates synchronous negotiation, the adapter always responds.
Maximum Sync Transfer Rate	40.0 32.0 26.8 20.0	The host adapter supports synchronous data transfer rates up to the Fast SCSI maximum rate of 20 megatransfers/sec or 40MB/sec.
Enable Disconnection	yes no	When yes, the host adapter lets the SCSI device disconnect from the SCSI bus. When no, the adapter does not allow the device to disconnect from the bus. If two or more devices are connected to the adapter, leave this option set to yes.
Initiate Wide Negotiation	yes no	When yes, this option allows wide SCSI hard drives to achieve 2 bytes per transfer.
Send Start Unit Command	yes no	No effect if the BIOS is disabled. When yes —required for SCSI hard drives—the host adapter sends the Start Unit Command to the SCSI device during bootup. This reduces the load on the server power supply by allowing the adapter to power-up SCSI devices one at a time when you boot the server. The adapter sends the command to the device with the lowest SCSI ID. When it responds, the adapter sends the command to the next highest SCSI ID. When no, each device powers up in its normal fashion; if the device has been jumpered to wait for a start command, it will not start.
Include in BIOS Scan	yes no	When yes, the host adapter BIOS controls the SCSI device if it is an Int 13 device such as a SCSI disk drive. When no, the adapter BIOS does not search SCSI IDs for devices to control; device driver software must be used to control the SCSI devices.

Advanced Configuration Options

Feature	***Option***	***Comment***
Reset SCSI Bus at IC Initialization	Enabled Disabled	Enabled resets the SCSI bus the first time the host adapter is initialized.
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled Disabled	Enabled lets the server boot from a SCSI hard drive connected to the host adapter. When enabled, the AIC-7880 BIOS reserves 32 KB of BIOS space. No effect if the BIOS is disabled; however, 2 KB of memory space is still reserved per PCI and Plug-and-Play specifications.
Support Removable Disks Under BIOS as Fixed Disks	Boot Only All Disks Disabled	These options let you control which removable-media drives the host adapter BIOS supports. No effect if the BIOS is disabled. **CAUTION** *Do not remove media from a removable-media drive if it is under BIOS control.* Boot Only: Only a removable-media drive designated as the boot device is treated as a fixed (hard) disk drive. All Disks: All removable-media drives supported by the AIC-7880 BIOS are treated as fixed drives. (If you are a NetWare user: all removable-media drives are automatically supported by NetWare as fixed disks regardless of how you set this option.) Disabled: No removable-media drives running under DOS are treated as fixed drives. Device driver software is needed because the drives are not controlled by the adapter BIOS.
Extended BIOS Translation for DOS Drives greater than 1 GB	Enabled Disabled	Enabled allows SCSI hard disk drives greater than 1 GB to use a translation scheme of 255 heads, 63 sectors per track. No effect if the BIOS is disabled.
Display <Ctrl-A> Message During BIOS Initialization	Disabled Enabled	When enabled, at boot time a prompt displays to let you run the SCSI*Select* program. No effect if the BIOS is disabled.
Multiple LUN Support	Enabled Disabled	Select enabled if any devices have multiple logical units. No effect if the BIOS is disabled.
BIOS Support for Bootable CD-ROM	Enabled Disabled	Enabled lets the server boot from a CD-ROM. The option displays only if the adapter BIOS is configured to include it. To boot from a hard drive or other device, either disable this option or make sure there is no bootable CD in the drive. No effect if the BIOS is disabled.
BIOS Support for Int13 Extensions	Enabled Disabled	When enabled, the adapter BIOS supports Int 13h extensions, required for bootable CD-ROMs. The option displays only if the adapter BIOS is configured to include bootable CD-ROM support. You can disable the option if the boot device is *not* a CD-ROM, but it does no harm to leave it enabled. No effect if the BIOS is disabled.
Support for Ultra SCSI Speed	Enabled Disabled	The option displays only if the BIOS is configured to support *Ultra*SCSI speeds. Select enabled to use *Ultra*SCSI speeds with the AIC-7880. No effect if the BIOS is disabled.

SCSI Disk Utilities Menu

When you select SCSI Disk Utilities, the SCSI*Select* utility scans the SCSI bus for SCSI devices. After scanning the bus, it reports a description of each device. If a device is present, select it and press <Enter> to see the options.

SCSI Device	***Option***	***Comment***
SCSI ID #0: No device (If a hard disk drive is present, select it, and press <Enter> to display the utilities.)	Format Disk	This utility performs a low-level format on the hard disk drive. **CAUTION** *Back up your data before performing a low-level format. Once started, you cannot abort it.*
	Verify Disk Media	This utility scans the media of the selected device for defects. If it finds bad blocks, it prompts you to reassign them. If you select yes, the blocks will no longer be used.
SCSI ID #1 - #5, #8 - #15: No device	None	No device present.
SCSI ID #6: ESG-SHV SCA HSBP M2	None	Not a disk drive. This is the SCSI hot-docking backplane.
SCSI ID #7: AIC-7880 Ultra/Ultra W	None	This is the SCSI host adapter on the system board.

Exit Menu

Feature	***Option***	***Comment***
Exit Utility?	Yes No	When you complete configuring your SCSI devices, select "Yes" and press <Enter>. When this message appears: **`Please press any key to reboot`** Press any key and your server will reboot.

When to Run the System Configuration Utility

The SCU lets you do the following:

- add and remove boards
- change the server configuration settings
- save the server configuration
- view switch and jumper settings on the boards in your server

If you install or remove an ISA add-in board in your server, you must run the SCU to reconfigure the server. Running the SCU is optional for a PCI add-in board.

The SCU is PCI-aware, and it 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 server 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 them in flash memory. These values take effect when you boot up the system. 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 POST, activates the BIOS Setup Utility.

Running the SCU

1. Turn on your video monitor and your system.
2. There are two ways to start the SCU.
   - ◊ After installing your operating system: Insert the System Configuration Utility Disk in drive A, and copy it to a directory on your hard drive. While in the directory, type **AMISCU** and press <Enter>.
   - ◊ From diskette after installing your 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 your server 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. From the main menu, select "Step 1: About System Configuration" for information about setting up your server.

System Board Settings

Default values are in bold typeface. This extensive list continues over several pages.

System Identification and Version Information	
System Identification String	IDNODA0 (Configured by the User or System Integrator, using the ROM-based or disk-based configuration utility.)
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 Module	
Processor 1 in Slot 1	Pentium Pro Processor at XXXMHz (Display only.)
Processor 2 in Slot 1	Pentium Pro Processor at XXXMHz (Display only.)
System Processor Status	
Processor 1 in Slot 1	Pass
Processor 2 in Slot 1	Pass
System Performance	
Power-on Speed Option	Processor Speed=Fast Processor Speed=Slow (BIOS programs the SLOWH timer before boot.)
Direct PCI Interrupts to I/O APIC	Enable Disable
Memory Subsystem	
Base Memory Options	640 KB Base Memory 512 KB Base Memory
Shadowing ISA ROMs Options	Press <Enter> to modify the shadowing options. Shadow Hole Base Address C8000h (800 KB) CC000h (816 KB) D0000h (832 KB) D4000h (848 KB) D8000h (864 KB) DC000h (880 KB) Shadow Hole Size Disable 16 KB (4000h) 32 KB (8000h) 48 KB (C000h) 64 KB (10000h) 80 KB (14000h) 96 KB (18000h)

Extended Memory Options (Cache, 1 MB ISA Hole)	15 MB Extended Memory/256 KB Cache (WB) (Press <Enter> to access Extended Memory Options Menu.) Cache Mode Write-Back Disable 1 MB ISA Hole Control Disable Enable
Onboard Disk Controllers	
Onboard Floppy Controller	Enable Disable
Onboard IDE Controller	Enable Disable
Onboard Communications Devices	
Serial Port 1 Configuration	Port:3F8h IRQ:4 (COM 1) Port:2F8h IRQ:3 (COM 2) Port:3E8h IRQ:4 (COM 3) Port:2E8h IRQ:3 (COM 4) Port 1 Disable
Serial Port 2 Configuration	Port:2F8h IRQ:3 (COM 2) Port:3F8h IRQ:4 (COM 1) Port:3E8h IRQ:4 (COM 3) Port:2E8h IRQ:3 (COM 4) Port 2 Disable
Parallel Port Configuration	Port:378h IRQ:7 (LPT 1) Port:278h IRQ:5 (LPT 2) Port:3BCh IRQ:7 (LPT 3) Parallel Port Disable
Parallel Port Mode	Parallel Port Mode ISA Compatible Parallel Port Mode PS/2 Parallel Port Mode Extended (Not valid with LPT3) Parallel Port Mode ECP on LPT1 WITH DMA 1 Parallel Port Mode ECP on LPT1 WITH DMA 3 Parallel Port Mode ECP on LPT2 WITH DMA 1 Parallel Port Mode ECP on LPT2 WITH DMA 3
Floppy Drive Subsystems	
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	
ISA IDE DMA Transfers	Auto Configured Disable
IDE Configuration - Primary Master	No Drive Detected (Press <Enter> to access IDE Configuration Menu.)
	IDE Configuration Menu Auto Customize Disable
IDE Drive Options - Primary Master Multisector Transfer	Auto Configured 4 Sector/Block 8 Sector/Block Disable
Translation Mode	Auto Configured Standard CHS (cylinder head sector) Logical Block Addressing Extended CHS
Enhanced IDE Mode	Auto Configured Disable
IDE Configuration - Primary Slave	No Drive Detected (Press <Enter> to access IDE Configuration Menu.)
	IDE Configuration Menu Auto Customize Disable
IDE Drive Options - Primary Slave Multisector Transfer	Auto Configured 4 Sector/Block 8 Sector/Block Disable
Translation Mode	Auto Configured Standard CHS Logical Block Addressing Extended CHS
Enhanced IDE Mode	Auto Configured Disable
IDE Configuration - Secondary Master	No Drive Detected (Press <Enter> to access IDE Configuration Menu.)
	IDE Configuration Menu Auto Customize Disable
IDE Drive Options - Secondary Master Multisector Transfer	Auto Configured 4 Sector/Block 8 Sector/Block Disable

Translation Mode	Auto Configured Standard CHS Logical Block Addressing Extended CHS
Enhanced IDE Mode	Auto Configured Disable
IDE Configuration - Secondary Slave	No Drive Detected (Press <Enter> to access IDE Configuration Menu.)
	IDE Configuration Menu Auto Customize Disable
IDE Drive Options - Secondary Slave Multisector Transfer	Auto Configured 4 Sector/Block 8 Sector/Block Disable
Translation Mode	Auto Configured Standard CHS Logical Block Addressing Extended CHS
Enhanced IDE Mode	Auto Configured Disable
BIOS Language Support	
BIOS Language Support Options: Current BIOS Language	English (US) Español (SP) Italiano (IT) Français (FR) Deutsch (GR)
Keyboard and Mouse Subsystem	
Keyboard and Mouse Options: Num Lock Options	Off at Boot On at Boot
Typematic Speed	Auto 6 char/sec 8 char/sec 10 char/sec 12 char/sec 15 char/sec 20 char/sec 24 char/sec 30 char/sec
Mouse Control Option	Mouse Auto detected

Console Redirection	
Console Redirection Control COM Port for Redirection	Disable Enable Redirection on COM1 @ E4000 Enable Redirection on COM2 @ E4000
Serial Port Baud Rate	2400 Baud 9600 Baud 19.2 K Baud 115.2 K Baud
Hardware Flow Control	None CTS/RTS CTS/RTS & Xoff/Xon
Select Terminal Type	ANSI
Security Subsystem	
Administrative Password Option	Disabled (Press <Enter> to access Password Menu.) Password Menu New Password Enter Password XXXXX Verify Password XXXXX
User Password Option	Disabled (Press <Enter> to get the Password Menu.) Password Menu New Password Enter Password XXXXX Verify Password XXXXX
Hot Key Option	Disabled (Press <Enter> to access Hot Key Menu.) Hot Key Menu Disable Enable (Select enable and enter new hot key.)
Lock-out Timer	10 Minutes (Press <Enter> to access Lock-out Timer Menu.) Lock-out Timer Menu Value in minutes: 10 (enter the number of minutes) (255 = Maximum)
Secure Boot Mode	Disable Enable
Secure Mode Video Blanking	Disable Enable
Secure Mode Floppy Writes	Enable Disable

Boot Subsystem	
Boot Options First Boot Device	Boot Floppy Boot Hard Disk Boot IDE CD-ROM Boot Network
Second Boot Device	Boot Disabled Boot Floppy Boot Hard Disk Boot Network
Third Boot Device	Boot Disabled Boot Floppy Boot Hard Disk Boot Network
Fourth Boot Device	Boot Disabled Boot Floppy Boot Hard Disk Boot Network
Display “<F1> for Setup” message during POST	Enable Disable
Require user interaction on POST errors	Enable Disable
SCSI ROM BIOS Options	
SCSI-A ROM BIOS Scan	Enable Disable (If disabled, the SCSI-A channel is fully configured, but the ROM scan is skipped.)
Management Subsystem	
System Sensor Control	Press <Enter> to modify the system sensors.
Override Manufacturing System Sensor Values	Enable Disable
Speaker Options	Enable Disable
Scan User Flash area	Disable Enable
System Management Options: Event Logging and ECC Memory Scrubbing	Event Logging & ECC Memory Scrubbing Event Logging Only ECC Memory Scrubbing Only Neither (Disables System Management Mode)
PCI System Error Detection	Disable Enable

System Board Devices

The Plug-and-Play O/S manages the resources of the following devices:

- PCI Multifunction Device, Bus 0 Dev 12
- PCI Ethernet Device, Bus 1 Dev A
- PCI SCSI Device, Bus 1 Dev 5
- PCI VGA Device, Bus 1 Dev F

Hot Keys

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

To	***Press these keys***
Clear memory and reload the operating system—this is a soft boot reset.	<Ctrl+Alt+Del>
Increase the sound level made when a key is pressed.	<Ctrl+Alt> and <+>
Decrease the sound level made when a key is pressed.	<Ctrl+Alt> and <->
Secure your server system immediately.	<CTRL + Alt> + <(hot key)> (Set your hot-key with the SCU or Setup.)

When to Run the BIOS Setup Utility

The Setup utility lets you change the system configuration defaults. It does not allow you to enter or change information about PCI or ISA add-in boards; you must use the SCU instead. Setup stores the configuration values in flash memory; they take effect when you boot the system. 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 your diskette drive
- If you do not have access to a diskette drive
- If you have installed only ISA add-in boards in your system

Running the Setup Utility

You can enter and start Setup under several conditions:

- When you turn on the system, after POST completes the memory test
- When you reboot the system by pressing <Ctrl+Alt+Del> while at the DOS operating system prompt

Each time you turn on or reboot your server, after POST completes the memory test, it displays this message:

```
Press F1 key if you want to run SETUP
```

IF THE <F1> PROMPT DOES NOT APPEAR

If the <F1> prompt does not appear, the display of the prompt has been disabled in the SCU. You can enter Setup anyway by pressing <F1> during the memory test or right after the memory size is shown.

Setup provides four major menus and several submenus:

- Main Menu
- Advanced Menu
- Security Menu
- Exit Menu

Use the following keys to navigate through the menus and submenus.

Press	***To***
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

In the following tables:

Default values are in bold typeface, and auto-configured values are shaded.

Main Menu

Feature	*Option*	*Comment*
System Date	Current Date	To change this field, press <Enter>. Select the correct month, press <Enter>, and type the correct date and year. If you replace the battery, the default date is Jan 1990.
System Time	Current Time	To change this field, press <Enter> and type: hour, minutes, and seconds (this is a 24-hour clock). If you replace the battery, the default time is 00:00.
Floppy Options	Press <Enter>	See table: Floppy Options Menu.
Primary IDE Master	Not Installed	See table: IDE menu.
Primary IDE Slave	Not Installed	See table: IDE menu.
Language	English (US) Español (SP) Italiano (IT) Français (FR) Deutsch (GR)	Selects the appropriate language provided in the BIOS.
Boot Options	Press <Enter>	See table: Boot Options Menu.
Video Mode	EGA/VGA	Auto configured.
Mouse	Installed	Auto configured.
Base Memory	640 KB	Auto configured.
Extended Memory	15,360 KB	Auto configured.

Floppy Options Menu

Feature	*Option*	*Comment*
Floppy A:	Installed	Auto configured.
Floppy B:	Not Installed	Auto configured.
Floppy A: Type	Disabled 360 KB 5¼" 1.2 MB 5¼" 720 KB 3½" 1.44/1.25 MB 3½" 2.88 MB 3½"	
Floppy B: Type	Disabled 360 KB 5¼" 1.2 MB 5¼" 720 KB 3½" 1.44/1.25 MB 3½" 2.88 MB 3½"	

IDE Menu

Feature	*Option*	*Comment*
IDE Device Configuration	Auto Configured User Definable Disabled	Auto configured lets the BIOS automatically sense and configure any IDE drives in the system. User definable lets you define the drive parameters. You must type in specific values for the number of cylinders, heads, and sectors. The maximum capacity value is then auto configured.
Number of Cylinders	0	
Number of Heads	0	
Number of Sectors	0	
Maximum Capacity	0 MB	
IDE Translation Mode	Standard CHS (cylinder head sector) Logical Block Extended CHS Auto Detected	Selects the translation mode for the IDE hard drive. Standard CHS addressing (cylinder count of 1024 or less). Logical block addressing can be used if it is supported by the hard disk type. Extended CHS addressing (cylinder count greater than 1024). Auto detected selects the proper method based on information from the hard disk.
Multiple Sector Setting	Disabled 4 Sectors/Block 8 Sectors/Block Auto Detected	Sets IDE programmed I/O cycles so that multiple sectors are transferred with a single interrupt.
Fast Programmed I/O Modes	Disabled Auto Detected	Auto detected lets the BIOS query an IDE hard disk connected to the PCI IDE bus and use the fastest PIO protocol supported by the hard disk/controller pair.
ISA IDE DMA Transfers	Disabled Auto Detected	Auto detected lets the BIOS select the fastest DMA transfer mode possible for a hard disk/controller pair—Type F, Type B, or Standard.

Boot Options Menu

Feature	*Option*	*Comment*
First Boot Device	Floppy Hard Disk IDE CD-ROM Network	Selects the order in which the system checks drives to find an operating system to boot from. The network selection allows the user to boot off a network adaptor ROM. This is normally used in a diskless system that is booting over the network.
Second Boot Device	Disabled Floppy Hard Disk Network	(Same as above.)
Third Boot Device	Disabled Floppy Hard Disk Network	(Same as above.)
Fourth Boot Device	Disabled Floppy Hard Disk Network	(Same as above.)
System Cache	Disabled Enabled	When disabled, system performance decreases significantly.
Boot Speed	Deturbo Turbo	Selects processor speed. When set to deturbo, system performance decreases significantly.

Feature	*Option*	*Comment*
Num Lock	Off On	Sets the initial state of the Num Lock keyboard feature when the system boots. When off, the numeric keypad is not locked on at boot-time.
Setup Prompt	Disabled Enabled	When enabled, the screen prompt to enter the Setup utility is displayed. When disabled, the prompt does not appear. However, you can enter Setup after the memory test by pressing <F1>.
Hard Disk Pre-delay	Disabled 3 Second 6 Seconds 9 Seconds 12 Seconds 15 Seconds 21 Seconds 30 Seconds	Adds a delay before the first access of a hard disk by the BIOS. Some hard disks hang if accessed before they have initialised themselves. This delay ensures the hard disk has initialised after power up, before being accessed. To allow adequate spin-up time, set to 12 or 15 seconds if the first boot device is selected as CD-ROM
Typematic Rate Programming	Default Override	When set to default, the rate delay = 250 ms and the rate = 15 characters per second. When set to override, the rate delay and rate can be reprogrammed.

Advanced Menu

Feature	*Option*	*Comment*
Processor 1	Pentium Pro chip	Auto detected.
Processor 2	Pentium Pro chip	Auto detected.
Processor Speed	200 MHz	Auto detected. The speed is determined by the processor(s) on the dual processor/memory module.
Cache Size	256K or 512K	Auto detected.
Processor 1 Detection	Pass Failed Retest	These options reflect the state of the primary processor. Passed: processor passed the test. Failed: On the last boot, the processor failed the test. Retest: On the next reboot, test the primary processor. (Clearing CMOS will also cause retesting of the processor.)
Processor 2 Detection	Pass Failed Retest Not Inst/Detected	These options reflect the state of the secondary processor. Passed: the processor passed the test. Failed: On the last boot, the processor failed the test. Retest: On the next reboot, test the primary processor. (Clearing CMOS will also cause retesting of the processor.) Not Installed/Detected: Indicates the secondary processor is not installed or was not detected.
Peripheral Configuration	Press <Enter>	See Peripheral Configuration Menu.
Advanced Chipset Configuration	Press <Enter>	See Advanced Chipset Configuration Menu.
Server Management and Info.	Press <Enter>	See Server Management and Information Menu.

Peripheral Configuration Menu

Feature	*Option*	*Comment*
Primary IDE Interface	Disabled Auto	Enables the onboard standard Enhanced IDE hard disk controller.
Floppy Interface	Disabled Enabled Auto	Enables the onboard controller for the diskette drive.
Serial Port 1 Address	Disabled COM1 3F8 IRQ4 COM2 2F8 IRQ3 COM3 3E8 IRQ4 COM4 2E8 IRQ3 COM1 3F8 IRQ3 COM2 2F8 IRQ4 COM3 3E8 IRQ3 COM4 2E8 IRQ4 AUTO	Enables onboard serial port 1 and configures the COM number and I/O address. Selecting disabled frees up the serial port 1 interrupt.
Serial Port 2 Address	Disabled COM1 3F8 IRQ4 COM2 2F8 IRQ3 COM3 3E8 IRQ4 COM4 2E8 IRQ3 COM1 3F8 IRQ3 COM2 2F8 IRQ4 COM3 3E8 IRQ3 COM4 2E8 IRQ4 AUTO	Enables onboard serial port 2 and configures the COM number and I/O address. Selecting disabled frees up the serial port 2 interrupt.
Parallel Port Address	Disabled LPT3 3BC IRQ7 LPT1 378 IRQ7 LPT2 278 IRQ7 LPT3 3BC IRQ5 LPT1 378 IRQ5 LPT2 278 IRQ5 AUTO	Enables the onboard parallel port and configures the LPT number and I/O address. Selecting disabled frees up the parallel port interrupt.
Parallel Port Mode	Compatible Bi-directional ECP EPP	Compatible is the AT specification output only mode. Bi-directional is the input/output only mode. Extended Capabilities Port (ECP) mode (IEEE 1284). Enhanced Parallel Port (EPP) mode, Rev. 1.7.
Primary IDE Status	Enabled	Auto configured.
Floppy Status	Enabled	Auto configured.
Serial Port 1 Status	COM1 3F8 IRQ4	Auto configured.
Serial Port 2 Status	COM2 2F8 IRQ3	Auto configured.
Parallel Port Status	LPT1 378 IRQ7	Auto configured.
Console Redirection	Disable Port 1 Port 2	Redirects the console to a serial port. This lets you control the server from a remote terminal port via the serial port. You can type and see the video as if you were at the console of the server. This works only for DOS and the BIOS POST. Under DOS, only text video modes are supported.

Advanced Chipset Configuration Menu

Feature	*Option*	*Comment*
Base Memory Size	512 KB 640 KB	Use to set the amount of system board base memory.
DRAM Memory Hole at 15 MB	Disable Enable	Some plug-in ISA boards use memory address space as a resource. Enabling the memory hole in DRAM space from 15 MB to 16 MB (1 MB) lets processor cycles to the memory hole pass through to the PCI/ISA bus.
PCI-PCI Posting	Disable Enable	Enabling allows PCI-PCI bridge write posting (only plug-in 2.0 class PCI-PCI bridges).
Request Mask Timer	Disable 16 PCI clocks 32 PCI clocks 64 PCI clocks	Designates the maximum value of the request mask timer that is enabled after the plug-in PCI-PCI bridge issues a target retry to a master on the secondary bus. PCI-PCI posting must be enabled for this to work.
Video Palette Snoop	Disabled Enabled	Enabling lets an ISA add-in board share a common palette with the onboard graphics controller.
Latency Timer (PCI Clocks)	66	Guarantees a PCI board access to the PCI bus within the specified number of PCI clocks on the host bridge.
Memory Error Detection	Disable ECC	Selects the memory error detection scheme. Selecting ECC lets memory correct itself for single bit errors if the System Memory Scrubbing option (see below) is enabled. When disabled, errors are logged to the event log if the Event Logging option (see below) is enabled.
Onboard SCSI BIOS	Enable Disable	Selecting enable installs the SCSI BIOS option ROM for the onboard AIC-7880 adapter during POST. When disabled, only the SCSI BIOS scan is skipped. The device can still be found by an OS driver.
MPS Version	1.1 1.4	Selects the Multi-processor Specification (MPS) version.
Direct PCI Intr. to I/O APIC	Disable Enable	Enabling directly connects PCI IRQs to IOAPIC.
SMM Feature	Disable Enable	The System Management Mode (SMM) must be enabled for Event logging or ECC memory scrubbing to function. You must also enable SMM to be able to use Server Management Software (SMS). Enabling allows system management interrupts to occur.
Event Logging	Disable Enable	When event logging is enabled, the system records system events to an area in flash memory for the SMS. The SMM feature must be enabled for this to work.
User Flash Scan	Disable Enable	When enabled, this scans and initialises the user binary during BIOS POST.
System SERR Detection	Disable Enable	When enabled, the system will generate a nonmaskable interrupt (NMI) and/or record to the event log that a PCI system error (SERR) has occurred. SMM and event logging must be enabled for the system to write to the event log.
System SERR Detection, cont.		A system error (SERR) occurs whenever a nonrecoverable bus or chipset error occurs. SERR will typically be generated when the PCI bus timing is violated or multiple bits fail in memory. When such errors or events are detected, they are logged in a way that is transparent to the OS. Then a nonmaskable interrupt (NMI) is generated for certain events so the OS can respond. To record a SERR in the event log, you must enable both the SMM and Event Logging features (see above).
PCI PERR Detection	Disable Enable	When enabled, the chipset status register will record that a PCI PERR has occurred.

Feature	*Option*	*Comment*
System Memory Scrubbing	Disable Enable	When enabled, the system will force a write back to memory of any corrected single bit errors. Memory scrubbing will search through memory to find the bad bit and rewrite it from cache back to main memory. You must enable SMM, and select ECC memory selected for this to work (see above). When disabled, the application will flush the cache and write the correct bits back to memory.
Clear Event Log Block	Disable Enable	Generally, when disabled, SMS clears the event log as needed. Enabling clears the event log area and resets this field to the disable state in the next system boot. However, some event records may be lost.
Load Sensor Data	Disable Enable	Enabling loads the sensor data from the SDS table to the SM microcontrollers.

Server Management and Information Menu

Feature	*Option*	*Comment*
Configuration Mode	Use Setup Utility Use SCU	Add ISA board resource information in the SCU.
When you select Use SCU, the following field appears:		
Boot With PnP OS	None Other Windows 95	None option initialises all Plug-and-Play devices. Windows95 option only initialises Plug-and-Play boot devices. Enables the desired boot method when using an operating system (OS) that supports Plug-and-Play.
Board Part Number	xxxxxx-xxx	Auto Detected (system board)
Board Serial Number	xxxxxxxxx	Auto Detected (system board)
System Part Number	(product code)	Auto Detected (The system part number can be changed with standard DMI 2.0 calls.)
System Serial Number	xxxxxxxxx	Auto Detected (The system serial number can be changed with standard DMI 2.0 calls.)
Chassis Part Number	Absent	Auto Detected (includes all boards in the server)
Chassis Serial Number	Absent	Auto Detected (includes all boards in the server)
PBC Part No.	xxxx	Auto Detected (processor/memory module)
PBC Serial No.	xxxx	Auto Detected (processor/memory module)
Primary HSWP Part No.	xxxx	Auto Detected (primary SCSI hot-docking backplane)
Primary HSWP Serial No.	xxxx	Auto Detected (primary SCSI hot-docking backplane)
Secondary HSWP Part No.	Absent	Auto Detected (secondary SCSI hot-docking backplane)
Secondary HSWP Serial No.	Absent	Auto Detected (secondary SCSI hot-docking backplane)
Power Share Part No.	xxxx	Auto Detected (power share backplane)
Power Share Serial No.	xxxx	Auto Detected (power share backplane)
BMC Device ID	xxxxxxxx	Auto Detected (system board microcontroller)
FPC Device ID	xxxxxxxx	Auto Detected (front panel board microcontroller)
PBC Device ID	xxxxxxxx	Auto Detected (processor/memory module microcontroller)
Primary HSWP Device ID	xxxxxxxx	Auto Detected (primary SCSI hot-docking backplane)
Secondary HSWP Device ID	Absent	Auto Detected (secondary SCSI hot-docking backplane)
Power Share Device ID	xxxxxxxx	Auto Detected (power share backplane)

Security Menu

Feature	*Option*	*Comment*
User Password is	Disabled	When you enter your user password, this field automatically changes to enabled.
Administrative Password is	Disabled	When you enter your administrative password, this field automatically changes to enabled.
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>	Administrative password controls access to the setup utility. Password may be from one to seven characters. See "Password Menu."
When you enter your user password, the following fields appear:		
Unattended Start	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.
Security Hot Key (CTRL-ALT-)		Enter your hot key. Press <CTRL + Alt> + <(hot key)> to place the system in the secure mode. To exit from the secure mode, enter your user password.
Keyboard Inactivity Timer	10	Enter the number of minutes (1-255) of keyboard inactivity before securing the system.
Video Blanking	Disable Enable	
Floppy Writes	Enable Disable	When enabled, you can write to the floppy drive.

Password Menu

Task	**Field**	**Instructions**
Enter New Password	(password field)	Type your password in this field, and press <Enter> or <Tab>. Press ESC to abort.
Confirm New Password	(password field)	Type your password again, and press <Enter> or <Tab> to accept it. Press ESC to abort.
To change your password:		
Enter Current Password	(password field)	Type your current password in this field, and press <Enter> or <Tab>. Press ESC to abort.
Enter New Password	(password field)	Type your new password, and press <Enter> or <Tab> to accept it. Press ESC to abort.
Confirm New Password	(password field)	Type your new password again, and press <Enter> or <Tab> to accept it. Press ESC to abort.
To clear your password:		
Enter Current Password	(password field)	Type your current password in this field, and press <Enter> or <Tab>. Press ESC to abort.
Enter New Password	(password field)	Press <Enter> or <Tab>.
Confirm New Password	(password field)	Press <Enter> or <Tab>.

Exit Menu

Setup Feature	*Default Setting*	*Comments*
Exit Saving Changes	Press <Enter>	Saves 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.
Discard Changes	Press <Enter>	Discards changes made in the current Setup session, but does not exit the utility.

When to Run the Load File Program Utility

The Load File Program (LFP) utility programs the EEPROMs and desktop management interface (DMI). You need to run the utility each time you upgrade or replace the hardware in your server. For example, if you install a second SCSI hot-docking backplane in your server, you need to run the utility. It programs the sensors that need to be monitored for server management.

Hardware Upgrade/Replace	*Run the LFP utility?*
Cooling (fans), Redundant Upgrade	Yes
Cooling (fan), Removal for third Power Supply Upgrade	Yes
SCSI Hot-docking Backplane	Yes
System Board (baseboard)	Yes
Power Share Backplane	Yes
Power Supply, Replacement	No
Cooling (fans), Replacement	No
Pentium Pro Processor	No
Pentium Pro Processor/Memory Module	No

Menus

When you boot the server from the Load File Program Utility diskette, it displays a horizontal menu bar across the top of the screen.

Menu	*Comments*
TEST	Access to test modules and individual subtests.
ERRORS	View error messages.
SUMMARY	View summary of test results.
CONFIGURATION	Various menu and system configuration tools.
OPTIONS	Changes the way tests are run.
HELP	Index to available online help.
QUIT	Lets you exit the utility and return to DOS.

Function Keys

Most of the function keys are only available through the TEST and SUBTEST menus.

Press	***To***
<F1>	Get help for <menu item>
<ALT+F1>	Get help for <submenu item>
<F2>	Run <selected item>
<ALT+F2>	Run <all enabled test modules and subtests>
<F3>	Disable <selected test module or subtest>
<ALT+F3>	Disable <all test modules and subtests>
<F4>	Enable <selected test module or subtest>
<ALT+F4>	Enable <all test modules and subtests>
<F5>	Edit/view run-time flags for <selected item>
<F6>	Edit/view configuration parameters for <selected item>
<F7>	View error messages
<F8>	View summary

TEST Menu Function Keys

The TEST menu contains a list of available test modules for a selected configuration. The following function keys are available in this menu.

Press	***To***
<Enter>	Open the SUBTEST menu. It contains a list of available subtests in the test module.
<Space>	Toggle enable/disable settings for all the tests in a test module.
<F1>	Display the entire help file for the test module.
<F2>	Run all enabled subtests in the module. A dialog box pops up after pressing <F2> asking for the number of loops to execute.
<F3>	Disable all subtests in the selected test module.
<F4>	Enable all subtests in the selected test module. Press <CTRL+C> or <CTRL+Break> to stop a subtest.
<F5>	Access global and test module run-time flags.
<F6 >	Access test module CFG parameters. The CFG file is displayed (if one is specified) and any parameters from the PKG file; the PKG file parameters have brackets [ ] around the name of the test module.
<F7>	Display the current error message file.
<F8>	Display the current summary file.
<F9>	Displays the version number of the test module.
<ALT+F2>	Run all enabled tests in all test modules. After pressing <ALT+F2>, a dialog box pops up asking for the number of loops to execute.
<ALT+F3>	Disable all tests in all test modules.
<ALT+F4>	Enable all tests in all test modules.
<ALT+F6>	Access all CFG parameters stored in the menus, but not part of any test module. This includes system parameters.

SUBTEST Menu Function Keys

The SUBTEST menu contains a list of the available subtests in a selected test module. Use the arrow keys and page keys to scroll through the list and select any entry. A small arrow icon appears at the top or bottom of the pop-up window to indicate that more subtests are in the indicated direction.

Press	***To***
<ENTER>	Cause the select test to be executed one time. If the test is set to disable a dialog box with an informative message will appear. Pressing <CTRL+C> will abort the test. If the test does not respond, try <CTRL+Break>.
<ESCAPE>	Cause the SUBTEST menu to disappear and return to the TEST menu.
<SPACE>	Toggle enable/disable for the selected subtest.
<F1>	Display the portion of the test module help file that applies to the selected subtest.
<F2>	Run the subtest. After pressing <F2>, a dialog box pops up asking for the number of loops to execute.
<F3>	Disable the selected subtest.
<F4>	Enable the selected subtest.
<F5>	Access the run-time flags from all sources.
<F6 >	Access test module CFG parameters. The CFG file is displayed (if one is specified) and any parameters from the PKG file; the PKG file parameters have brackets [ ] around the name of the test module.
<F7>	Display current error message file.
<F8>	Display current summary file.
<F9>	Display the version number of the test module.
<ALT+F1>	Display the entire help file for the test module.
<ALT+F2>	Run all enabled subtests in the test module. After pressing <ALT+F2>, a dialog box pops up asking for the number of loops to execute.
<ALT+F3>	Disable all subtests in the SUBTEST menu.
<ALT+F4>	Enable all subtests in the SUBTEST menu.
<ALT+F6>	Access all CFG parameters stored in the menus, but not part of any test module. It includes system parameters.

Test Modules

There are five test modules in the TEST menu—only those for the configuration you select are displayed. Each module contains a SUBTEST menu; the default subtests are highlighted (boldface). If necessary, you can enable (highlight) a subtest by pressing <Space>; press <Enter> to run the subtest.

To get a detailed description of a test module or subtest, use the up and down cursor keys to highlight the module or subtest, and Press <F1>.

1. BASEBOARD This test module provides utilities to display, program, and verify various I^2C EEPROM areas and Sensor Data Structure (SDS) in the desktop management interface (DMI) GPNV area. It also provides utilities to modify and clear the I^2C EEPROM.

```
1   WRITE_COMMON_HEADER
2   WRITE_SENSOR_AREA
3   WRITE_DMI_SENSOR_AREA
4   CHECK_COMMON_HEADER
5   CHECK_SENSOR_AREA
6   CHECK_DMI_SENSOR_AREA
7   DISPLAY_COMMON_HEADER
8   DISPLAY_SENSOR_AREA
9   DISPLAY_CHASSIS_AREA
10  DISPLAY_BOARD_AREA
11  DISPLAY_SYSTEM_AREA
12  DISPLAY_DMI_SENSOR_AREA
```

2. PROCESSOR_MODULE This test module is for the controller (PBC) I^2C EEPROM on the processor/memory module. It provides utilities to display, program, and verify various I^2C EEPROM areas and SDS in the DMI GPNV area. It also provides utilities to modify and clear the I^2C EEPROM.

```
1   WRITE_COMMON_HEADER
2   WRITE_SENSOR_AREA
3   CHECK_COMMON_HEADER
4   CHECK_SENSOR_AREA
5   DISPLAY_COMMON_HEADER
6   DISPLAY_SENSOR_AREA
7   DISPLAY_BOARD_AREA
```

3. POWER_SHARE This test module is for the power share controller (PSC) I^2C EEPROM on the power share backplane. It provides utilities to display, program, and verify various I^2C EEPROM areas and SDS in the DMI GPNV area. It also provides utilities to modify and clear the I^2C EEPROM.

```
1   WRITE_COMMON_HEADER
2   WRITE_SENSOR_AREA
3   CHECK_COMMON_HEADER
4   CHECK_SENSOR_AREA
5   DISPLAY_COMMON_HEADER
6   DISPLAY_SENSOR_AREA
7   DISPLAY_BOARD_AREA
```

4. SCSI_BP1 This test module is for the hot swap controller (HSC1) I^2C EEPROM on the upper SCSI hot-docking backplane. It provides utilities to display, program, and verify various I^2C EEPROM areas and SDS in the DMI GPNV area. It also provides utilities to modify and clear the I^2C EEPROM.

```
1   WRITE_COMMON_HEADER
2   WRITE_SENSOR_AREA
3   CHECK_COMMON_HEADER
4   CHECK_SENSOR_AREA
5   DISPLAY_COMMON_HEADER
6   DISPLAY_SENSOR_AREA
7   DISPLAY_BOARD_AREA
```

6. SCSI_BP2 This test module is for the hot swap controller (HSC2) I^2C EEPROM on the lower SCSI hot-docking backplane. It provides utilities to display, program, and verify various I^2C EEPROM areas and SDS in the DMI GPNV area. It also provides utilities to modify and clear the I^2C EEPROM.

1	**WRITE_COMMON_HEADER**
2	**WRITE_SENSOR_AREA**
3	CHECK_COMMON_HEADER
4	CHECK_SENSOR_AREA
5	DISPLAY_COMMON_HEADER
6	DISPLAY_SENSOR_AREA
7	DISPLAY_BOARD_AREA

Make the Load File Program Utility Diskette Bootable

Before you can use the Load File Program Utility diskette, you must make it MS-DOS bootable. The mkboot.bat on the diskette automatically does this for you. However, you must have MS-DOS installed on drive C:\DOS.

1. Turn on your video display monitor and server.
2. When the DOS prompt C:\> appears, insert the Load File Program Utility diskette into drive A.
3. Type **a:mkboot** and press <Enter>. Follow the instructions on your screen display.

Running the Load File Program Utility

1. Insert the bootable Load File Program Utility diskette into drive A.
2. Turn on your server. If it is already on, push the reset switch on the front panel to restart the server and boot from the diskette.
3. When POST completes, the server beeps once, MS-DOS starts, and the autoexec.bat program on the diskette creates a 2048 K RAM drive.
4. This will take a few moments as files are being uncompressed and copied to ramdrive.
5. After the program extracts the files to the RAM drive, it starts the Load File Program Utility and looks for a PKG file.
6. No PKG file indicated (press any key ...)
7. When you press a key, the Select a Configuration menu appears. Use the up and down arrow keys to highlight the configuration of your server, and press <Enter>.
8. A TEST menu pops up on the screen with the first test module highlighted. If you want to select a different module, use the up and down arrow keys to highlight the appropriate module. To run the enabled subtests in the highlighted test module, press <F2>.
9. If you want to run all enabled subtests in all modules, press <Alt + F2>. (This is the recommended way to update your server.)
10. An option menu pops up on the screen with the Loop count option highlighted. Do not toggle the other options available options; you need to run the utility only one time.
    - ◊ Loop count: Press <Space> to toggle it to 1 pass, and press <Enter> to run the subtests.
    - ◊ Test duration: *Do not change this option*.

◊ Subtest order: *Do not change this option*.

11. The enabled subtests will start running.
12. If you want to run the subtests one at a time, first highlight the test module, then press <Enter> to see the available subtests; some of them are disabled.
13. To enable or disable a subtest, simply press <Space>; press <Enter> to run an enabled subtest.
14. To exit the utility, use the right arrow key to highlight Quit on the menu bar, and press <Enter>. If you press <Esc>, it will back you out of wherever you are each time you press it until the utility finally asks if you want to quit. Then follow the instructions on the screen.

Installing Video Drivers

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

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

To install these video drivers:

1. Fully configure your server. (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 'Troubleshooting'.

Configuring the Network Controller

The system board includes an Intel 82557 Fast Ethernet PCI Bus Controller for 10 or 100 Mbps Fast Ethernet networks. A flash device on the system board stores the network ID.

DOS and Windows 3.1 Setup - Novell NetWare Clients

Windows NT users do not need to run Setup. Skip this procedure and go directly to page 3/31 for 'Windows NT'.

Automatic Configuration

PCI servers automatically detect and configure PCI-compliant adapters while booting. The onboard PRO/100B TX PCI adapter IRQ level and I/O address are automatically set each time you start your server.

Start your server to automatically configure the adapter. Configuration is complete when the DOS prompt appears. You can now continue with the optional procedure below.

If your server displays an error while booting, your PCI server may require additional steps to configure a PCI adapter. See the 'PCI Installation Tips' section on page 3/37 for more information if you get an error.

Test the Adapter and Install Network Drivers

Although not required for operation, it's a good idea to run diagnostic tests every time you install an adapter. The Setup program lets you test the adapter to see if there are any problems with the adapter hardware, the cabling, or the network connection.

In addition, Setup can automatically install NetWare client drivers for you or display a README file with installation instructions for other network operating system (NOS) drivers.

1. If your server already has PRO/100B network drivers installed, restart the server without loading them. If the drivers are loaded from the AUTOEXEC.BAT file, add REM in front of each line that loads a driver. Or, with DOS 6.x or later press <F5> at boot time to bypass the lines.
2. Insert the Configuration and Drivers disk in a floppy drive, switch to that drive, and at the DOS prompt, type: SETUP and press <Enter>
3. If you have more than one PRO series PCI adapter in your server, an adapter selection menu appears on the screen. Select the adapter you want by noting the Ethernet address. See page 3/34 for more information on multiple adapters.
4. Select Automatic setup from the Main menu. Then follow the instructions on the screen. (If you want to test the adapter with a responder on the network, see the procedure below before continuing.)
5. Setup displays the adapter's configuration, then runs a series of diagnostic tests that makes sure the adapter and network are functioning properly. If Setup finds a problem, it displays the results and some possible solutions.
6. When Setup finishes the tests, the Install network drivers screen appears.
7. Select the driver you want to install.
8. Setup can install NetWare client drivers for you. If you're installing other drivers, Setup displays a README file with installation instructions.

Test the Adapter With a Responder on the Network

Setup can test the adapter more thoroughly if you have a responder on the network while running the tests.

1. Go to a server on the network with any EtherExpress™ adapter installed (except EtherExpress 32 or EtherExpress 16 MCA).
2. Run the appropriate configuration program (SETUP, SOFTSET2, E100DIAG, or FL32DIAG) for that adapter and set up the adapter as a responder.
3. Return to the new, run Setup, and test the adapter.

Troubleshooting

If you cannot connect to a server or Windows NT reports an error while trying to connect, try the suggestions here first, then turn to the other 'Troubleshooting' sections within this chapter.

- Make sure you're using the drivers that come with this adapter. The driver filename contains the letter B (for example, E100BODI.COM).
- If you're replacing an existing adapter, make sure the LINK statements in your NET.CFG are correct for the new adapter. For example, the link statement for a NetWare client should be: LINK DRIVER E100BODI
- Verify the FRAME type in your NET.CFG file.

- If setting up a server, check your LOAD and BIND statements.
- Make sure the hub port is configured for the same duplex mode as the adapter. See page 3/34 for more information on full duplex.
- Make sure the network cable is securely attached to both the adapter and hub port and the adapter LNK light is on.
- Test the adapter
- Check the README files.

Windows NT - Server or Workstation

Automatic Configuration

PCI servers automatically detect and configure PCI-compliant adapters while booting. The onboard PRO/100B TX PCI adapter IRQ level and I/O address are automatically set each time you start your server.

Start your server to automatically configure the adapter. Configuration is complete when Windows NT starts or the DOS prompt appears.

If your server displays an error while booting, your PCI server may require additional steps to configure a PCI adapter. See the 'PCI Installation Tips' section on page 3/37 for more information if you get an error.

Install Network Drivers and Test the Adapter

After starting Windows NT, you need to install the drivers and test the adapter.

1. Double-click the Network icon in the Control Panel.
2. Click Add Adapter.
3. Don't select an adapter from the list. Instead, scroll to the end of the list and select
   - ◊ <Other> Requires disk from manufacturer.
4. Insert the Configuration and Drivers disk in a floppy drive and click OK.
   - ◊ The PROSet program automatically scans server resources and determines what resources were assigned to the PRO/100B TX PCI adapter.
5. Click Test.
   - ◊ If you've just added the adapter, the network driver is not active and the diagnostics will test the adapter and its connection to the network.
   - ◊ If you're testing an existing PRO/100B TX adapter, the network driver will probably be active and the diagnostics will test the driver. This diagnostic tracks the driver's actual network activity.
6. Click OK to accept the adapter's configuration.
7. Click OK in the Network Settings dialog box and when prompted, restart Windows NT.
8. To install multiple adapters, repeat this procedure for each new adapter. In addition, read the notes on page 3/34.
   - ◊ To run the PROSet software at any time, follow steps 1 and 2 above. Then click Configure in the window that appears.

Troubleshooting

If you cannot connect to a server or Windows NT reports an error while trying to connect, try the suggestions here first, then turn to the other 'Troubleshooting' sections within this chapter.

- Make sure you're using the drivers that come with this adapter. The driver filename contains the letter B; for example, E100B.SYS.
- Make sure the driver is loaded and the protocols are bound. See the Network Bindings dialog box in Windows NT to make sure.
- Make sure the network cable is securely attached to both the adapter and hub port and the adapter LNK light is on.
- Make sure the hub port is configured for the same duplex mode as the adapter. See page 3/34 for more information on full duplex.
- Test the adapter
- After installing the adapter you can run the PRO adapter setup and test program without the installation disk. To do this, double click the Network icon and then click Configure.
- Check with your LAN administrator, you may need to install supplemental networking software.

Install PROSet Software and Test the Adapter

When you install the PROSet software, it starts automatically. To run PROSet in the future, double click the PROSet icon in the Control Panel.

To install it and run the diagnostics:

1. Insert the Configuration and Drivers disk.
2. From Explorer, double click on the Floppy disk icon.
3. Find the PROSet icon and click the right mouse button. From the menu that appears click Install.
4. The PROSet software examines your server and displays the PRO Adapter Setup Window. This window shows the adapter's I/O address, interrupt, and Ethernet address.
5. Click Test to begin diagnostics.

There are two testing options. Testing with the NDIS driver checks overall operation of the adapter with the network. The second option, tests the adapter hardware only. Read both sections below before testing.

Test the adapter and driver together (recommended)

The adapter and driver test does not require you to unload the NDIS driver. You do not need to restart after testing.

1. Click Test NDIS.
2. When the test is complete, click OK to exit.
3. If this test fails, try again, unloading NDIS first.

Test the adapter hardware only

This test unloads the NDIS driver. You will need to restart after testing.

1. Click Unload NDIS.
2. After the NDIS driver unloads, click OK to continue.
3. When the test is complete, click OK to exit or click Advanced for more testing. Click Help in the Advanced Diagnostics window for more information.
4. Restart the server. You must restart the server before accessing any network drives.

Manually Adding an Adapter

If the New Hardware Found dialog box does not appear, or if you are adding a second adapter, use the following process.

1. From the Control Panel, double click the Network icon.
2. Click Add from the window that appears.
3. Click Adapter and then Add on the window that appears.
4. Click Have Disk from the window that appears. Insert the Configuration and Drivers Disk and click OK.
5. Follow any prompts for Windows installation disks or CD and restart when prompted.
6. If installing multiple adapters, repeat this procedure for each adapter (add only one adapter each time).

Troubleshooting

If you can't connect to a server or Windows reports an error after you double click Network Neighborhood, turn turn to the other 'Troubleshooting' sections within this chapter.

Other Operating Systems and Servers

If you are using an operating system (OS) other than DOS, Windows 3.11, or Windows NT, or if you are setting up a server, check the utility disks for 'README' files.

To view the README files, insert the Configuration and Drivers disk into a drive, switch to that drive, and type

```
SETUP /README E
```

Look through the selection called "Installing EtherExpress PRO/100 TX PCI Adapter Drivers" for the operating system you need. The README files contain driver information for the following networks:

- Novell (client and server)
- Microsoft (workstation and server)
- Lantastic, Banyan, NDIS, UNIX, IBM.

Installing Multiple Adapters

Windows NT users: Repeat the configuration procedure for each adapter you want to install (add only one adapter at a time). While the PRO/100B TX adapter setup program can detect all the PRO adapters in your server, you still need to perform the configuration process on each adapter. In Windows NT, be sure to click the Show all PRO Adapters box in the Configuration window.

NetWare users: The server drivers use the PCI slot number to identify each installed adapter. You can correlate the PCI slot number to the adapter by using the Ethernet address that is printed on a label on the adapter. Run Setup from the diskette to view Ethernet address and slot number for each installed adapter.

The adapter's 12-digit Ethernet address is on a sticker near the edge of the adapter (the address digits start with 00AA). The Ethernet address is sometimes called the node address or the MAC address. Note that the PCI slot number may not correspond with the physical connector in your server.

Select Duplex Mode (10 Mbps only)

Duplexing is a performance option that lets you choose how the adapter sends and receives data packets over the network. There are two duplex modes available at 10 Mbps and one at 100 Mbps.

- Full duplex (requires a full duplex switching hub): The adapter sends and receives packets at the same time. This mode can increase adapter performance capability. Full duplex is available to the adapter at 10 Mbps only.
- Half duplex: The adapter performs one operation at a time; it either sends or receives. This mode is available at 10 and 100 Mbps and is the default mode.

NOTE

If your hub is running at 100 Mbps and half duplex, your performance will be higher than if you run at 10 Mbps and full duplex.

Configuring for Full Duplex

To configure for full duplex, first verify that your hub has full duplex capability. Configuring the PRO/100B TX PCI adapter for full duplex is a two step process: the Speed setting on your adapter must be changed to 10 Mbps, and the Duplex setting also must be changed to full duplex. However, configuration is specific to the driver you are loading for your NOS as shown in the sections below.

To set up the duplex mode, refer to the section below that corresponds to your operating system. For example, if you are running Windows NT on a Novell network, choose the Windows NT method below.

NOTE

Performance may suffer if your hub is not full duplex and you configure the adapter to full duplex. Leave the adapter on half duplex if you are not sure what type of hub you are connected to.

DOS ODI, NDIS 2.01 Clients:

Edit the NET.CFG or PROTOCOL.INI file. Add to Link Driver section:

```
FORCEDUPLEX 2
SPEED 10
```

NetWare Server:

Load E100B.LAN and edit PROTOCOL.INI file. Add to Link Driver section (you must include the equal sign for servers):

```
FORCEDUPLEX=2
SPEED=10
```

Windows NT:

While running Windows NT:

1. From the Control Panel, double-click the PROSet icon.
2. PROSet examines your system and displays the Adapter Setup window. If you have multiple adapters, click the "Show All Adapters" box and then select the adapter you are configuring (it can be identified by its Ethernet address. Each adapter must be configured separately. See page 34, "Installing Multiple Adapters," for more information.
3. From the window that appears, click Change.
4. From the Adapter Setup window, click the menu for Network Speed.
5. Click 10 Mbps.
6. Click the menu for Duplex Mode.
7. Click Full.
8. Click OK when finished.
9. Click OK to restart Windows.

Other NOS:

See the Adapter Installation and Special Configurations README file.

Troubleshooting

If the adapter cannot connect to the network:

- Make sure the cable is installed properly

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

If you're directly connecting two servers (no hub), use a crossover cable. Some hubs may also require a crossover cable (see your hub documentation).

See the Cabling README file for more information on crossover cables.

- Check the LED lights on the system board adapter

The PRO/100B TX PCI adapter has three diagnostic LEDs on the system board that are visible through an opening in the back of the chassis. These lights help indicate if there's a problem with the connector, cable, or hub.

LED	Indication	Meaning
LNK	On	The 82557 and hub are receiving power; the cable connection between the 82557 and hub are good.
	Off	The 82557 and hub are *not* receiving power; the cable connection between the 82557 and hub is faulty; or you have a driver configuration problem.
ACT	On or flashing	The 82557 is sending or receiving network data. The frequency of flashes varies with the amount of network traffic.
	Off	The 82557 is *not* sending or receiving network data.
100	On	The 82557 is operating at 100 Mbps.
	Off	The 82557 is operating at 10 Mbps.

- Make sure you're using the correct drivers

Make sure you're using the drivers that come with this adapter. The driver filename contains the letter B; for example, E100B.COM. Drivers that support previous versions of the PRO/10 PCI adapter do not support this version of the adapter.

- Make sure the hub port and the adapter have the same duplex setting

If you configured the adapter for full duplex, make sure the hub port is also configured for full duplex. Setting the wrong duplex mode can degrade performance or result in lost connections.

- Test the adapter

Test the adapter as described in this guide. For DOS or Windows 3.11 servers, run Setup; for Windows NT don't run Setup. Instead, use the procedures listed on page 3/32.

Common problems and solutions

SETUP.EXE reports the adapter is "Not enabled by BIOS".

The PCI BIOS isn't configuring the adapter correctly. Try the 'PCI Installation Tips' on page 3/37.

The server hangs when the drivers are loaded.

Change the PCI BIOS interrupt settings. See page 3/37, 'PCI Installation Tips'.

If you are using EMM386, it must be version 1.49 or newer (this version ships with MS-DOS 6.X).

Diagnostics pass, but the connection fails.

- Make sure the network cable is securely attached.
- Make sure you specify the correct frame type in your NET.CFG file.
- Make sure the duplex mode setting on the adapter matches the setting on the hub.

The LNK LED doesn't light.

- Make sure you've loaded the network drivers.
- Check all connections at the adapter and the hub.
- Try another port on the hub.
- Make sure the duplex mode setting on the adapter matches the setting on the hub.

- Make sure you have the correct type of cable between the adapter and the hub. Some hubs require a crossover cable while others require a straight-through cable. See the Cabling README file for more information on cabling.

The ACT LED doesn't light.

- Make sure you've loaded the correct network drivers.
- Network may be idle. Try accessing a server.
- The adapter isn't transmitting or receiving data. Try another adapter.

The adapter stopped working when another adapter was added to the server.

- Make sure the cable is connected to the EtherExpress PRO/100B TX PCI adapter.
- Make sure your PCI BIOS is current. See below, 'PCI Installation Tips'.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts
  - For example, OS/2 does not.
- Try reseating the newest adapter.

The adapter stopped working without apparent cause.

- Try reseating the adapter first, then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and reinstall the drivers.
- Try a different PRO/100B TX PCI adapter.
- Run the diagnostics.

Technical information

PCI Installation Tips

Some PCI servers require additional steps to configure a PCI adapter. You may need to verify or change some BIOS settings. Some common PCI solutions are listed here.

- Reserve interrupts (IRQs) and/or memory addresses for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Check your PCI BIOS setup program. There may be IRQ options such as 'Enable for ISA', 'Reserve for ISA', or 'Disable for PCI'. This option is sometimes in the Plug-and-Play area of the BIOS setup.
- Enable the PCI slot. In some PCI servers, you must use the PCI BIOS setup program to enable the PCI slot. This is especially common in PCI servers with the Phoenix BIOS.
- Update your PCI BIOS. An updated PCI system BIOS can correct some PCI configuration problems. Call your server manufacturer to see if an updated BIOS version is available for your server. Phone numbers for the top PCI server manufacturers are listed in the PCI installation README file on the Configuration and Drivers disk.
- Configure the slot for level-triggered interrupts. The slot the adapter is using must be configured for level-triggered interrupts rather than edge-triggered interrupts. Check your PCI BIOS Setup program.

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 the advice in the Appendix A 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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 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.

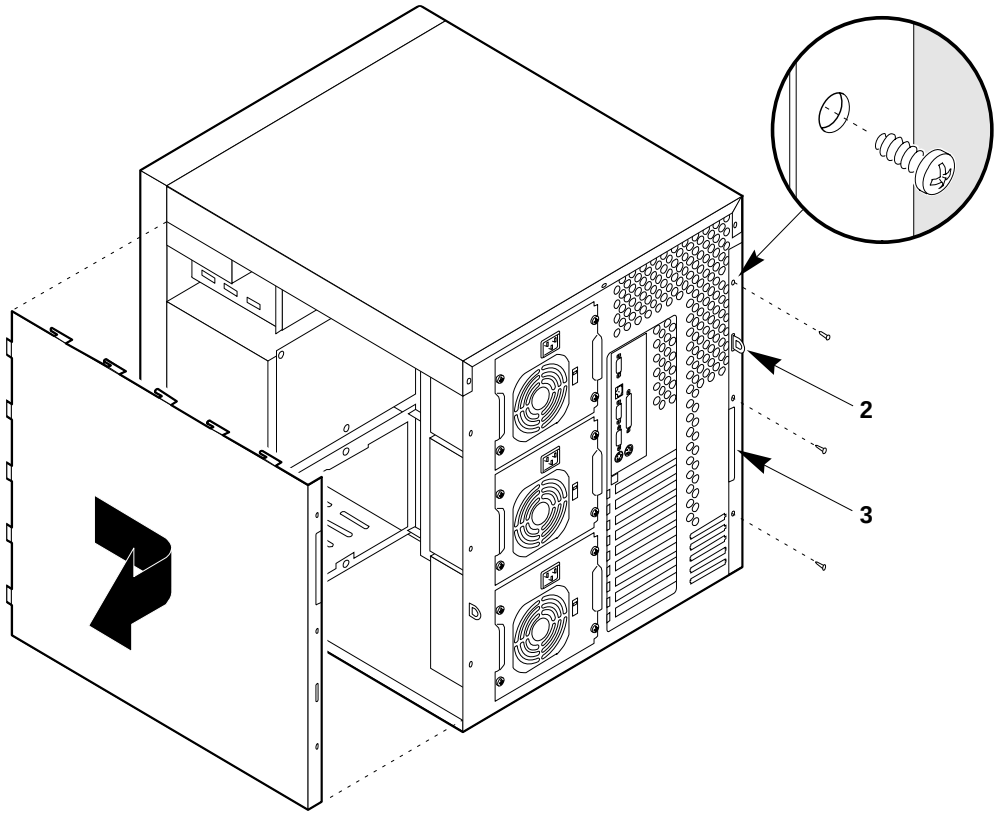


Figure 4-1. Side Covers

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

Replacing a Side Cover

The identical side covers can be installed on either side of the server.

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.

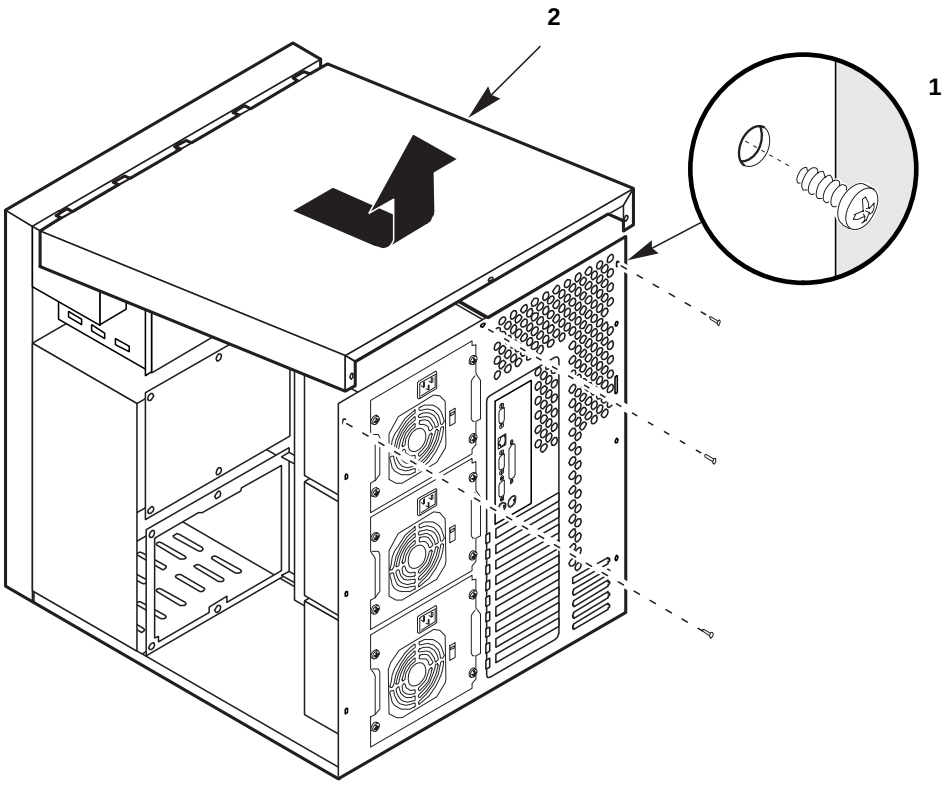


Figure 4-2. Top Cover

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.

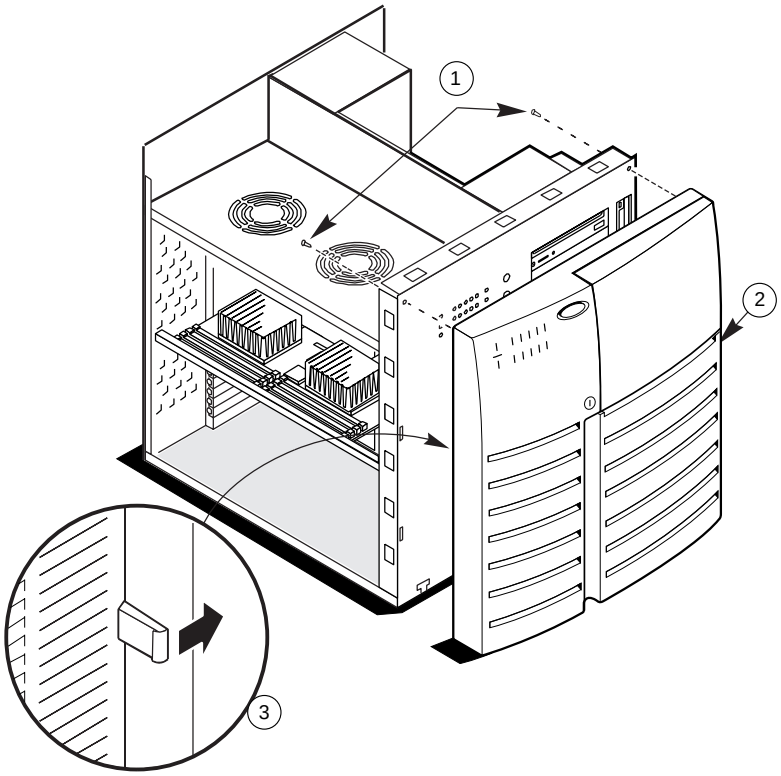


Figure 4-3. Front Bezel

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.

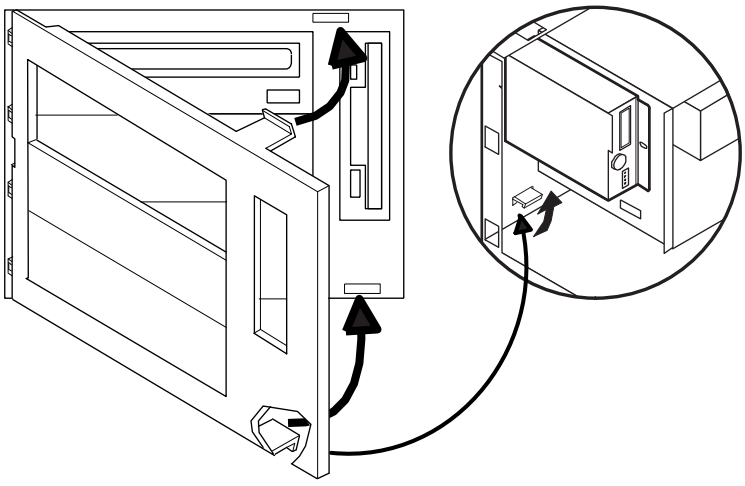


Figure 4-4. Snap-in Plastic Peripheral Bay Cover

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.

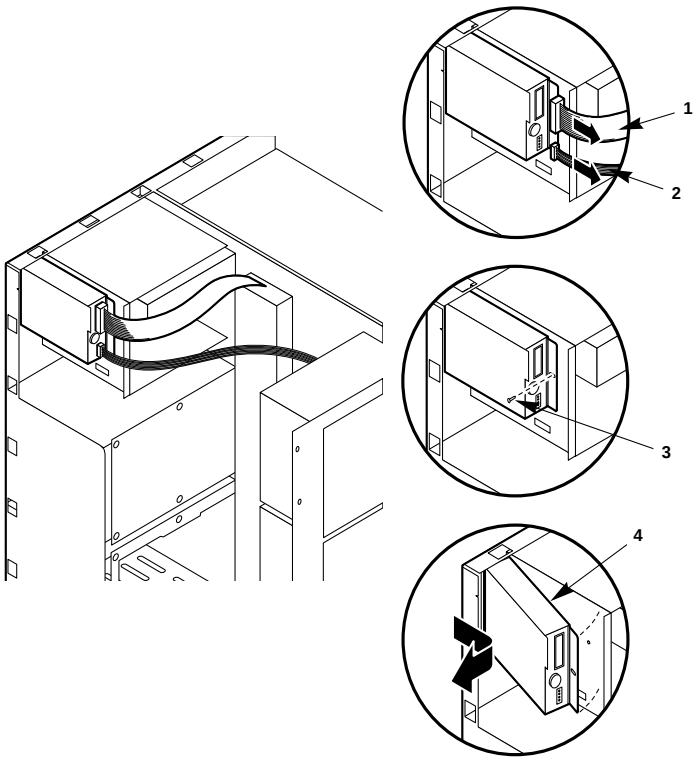


Figure 4-5. Removing the Diskette Drive

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.

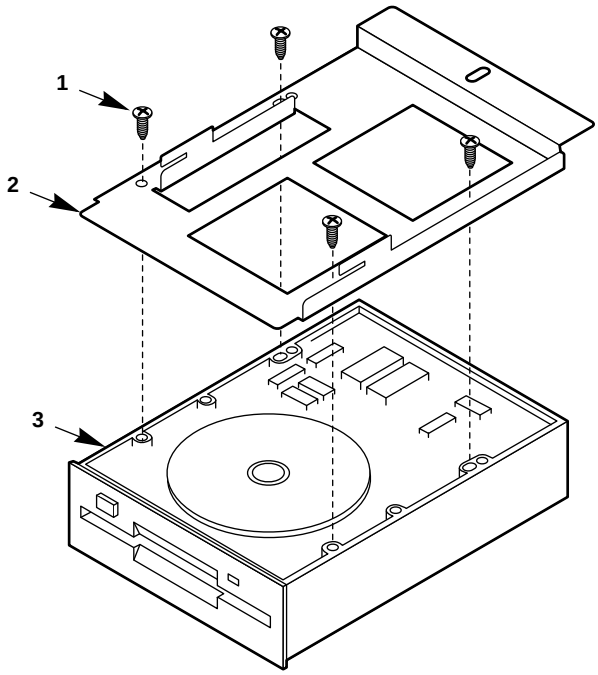


Figure 4-6. Diskette Drive and Carrier Assembly

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.

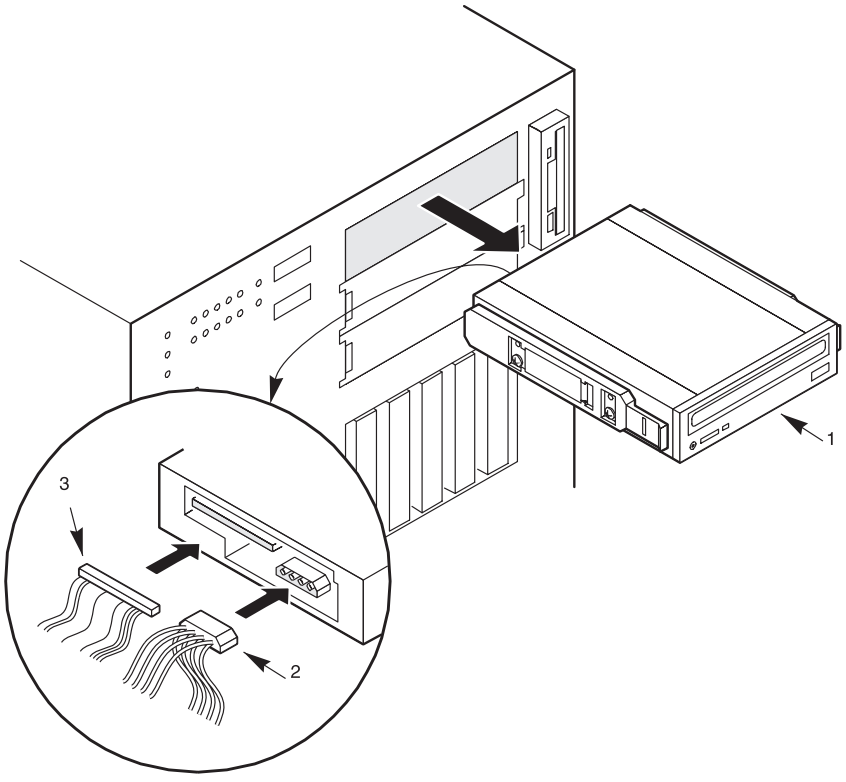


Figure 4-7. Removing the CD-ROM Drive (Bezel not shown for clarity)

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.

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

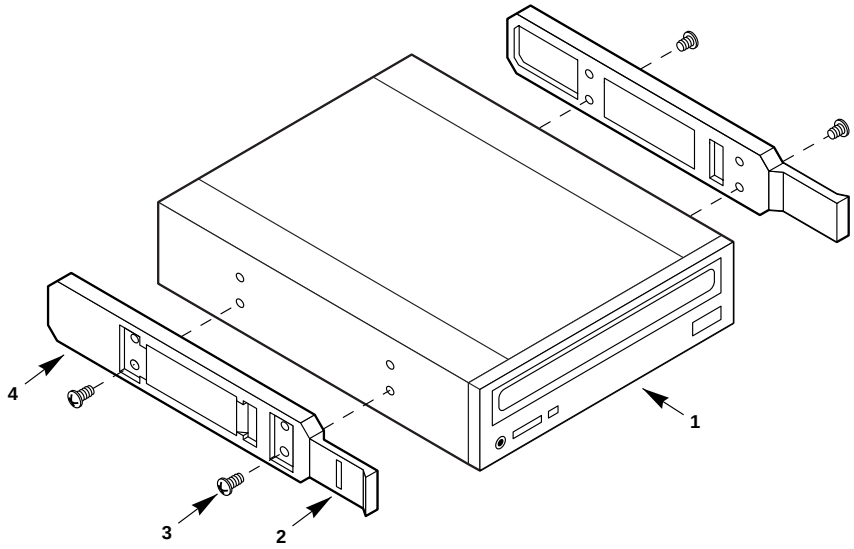


Figure 4-8. Snap-in Plastic Slide Rails

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.

13. This step is optional. If you installed a SCSI CD-ROM drive, run the SCSI*Select* utility to enable BIOS support for a bootable CD-ROM. Run the SCU or Setup to specify that the CD-ROM is the boot device. For information about running these utilities, see Chapter 3, 'Configuration'.

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.

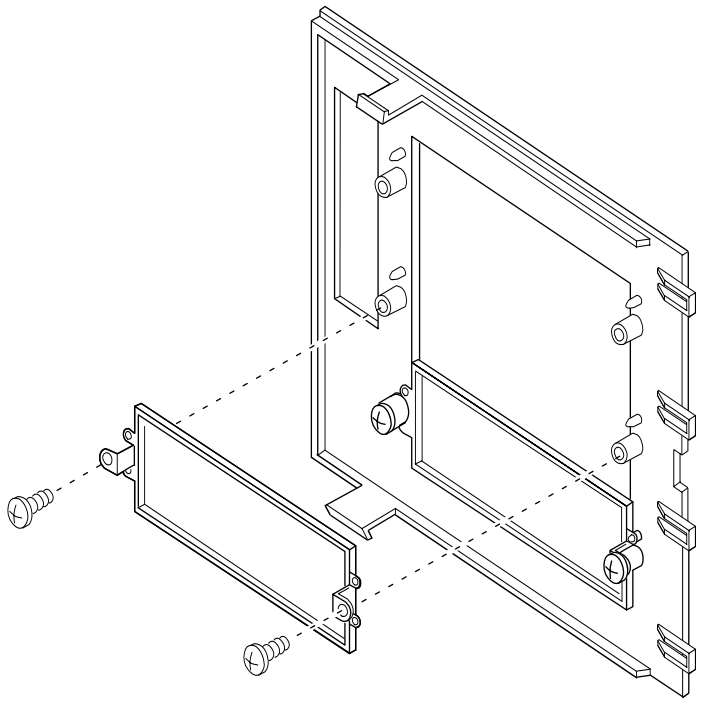


Figure 4-9. Filler Panels

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.

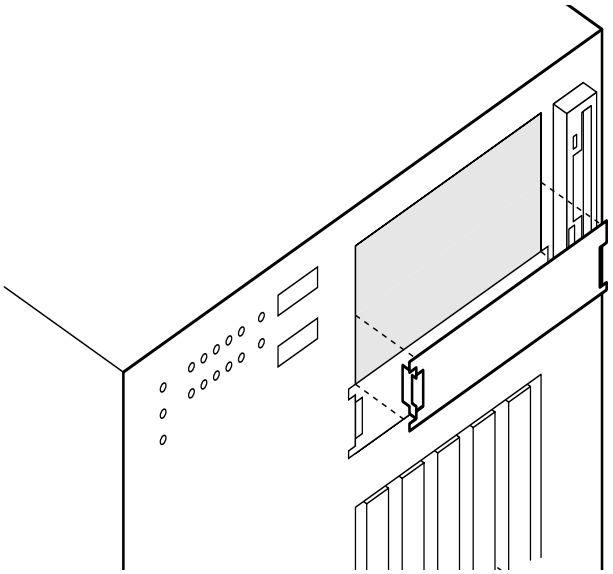


Figure 4-10. Removing the EMI Shield (Bezel not shown for clarity)

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

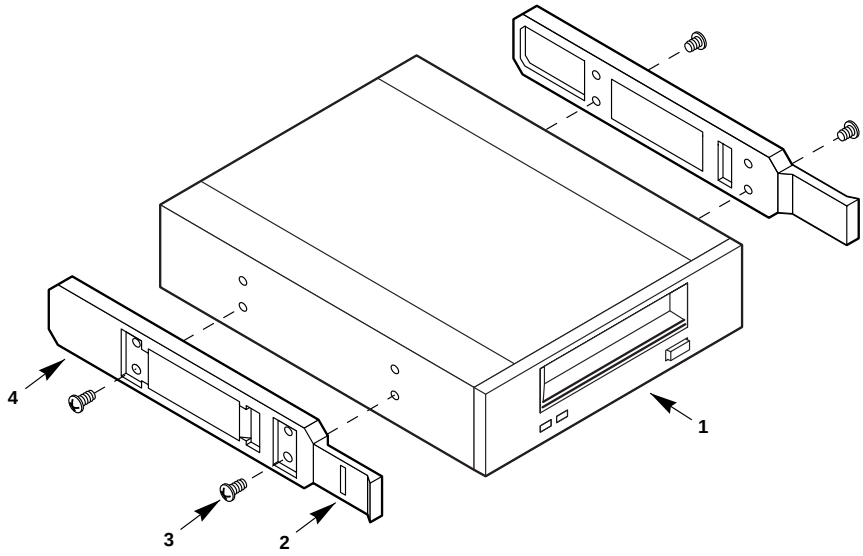


Figure 4-11. Snap-in Plastic Slide Rails

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 apprpriate signal cable and power cable to the drive.

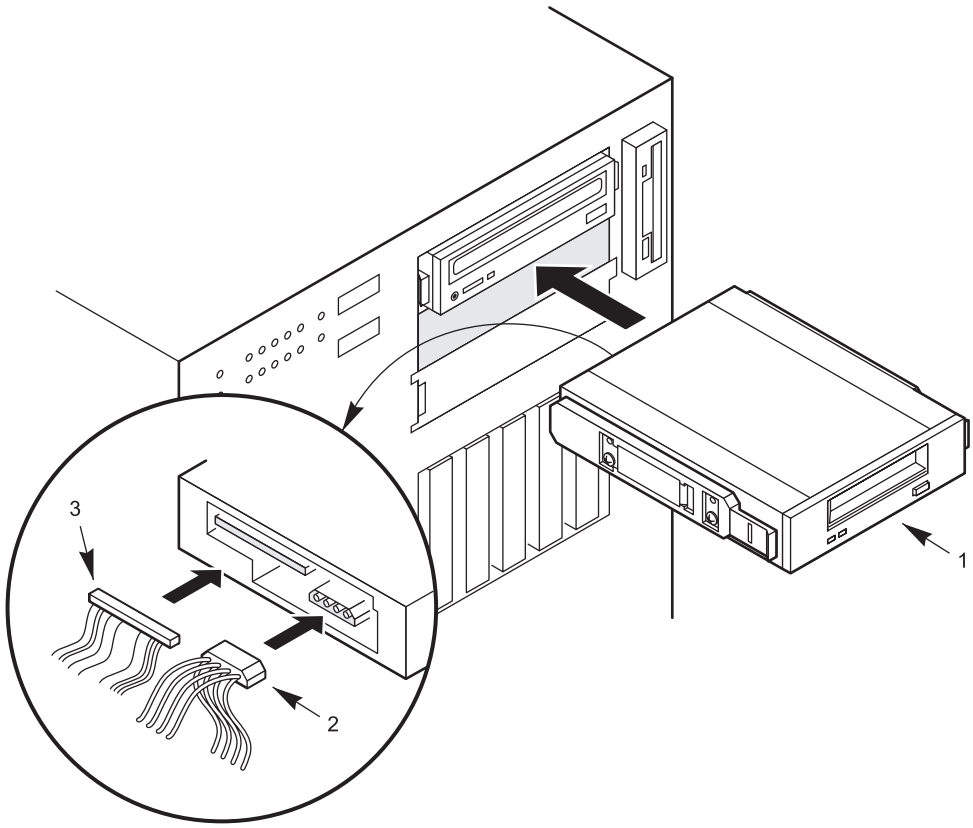


Figure 4-12. Installing a Mass Storage Device (Bezel not shown for clarity)

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.

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

The server may be configured with one, two, or three 330 watt power supplies.

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

If a single power supply fails in a redundant power system, the yellow power supply failure LED on the front panel starts flashing. When you can safely shut down the server power, you can easily replace the defective power supply.

An 'entry level *non-redundant/redundant* power system' typically limits the server configuration to dual processors, 1 GB memory and five hard drives.

A 'maximum level *non-redundant/redundant* power system' provides power for fully configured servers. The power supplies current share using a proprietary forced current sharing technique that ensures that the power supplies stay within five percent, or less, of the voltage regulation specifications.

Each power supply has an integrated fan for cooling and an individual AC power cable that plugs into the external receptacle on the power supply. For servers with redundant power systems, the loss of a single power supply will not affect the operation of the server. However, care must be taken not to overload a branch circuit of the AC supply by plugging too many power cables into a single AC circuit.

Warnings and Cautions

1. Observe the precautions in the safety and regulatory notices, and the advice in the Appendix A 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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.

Removing a Power Supply

See Figure 5-1

1. Unplug the AC power cable(s) from each power supply or wall outlet.
2. Remove both side covers and the top cover. See chapter 4, ‘Opening up the server’.
3. Label and disconnect the power supply cable(s) from the power-share backplane if one is fitted. If not, disconnect them from the cable harnesses attached to the hot-docking bay, peripherals, and system board.
4. Remove the screws that attach the power supply to the server chassis, and set them aside.
5. Remove the screws that attach the power supply to the centre wall inside the chassis, and set them aside.
6. Slide the defective power supply out the back of the server.

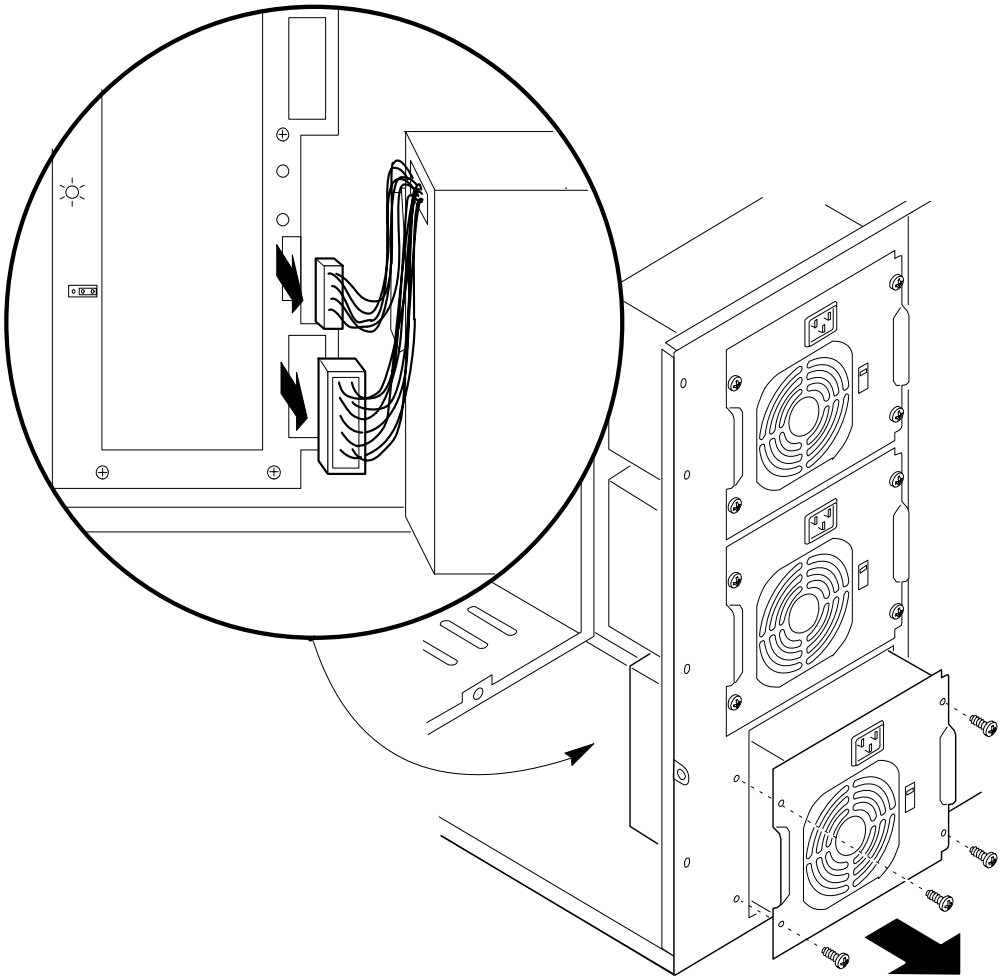


Figure 5-1. Removing a Power Supply

Replacing a Power Supply

See Figure 5-1.

1. Slide the power supply 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).
3. Attach the power supply to the centre wall inside the chassis with the two screws you saved.
4. Connect the power supply output cables to the power-share backplane if one is present. If not, connect them to the cable harnesses attached to the hot-docking bay, peripherals, and system board.
5. Replace the top cover and both side covers. See chapter 4, 'Opening up the server'.
6. Connect all signal cables and power cables(s) to the system.
   - ◊ Some systems have more than one power cable.

Installing a 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 method for fixing and the connections for the Backplane are detailed later in this chapter.

The existing first Power Supply will need reconnecting to this Backplane and the accompanying power harness/wiring needs to be replaced for correct 'redundant' operation.

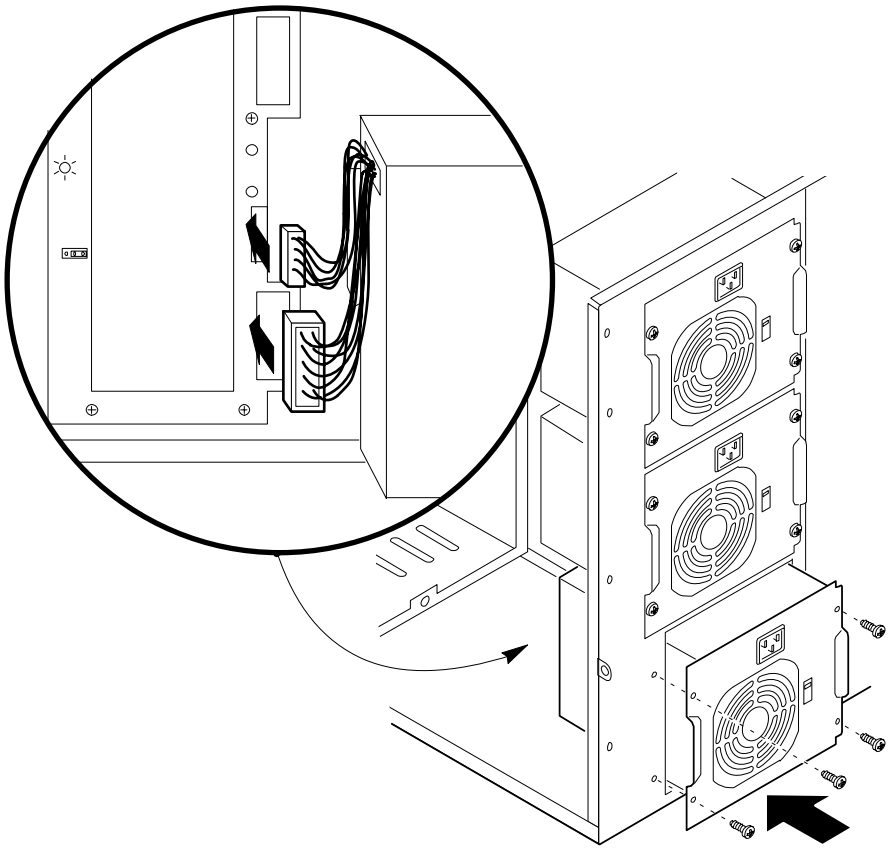
See Figure 5-2.

1. If your server contains more than one power supply, unplug the AC power cable from each power supply.
2. Remove the right side as described on page 2 of chapter 4.
   - ◊ It may assist the work if the top cover is also removed.
3. 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.
4. If your server contains *top and bottom* power supplies, remove the fan that is mounted between them. See chapter 10 'System Fans' for information.
5. Slide the power supply through the opening in the back of the server chassis.
6. 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).
7. Attach the power supply to the centre chassis bulkhead with two appropriate screws. Tighten the screws firmly (do not over-tighten as it may strip the threads).

WARNING

Use screws with a maximum length of 1cm when attaching the power supply to the centre chassis bulkhead. Longer screws will protrude through the bulkhead and may damage or short out components on the system board.

Figure 5-2. Installing a Power Supply



8. If this is the *bottom power supply*, connect the 24-pin connector of the power supply cable harness to J11 on the power share backplane and the 14-pin connector to J9.

   ◊ If this is the *middle power supply*, connect the 24-pin connector of the power supply cable harness to J7 on the power share backplane and the 14-pin connector to J6.

9. Replace the side cover.

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 Share Backplane

When the power system contains two or three power supplies, a power share backplane is used to distribute power to the server and to ensure even power supply load distribution. The backplane implements these server management features:

- I^2C bus
- power supply failure
- maximum current
- current usage
- number of power supplies installed in the server's power system
- redundant mode

The current sensing feature of the power share backplane shuts down the entire power system if any *single output* from the backplane to the system board or peripherals exceeds 240 VA. Current sensing limits the energy supplied by the power share backplane to levels generally accepted as operator accessible areas, less than 240 VA, without the use of interlocks.

If a power supply fails in a redundant power system, the yellow power supply failure LED on the front panel starts flashing. When the server can be safely shut down, the power supply can be easily replaced. Access to the power supply is through the right side of the server. The power supply is inserted through the back of the chassis and held in place with a mounting plate.

Power System Voltages	***+3.3V***	***+5V***	***+12V***	***-5V***	***-12V***
1 power supply, entry level *non-redundant* (Total combined output power of +3.3 V and +5 V shall not exceed 178W.)	11 A	32 A	12 A	0.25 A	0.5 A
2 power supplies, entry level *redundant*	6 A	30 A	11 A	0.25 A	0.5 A
2 power supplies, maximum level *non-redundant*	6 A	44 A	16 A	0.5 A	1.0 A
3 power supplies, maximum level *redundant*	6 A	44 A	16 A	0.5 A	1.0 A

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 5-3 and 5-4.

1. 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 the screws that attach the backplane to the threaded stand-offs on the inside chassis wall, and set them aside.
6. Pull the backplane carefully toward you to free it from the snap-on stand-offs.
7. Remove the backplane from the server, and set it aside.

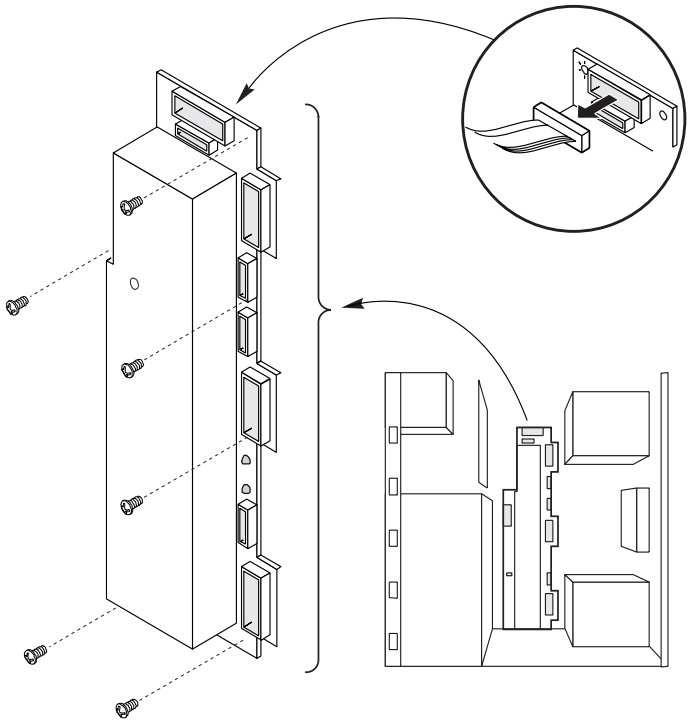


Figure 5-3. Removing the Power Share Backplane

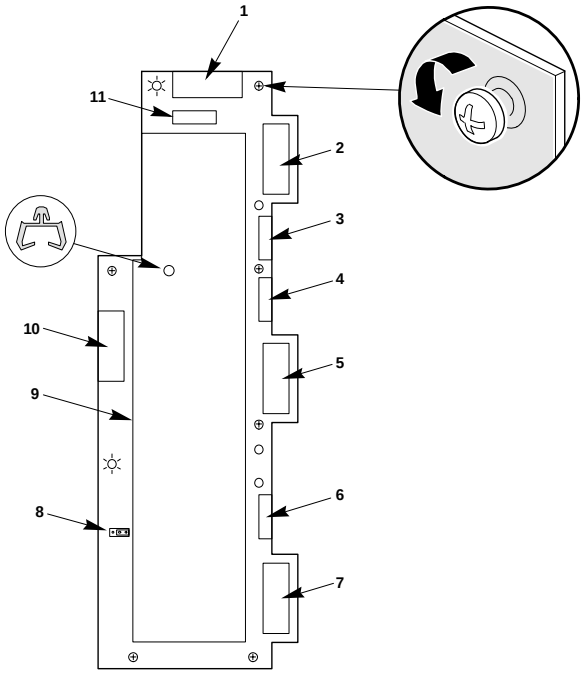


Figure 5-4. Power Share Backplane Connectors

1	J1 output to system board	7	J11 input from bottom power supply
2	J3 input from top power supply	8	J10 (factory configured jumper)
3	J4 input from top power supply	9	Non-removable cover
4	J6 input from middle power supply if present	10	J5 output to server peripherals
5	J7 input from middle power supply if present	11	J2 output to auxiliary power connector on system board
6	J9 input from bottom power supply		

Replacing the Power Share Backplane

See Figures 5-3 and 5-4.

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. Replace the side cover. See chapter 4, 'Opening up the server'.
8. Connect all signal cables and power cables(s) to the system.

New Installation of Power Share Backplane

If the server is having a second power supply added, the basic 'Replacing a Power share Backplane' instructions above should be followed to install the board. The major further steps required involve the fitting of a new power distribution harness to all Power Supplies and to the new Power Share Backplane.

The power cable harness should be disconnected from the first power supply and completely removed from the system. This will mean removing the other side panel and the top panel to access the other ends of the harness. Some of the power connections however, are in the same side as the power supplies, going to the system drive bays and the SCSI backplane.

A set of new power distribution cables is supplied with the backplane and they should be connected according to the information given with figure 5-4 and as follows:

1. Connect each of the Power Supply output cables to their appropriate connectors as in Figure 5-4.
2. Connect one of the 24-pin connectors of the new power cable harness to J1 on the power share backplane and feed the 24-pin connector on the other end through the centre chassis bulkhead and down through the fan panel. Connect this 24-pin connector to the power connector on the system board.
3. Connect the 14-pin connector P2 of the flat ribbon power cable to J2 on the power share backplane and feed the 14-pin connector P1 through the same way as the last cable. Connect P1 to the auxiliary power connector on the system board.
4. Connect the 20-pin P1 connector of the new peripheral power cable to J5 on the power share backplane and connect the 4-pin connector P8 of the daisy-chained power cable to the CD-ROM drive and connect P9 (miniature connector) to the floppy drive.
5. Connect the 4-pin connector P2 of the daisy-chained power cable to J13 on the top SCSI hot-docking backplane and connect P3 to J12.
6. If a bottom SCSI hot-docking backplane is fitted, connect the 4-pin connector P4 of the daisy-chained power cable to J13 and connect P5 to J12.

7. Connect 4-pin connectors P6 and P7 of the daisy-chained power cable to any devices in the remaining drive bays.
8. If the fan is still present, connect the 3-pin connector of the fan cable to J11 on the SCSI hot-docking backplane. Insert the plastic cable retaining clip in the small hole in the metal cover of the power share backplane. Press the 3-conductor fan cable into the retaining/support clip.

NOTE

You need to run the Load File Program Utility to tell the system of the changes, to activate the sensors and to monitor them for Server Management, particularly if you have added a Power Share Backplane in your server. Full information is in 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 +5 V and +12 V outputs are monitored at two points, the system board and the peripherals. The first is the total supply current that forms part of the load sharing circuit and monitors the +3.3 V as well as the +5 V and +12 V on the system board. Current to the

peripherals is also monitored. 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 cycling the server power off and on.

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 I^2C 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 I^2C 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 I^2C 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 330 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 though 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:

- 330 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 *non-redundant* power system
- 649 watts for a maximum level *redundant* power system

NOTE

The total power usage may vary depending on the processors and the size and number of DIMMs installed on the processor/memory module.

Voltage	***Maximum Continuous Current***	***Minimum Load Current***	***Peak Current***	***Watts***
+3.3 V	11.0 A	0.5 A		36.3 W
+5.0 V	32.0 A	5.0 A		160.0 W
–5.0 V	0.25 A			1.25 W
5V Standby	0.1 A			
+12.0 V	12.0 A	2.0 A	16.0 A	144.0 W
–12.0 V	0.5 A			6.0 W

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.

Calculating Power Usage

Use the worksheets in Tables 1 and 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 -1

2. Add the currents in each column of Table -1, and enter the total current for each column in Table -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 330 watts.

Table -1. Worksheet for Calculating DC Power Usage

	Current (maximum) at voltage levels:				
Device	***+3.3 V***	***+5 V***	***–5 V***	***+12 V***	***–12 V***
System board	1.0 A	3.5 A		0.1 A	0.1 A
Processor/Memory module	5.2 A	8.8 A		3.6 A	
Floppy diskette drive		0.3 A			
CD-ROM drive (typical)		0.4 A		1.0 A	
PCI RAID controller (typical)	0.2A	4.0A		0.1A	
Server Management Card		0.5A		0.8A	
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-1 slot 1					
PCI-1 slot 2					
PCI-0 slot 1					
PCI-0 slot 2					
PCI-0 slot 3					
PCI-0 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					

	Current (maximum) at voltage levels:				
Device	***+3.3 V***	***+5 V***	***–5 V***	***+12 V***	***–12 V***
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 SCSI tape drive					
Total Current					

Table -2. Total Combined Power Used by Your System

Voltage Level and Total Current (V x A = W)	***Total Watts for Each Voltage Level***
(+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 40 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. (This will require the installation of an additional SCSI controller card).

The procedure for fitting a second backplane is similar to the first. The fitting of a new SCSI controller card as an add-in board, is covered in the chapter 7, 'System boards'.

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 the advice in the Appendix A 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 and step 3 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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.

Signal States

In all tables in this chapter, active-low signal names have an "_L" symbol following the name; for example, P_REQ_SLOT0_L. Active-high signal names do not have an "_L" suffix.

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 indicaton (LED) on the front panel for each drive
- Internal I^2C bus
- +12 V connector for a fan with tachometer
- Local I^2C-based temperature sensor

The SCSI hot-docking backplane provides control signals and power for five wide/fast SCA SCSI hard disk drives. The backplane receives control signals from the Adaptec AIC-7880 wide/fast-20 SCSI III 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 wide/fast-20 SCA SCSI hard disk drives in the hot-docking bay get their control signals and power from the SCA connectors on the hot-docking backplane.

Since the backplane is the last device attached to the cable, it terminates the SCSI bus with SCSI active terminators. If the devices are terminated with terminating resistor packs, remove them. If the devices are terminated with SCSI IC active terminators, disable them.

The SCSI bus accepts a combination of 8-bit narrow and 16-bit wide SCSI devices.

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.

The power control also allows for hot-spare drives. A spare drive can be inserted and stored in a hot-docking SCA connector. When a drive fails, the spare drive can be put into service.

Depending on the supplied configuration, the server may be equipped with two SCSI backplanes. The second being controlled by an add-in card.

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.

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 Independent 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.

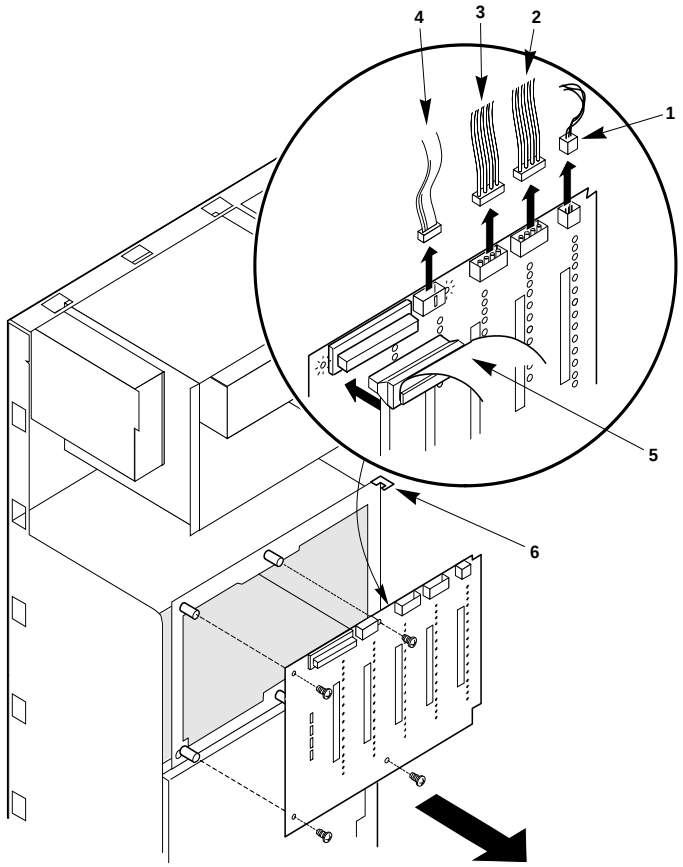


Figure 6-1. Removing a Hot-docking Backplane

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.
   - ◊ 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 cables(s) to the system.
   - ◊ Some systems have more than one power cable.

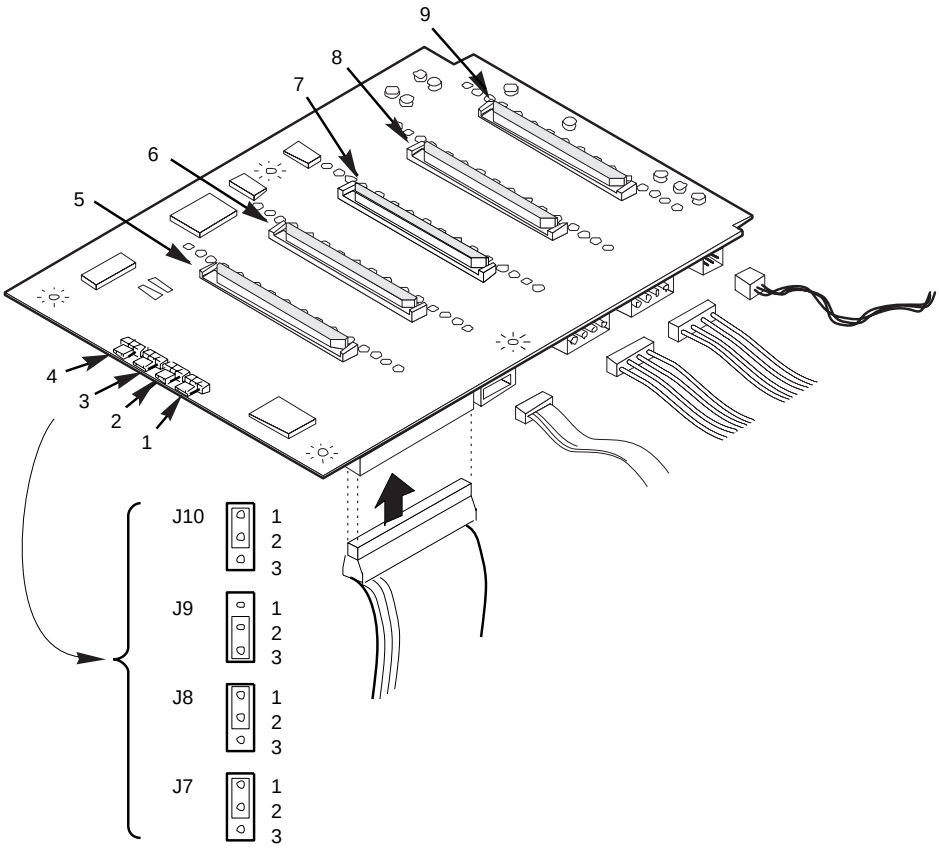


Figure 6-2. SCSI Backplane

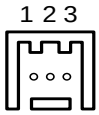
1	SCSI ID B, J10	6	SCSI drive 3
2	SCSI ID A, J9	7	SCSI drive 2
3	Internal/external, J8	8	SCSI drive 1
4	Normal operation, J7	9	SCSI drive 0
5	SCSI drive 4		

Extra connectors on the backplane

Fan Connector

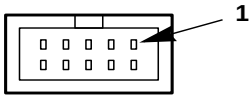
This connector provides power to the fan below the top power supply.

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



Front Panel Connector

The front panel connector and cable provide the chassis-wide I^2C bus and the electrical path between the drive fault indicators (LEDs) and the SCSI backplane that controls them.



Pin	*Name*	*Description*
1	GND	Electrical ground (0V)
2	I2C_SDA	I^2C SDA (Serial Data)
3	GND	Electrical ground (0V)
4	I2C_SCL	I^2C Serial Clock
5	RFU	Reserved for future use
6	FAULT1_L	Fault signal for drive 1 (logical drive 0)
7	FAULT2_L	Fault signal for drive 2 (logical drive 1)
8	FAULT3_L	Fault signal for drive 3 (logical drive 2)
9	FAULT4_L	Fault signal for drive 4 (logical drive 3)
10	FAULT5_L	Fault signal for drive 5 (logical 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.

An additional hot-docking backplane can be installed in the lower hot-docking bay for five more drives. However, you must install an add-in SCSI host adapter on the system board to support drives in the lower bay. The hot-docking bays accept peripherals that consume a maximum of 11 watts with a maximum operating temperature of 65°C.

By installing a Redundant Array of Independent Disks (RAID) controller add-in card to the system board, RAID software, and SCSI hard disk drives in the hot-docking bays, you can easily set up RAID applications.

Contact your Apricot supplier for additional SCSI adapters or RAID controllers/software.

SCSI Hard Disk Drive

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

Contact your Apricot 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 host adapter controller boards and devices in your system. Installing differential SCSI drive types can result in electrical damage to the host adapter boards 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, along with 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.

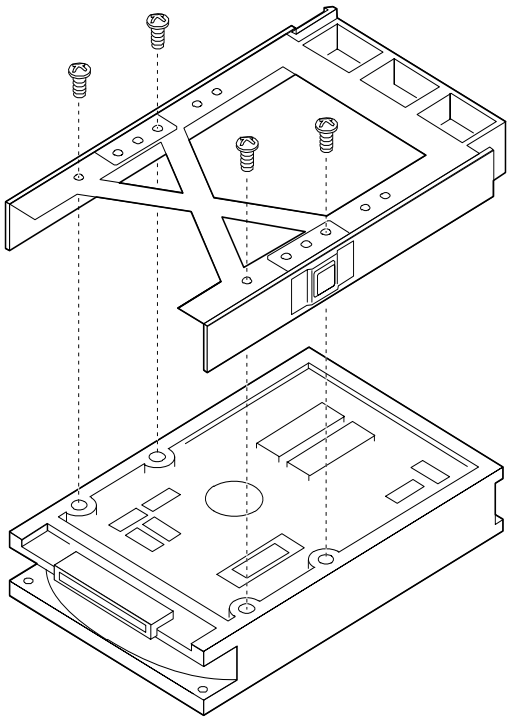


Figure 6-3. Hard Disk Drive and Carrier

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 a RAID host adapter board in your server, run the Disk Array Controller Configuration utility supplied with the board. Consult the documentation provided with the board.

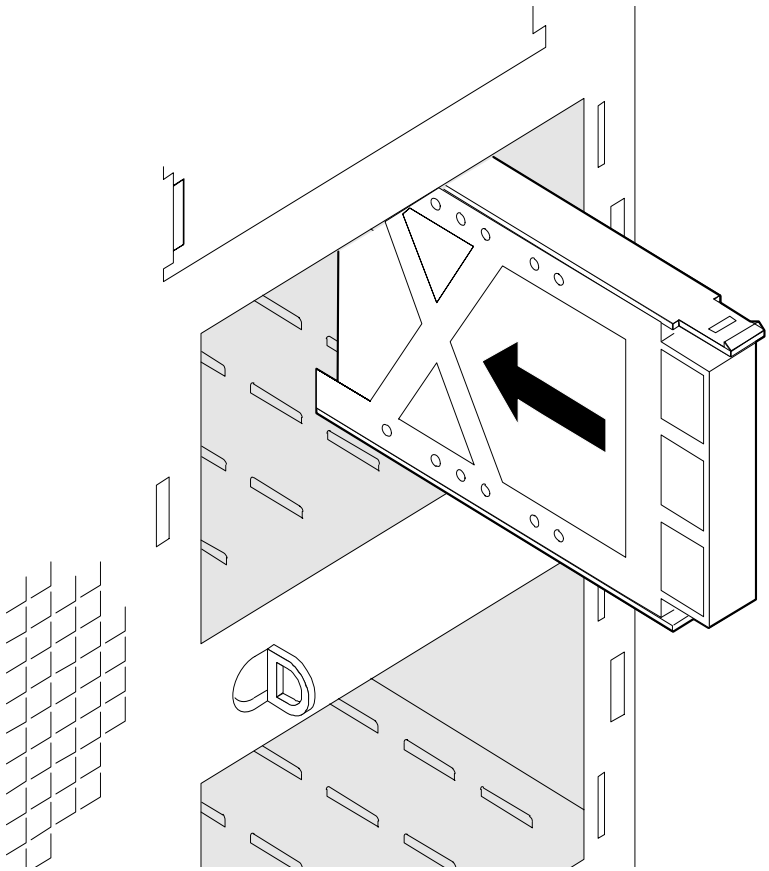


Figure 6-4. Installing a Hard Disk Drive (Bezel not shown for clarity)

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.

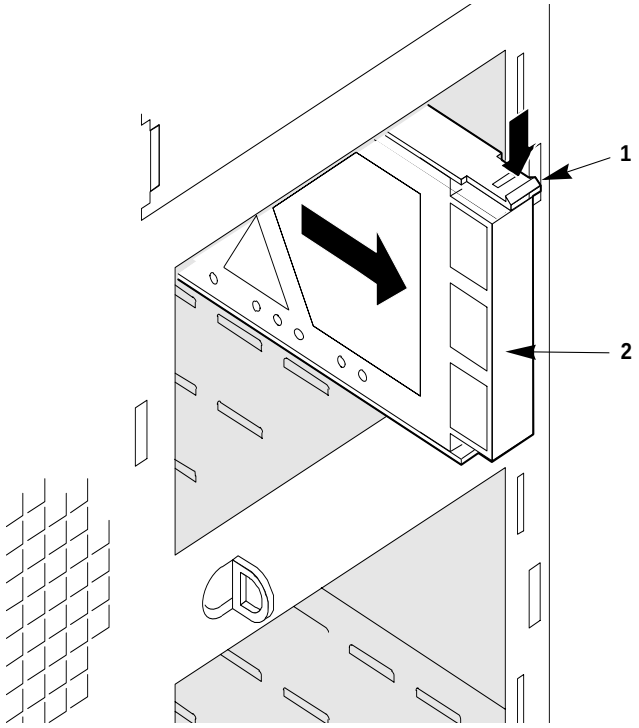


Figure 6-5. Hot-swapping a Hard Disk Drive (Bezel not shown for clarity)

1	Plastic tab
2	Handle

7 SYSTEM BOARDS

This chapter covers the principal boards within the server:

- System Motherboard:
  - ◊ fitting and removing
  - ◊ jumper settings
  - ◊ Backup battery replacement
- Dual Processor/Memory board:
  - ◊ Installation and removal
- Front panel board:
  - ◊ Installation and removal
- Add-in expansion boards:
  - ◊ Installation and removal
  - ◊ PCI interrupt and position rules

The exception being the SCSI backplane which is detailed in chapter 6 along with the hard disks connected to it.

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, and the advice in the Appendix A 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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.

Motherboard

Removing the Motherboard

See Figure 7-1.

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Label and disconnect all internal cables connected to the add-in boards installed in the expansion slots.
3. Remove the dual processor/memory module and add-in boards as described later in this chapter, from page 7/9 onwards.
4. Label and disconnect all internal cables connected to the system board.
5. Remove the board retaining screws and set them aside.
6. Pull the board toward you gently to disengage it from the snap-on stand-off, and slide the board toward the front of the server until its I/O connectors clear the rear of the chassis.
7. Remove the system board, and place it component-side up on a non-conductive, static-free surface or in an antistatic bag.

CAUTION

If you place the system board on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery.

8. Remove and save the I/O EMI gasket.

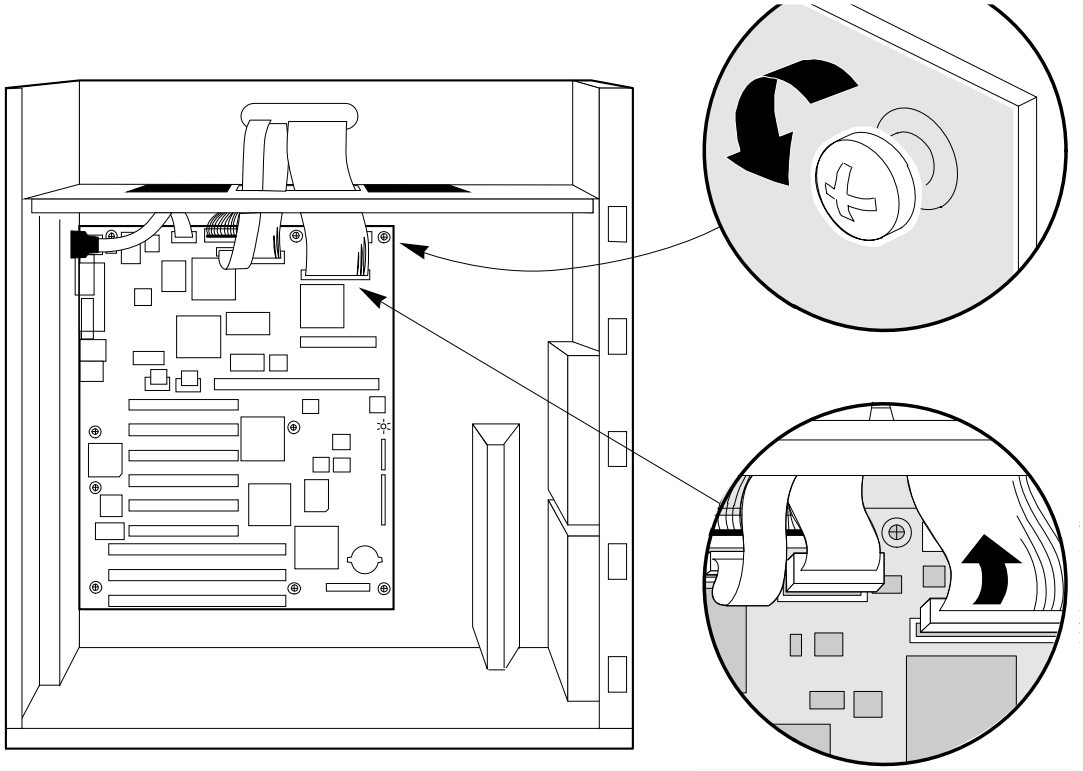


Figure 7-1. Removing the System Board

Installing the System Board

See Figure 7-1 and 7-2.

1. Record the serial number of the board in your equipment log.
2. Remove the left side cover. See chapter 4, ‘Opening up the server’.
3. Place the EMI gasket over the I/O connectors on the system board.
4. Position the system board over the snap-on stand-off and threaded stand-offs on the centre wall inside the chassis, and slide it toward the rear of the system until the I/O connectors protrude through the back panel.
5. Press the board onto the snap-on stand-off, and insert a screw through one of the mounting holes of the board and into a threaded stand-off. Do not tighten the screw until you have installed the remaining screws in the rest of the stand-offs.
6. Insert the remaining screws through the mounting holes and into the threaded stand-offs. Make sure the board is properly seated, and tighten all the screws firmly (do not over-tighten as it may strip the threads).
7. Connect all internal cables to the system board.
8. Check the required board settings and set the jumpers accordingly. Figure 7-2.
9. Install the dual processor/memory module and add-in boards in their original expansion slots as described on pages and respectively.
10. Connect all internal cables that go to the add-in boards installed in the expansion slots.
11. Replace the left side cover and connect all peripheral device cables that go to the I/O panel on the rear of the system.
12. Run the SCU and use the saved configuration file to restore all options to the same settings. For information about running this utility, see chapter 3, ‘Configuration’.

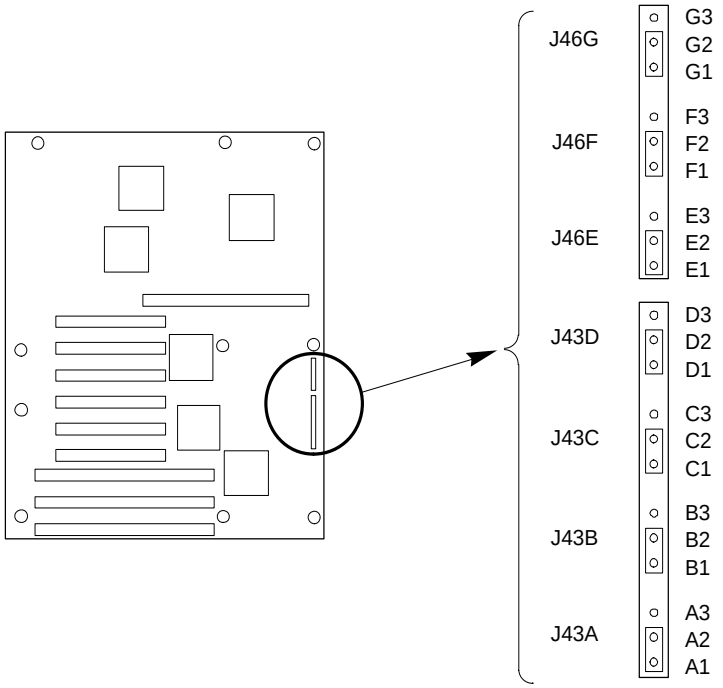


Figure 7-2. System Board Jumpers

Jumper	*Pins (default in bold)*	*Resetting the server*
J46G, Chassis Intrusion Detection	1-2, Enable	Activates alarm switches. They detect removal of the chassis covers.
	2-3, Disable	Bypasses the chassis intrusion switch.
J46F, Boot Option	1-2, Normal Boot	Inverts address A16 so that the Normal BIOS does not reside at the top of Flash memory where the write-protected Recovery BIOS region is located.
	2-3, 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 floppy diskette.
J46E, Flash	1-2, Erase/Program	Applies +12 V power to the VPP pin on the Flash memory device, and enables erasing or programming of Flash memory.
	2-3, Protect	Protects the contents of Flash memory.
J43D, Boot Block	1-2, Protect	Prevents writing to the BIOS boot block.
	2-3, Erase/Program	Permits boot block erasing and programming.
J43C, FRB (Fault Resilient Boot Timer)	1-2, Enable	Allows the system to boot from processor 1 if processor 0 fails.
	2-3, Disable	Lets the system boot only from processor 0.
J43B, Password	1-2, Protect	Maintains the current system password.
	2-3, Erase	Clears the password.
J43A, CMOS	1-2, Protect	Preserves the contents of NVRAM.
	2-3, Erase	Replaces the contents of NVRAM with the manufacturing default settings.

CMOS

The jumper on J43A pins 1 and 2 preserves the CMOS settings during system reset. Moving the jumper to pins 2 and 3 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. See chapter 4, 'Opening up the server'.
2. Move the jumper on J43A from pins 1 and 2 to pins 2 and 3; replace the left side cover, and connect the power cable(s) to the system.
3. 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'.
4. Turn the system off, disconnect the power cable(s) from the system, and remove the left side cover again.
5. Move the jumper on J43A from pins 2 and 3 to pins 1 and 2; replace the left side cover, and connect the power cable(s) to the system.
6. Run the SCU to configure your system. For information on running the SCU, see chapter 3, 'Configuration'.

Password

The jumper on J43B pins 1 and 2 protects the system password during system reset. Moving the jumper to pins 2 and 3 clears the system password during system reset.

To clear and enter your password:

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Move the jumper on J43B from pins 1 and 2 to pins 2 and 3; replace the left side cover, and connect the power cable(s) to the system.
3. Turn the system on, and wait for POST to complete. This automatically clears the password. For instructions on running POST, see chapter 3, 'Configuration'
4. Turn the system off; disconnect the power cable(s) from the system, and remove the left side cover again.
5. Move the jumper J43B from pins 2 and 3 to pins 1 and 2; replace the left side cover, and connect the power cable(s) to the system.
6. Run the SCU to specify a new password. For information on running the SCU, see chapter 3, 'Configuration'

Fault Resilient Booting (FRB)

The jumper on J43C pins 1 and 2 allows the system to boot from processor 1 if processor 0 fails. Moving the jumper to pins 2 and 3 lets the system boot only from processor 0.

To boot only from processor 0:

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Move the jumper on J43C pins 1 and 2 to pins 2 and 3; replace the left side cover, and connect the power cord(s) to the system.
3. Turn the system on, and wait for POST to complete; for instructions on running POST, see chapter 3, 'Configuration'.
4. Run the SCU to configure your system. For information on running the SCU, see chapter 3, 'Configuration'.

Boot Block

CAUTION

This procedure should only be done by a qualified technical person because it requires a special 'Boot Block Update Utility'. Contact your Apricot supplier for more information.

The jumper on J43D pins 1 and 2 write-protects the BIOS boot block.

To permit boot block erasing and programming:

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Move the jumper on J43D from pins 1 and 2 to pins 2 and 3 to erase and program the BIOS boot block.
3. Replace the left side cover, and connect the power cable(s) to the system.
4. Run the Boot Block Update Utility.
5. Repeat step 1 above.
6. Move the jumper on J43D from pins 2 and 3 to pins 1 and 2 to write protect the BIOS boot block.
7. Repeat step 3 above.

Flash Memory

The jumper on J46E pins 1 and 2 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 pins 2 and 3 protects the contents of flash memory.

For a copy of the latest system BIOS release, contact your Apricot 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 6.00 (or greater) installed on C:\DOS.

To prevent accidentally installing a BIOS for a different type of system, the update utility insures 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 press reset. 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. See chapter 4, 'Opening up the server'.
4. Move the jumper on J46E from pins 1 and 2 to pins 2 and 3 to write protect the flash memory device.
5. Replace the left side cover, and connect the power cable(s) to the system.

NOTE

If the system BIOS becomes corrupted during the update process, for example, if a power outage occurs, follow the 'Recovering the BIOS' procedure on page 7.

Boot Option

Moving the boot option jumper on J46F from pins 1 and 2 to pins 2 and 3 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

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Move the jumper on J46F from pins 1 and 2 to pins 2 and 3 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 cable(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 at least three minutes. When the recovery process completes, the speaker emits two beeps.

NOTE

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 following beep codes describe the recovery status.

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. Turn the system off, disconnect the power cable(s) from the system, and remove the left side cover.
6. Move the jumper from pins 2 and 3 to pins 1 and 2, the normal boot mode.
7. Replace the left side cover, remove the diskette from drive A, and connect the power cable(s) to the system.
8. After running the special recovery mode, run the SCU to specify a new password. For information on running the SCU, see chapter 3, 'Configuration.'

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. See chapter 4, 'Opening up the server'.
2. Move the jumper on J46G from pins 1 and 2 to pins 2 and 3 to bypass the chassis intrusion switches.
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'.

Back-up Battery

The lithium battery on the system motherboard powers the real-time clock (RTC) for up to ten 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.

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of any used battery according to battery manufacturer's instructions.

Replacing the Back-up Battery

See Figure 7-3.

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Insert the tip of a small flat plastic tool under the tab on the snap-on retainer. Gently lift up and pull back on the retainer to remove it from the lithium battery socket.
3. Remove the lithium battery from its socket, but do not use a metal blade.
4. Dispose of the lithium battery according to the battery manufacturer's instructions.
5. Remove the new lithium battery from its package. Handle it by its edges only. Being careful to observe the correct polarity, insert it into the battery socket.
6. Install the snap-on plastic retainer on the lithium battery socket.
7. Replace the left side cover and the power cable(s).
8. Run the SCU to restore the configuration settings to the RTC. For information about running this utility, see chapter 3, 'Configuration'.

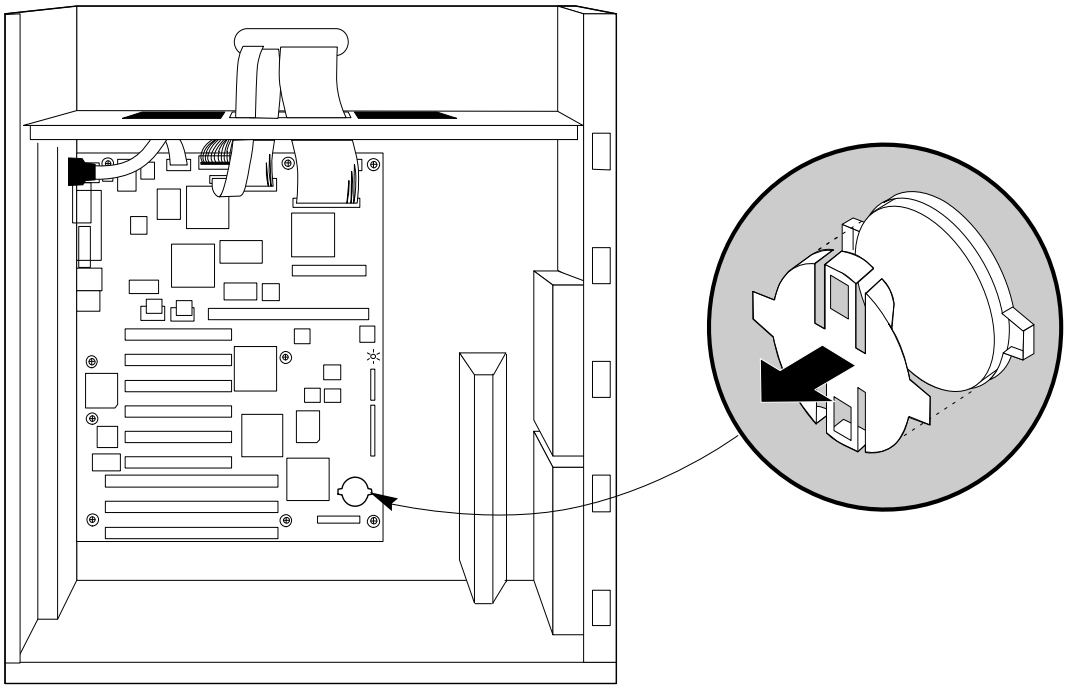


Figure 7-3. Lithium Back-up Battery

Dual Pentium Pro Processor/Memory Module

The server system board supports a dual processor/memory module containing two ZIF sockets for installing one or two Pentium Pro processors and eight DIMM sockets for installing memory. For information on upgrading this board, adding processors, memory and configuration, etc., see chapter 8, 'Upgrading the server'.

Installing the Dual Pentium Pro Processor/Memory Module

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

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove the screws from the bracket and set them aside.
3. Slide the bracket forward through the slot in the support panel near the fans until it clears the slot in the support panel on the back of the chassis.
4. Gently pull the bracket toward you until it clears the back of the module.
5. Slide the bracket towards the back of the chassis until it clears the front support panel. Remove the bracket from the system, and set it aside.
6. Handle the processor/memory module with care, remove it from its protective wrapper, place it processor-side up on a non-conductive, static-free surface.
7. Record the serial number of the module in your equipment log.

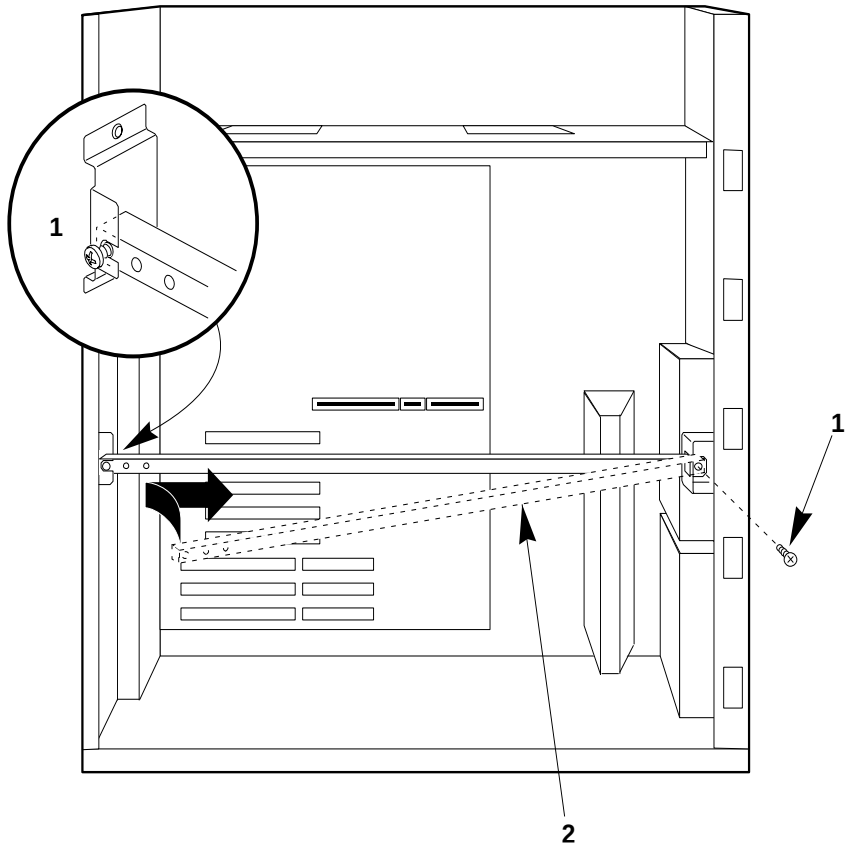


Figure 7-4. Removing the Module Retaining Bracket

1	Screw
2	Bracket

8. Hold the module by its top edge or upper corners, and firmly press it into the connector on the system board.

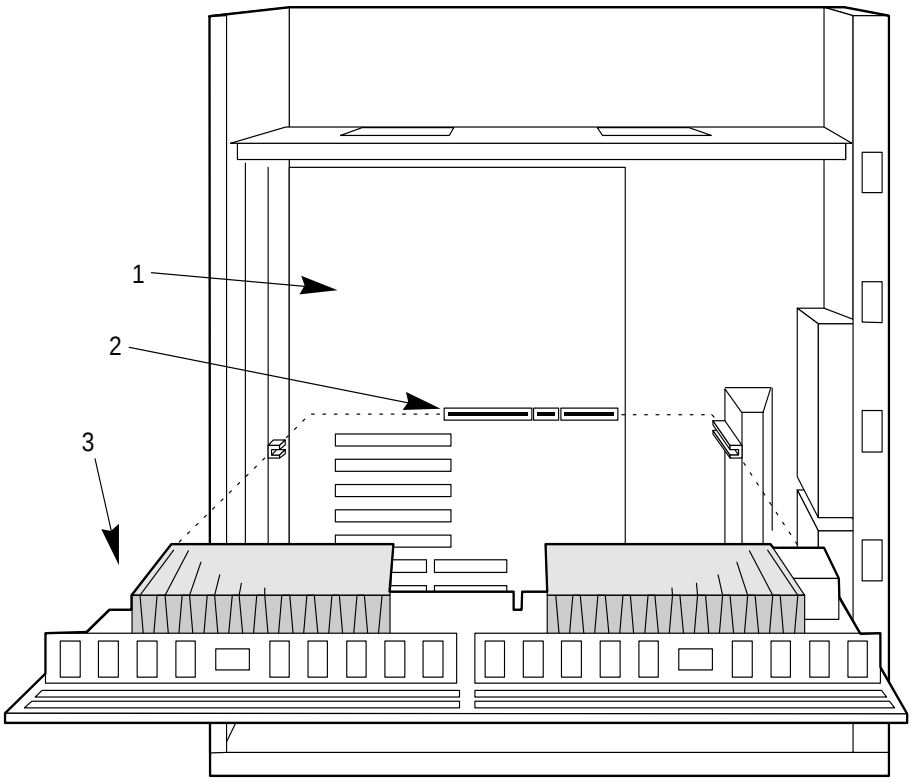


Figure 7-5. Installing the Dual Pentium Pro Processor/Memory Module

1	System board
2	Board connector
3	Module

9. Insert one end of the module retaining bracket into the notched metal tab in the support panel near the front fans.
10. While supporting the bracket, gently move the processor/memory module back and forth until it aligns with the slot in the plastic side of the bracket.
11. Slide the other end of the bracket into the notched metal tab in the support panel on the back of the chassis.
12. Attach each end of the bracket to the metal tabs with the screws provided, (do not over-tighten as it may strip the threads).
13. Replace the left side cover as previously described.
14. Run the SCU to configure the system. For information about running the utility, see chapter 3, 'Configuration'.

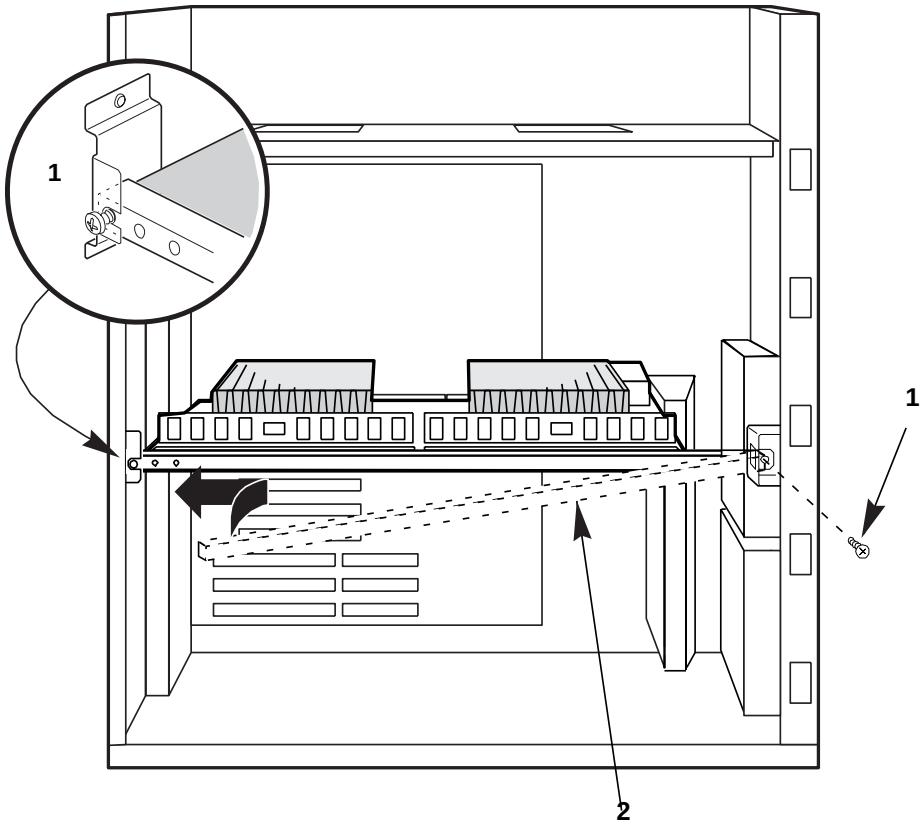


Figure 7-6 Installing the Module Retaining Bracket

1	Screw
2	Bracket

Removing the Dual Pentium Pro Processor/Memory Module

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

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove the screws from the bracket, and set them aside.
3. Slide the bracket forward through the slot in the support panel near the front fans until it clears the slot in the support panel on the back of the chassis.
4. Gently pull the bracket toward you until it clears the back of the module.
5. Slide the bracket towards the back of the chassis until it clears the front support panel. Remove the bracket from the system, and set it aside.
6. Holding the module by its top edge or upper corners, carefully rock it back and forth until the edge connector pulls free.
7. Store the module in an antistatic protective wrapper, or place it processor-side up on a non-conductive, static-free surface.

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 7-7.

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.

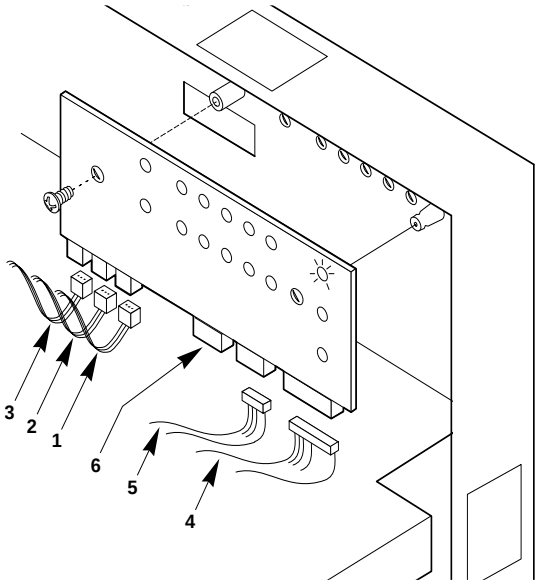


Figure 7-7. Removing the Front Panel Board

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 7-7.

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 six 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 (except for an 8-bit drop card that fits only in an 8-bit PC XT connector). 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.

PCI boards and IRQ allocation.

The motherboard uses a PCI to PCI bridge to increase the availability of PCI slots in the server. This means that devices that are on the far side of the bridge need to gain access to the main PCI bus through the bridge. Data transfers are arbitrated through the bridge onto the main bus. This can incur a latency affect on data transfers, particularly when the prime bus is being run with the bridge bus. This effect is not significant or noticeable due to the speed of the bus being much quicker than the average peripheral transfer rates.

IRQ allocation.

From the PIIX3 controller you have the standard 4 PCI IRQ lines INT_A, _B, _C and _D. These are connected to the primary bus slots in the following order:

	Slot 1	***Slot 2***	***Slot 3***	***Slot 4***
INT_A	PCI_INT_A	PCI_INT_D	PCI_INT_C	PCI_INT_B
INT_B	PCI_INT_B	PCI_INT_A	PCI_INT_D	PCI_INT_C
INT_C	PCI_INT_C	PCI_INT_C	PCI_INT_A	PCI_INT_D
INT_D	PCI_INT_D	PCI_INT_B	PCI_INT_B	PCI_INT_A

This is the usual arrangement. As most PCI cards use a single IRQ, INT_A, this allows 4 separate INT levels to the PIIX3 that are then mapped to separate IRQ levels.

The bridge is an additional PCI device connected to the above Bus. This means that it will have 4 PCI IRQ levels on the bus. These need to be mapped back to the main PCI bus. This is done in 1 to 1 i.e. PCI_INT_A on the prime bus is PCI_INT_A on the bridge bus and so on.

This means that devices on the bridge bus will have to use the same PCI INT line as the prime bus. This forces that where such devices use the same INT line, they are mapped to the same IRQ level. The bridge bus has also the SCSI and Ethernet controllers on it. The mappings are as follows:

SCSI	***Ethernet***	***Bus 1 slot 1***		***Bus 1 slot 2***	
PCI_INT_B	PCI_INT_C	INT_A	PCI_INT_A	INT_A	PCI_INT_D
		INT_B	PCI_INT_B	INT_B	PCI_INT_A
		INT_C	PCI_INT_C	INT_C	PCI_INT_B
		INT_D	PCI_INT_D	INT_D	PCI_INT_C

Therefore when adding any PCI cards, you need to consider which IRQs the card will map to, additionally when one card is allocated an IRQ, it will use a PCI_INT line, this will mean that other slots will have to use the same IRQ level.

Example

The on board SCSI uses PCI_INT_B, so; a card in slot 4 bus 0 using INT_A will be connected to PCI_INT_B and therefore have the same IRQ level.

The following table can then be constructed:

Device	***Shared with***	***From***
SCSI	Bus 0 Slot 4	PCI_INT_B
Ethernet	Bus 0 Slot 3	PCI_INT_C
Bus 1 Slot 1	Bus 0 Slot 1	PCI_INT_A
Bus 1 Slot 2	Bus 0 Slot 2	PCI_INT_D

When looking at the server PCI slots, this means that the following are the most suitable to be used in combination with adapter cards:

- Additional RAID controllers are used in slot 1-2
- Additional 3COM Network controllers are used in slot 0-1 then 1-1
- Additional Intel Network controllers are used in slot 0-3
- Additional 2910 SCSI controllers are used in slot 0-4
- Additional 2940 SCSI controllers are used in slot 1-2

See figure 5-8 below.

The actual IRQ level that the PCI_INT_? is mapped to is free to the user to force a selection, or to leave the PnP facility to allocate.

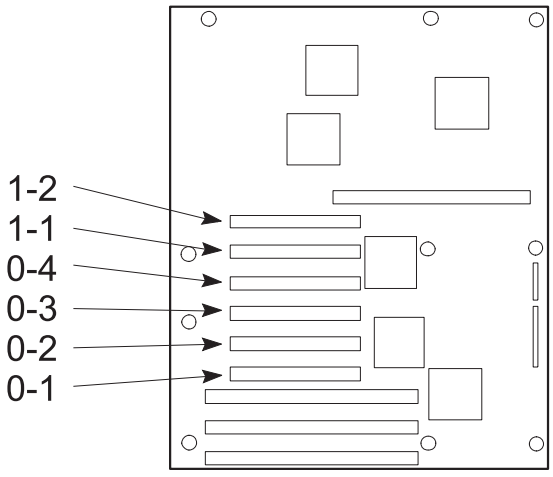


Figure 7-8. PCI bus slot Numbering on the Motherboard

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 7-9, 7-10 and 7-11.

1. Remove the left side cover. See chapter 4, 'Opening up the server'.
2. Remove and save the expansion slot screw and cover. (Figure 7-9)
   - ◊ 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 7-10 or Figure 7-11).
   - ◊ The retaining bracket fits into the space that was occupied by the slot cover.

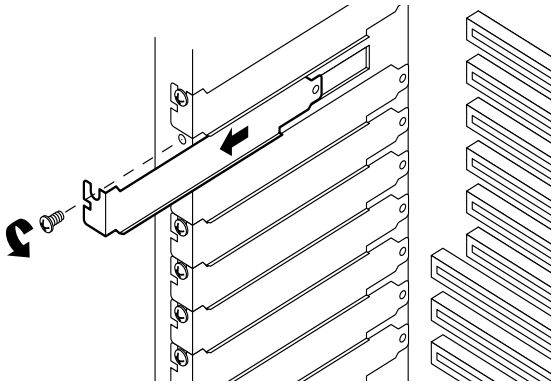


Figure 7-9. Expansion Slot Cover

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.
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'.

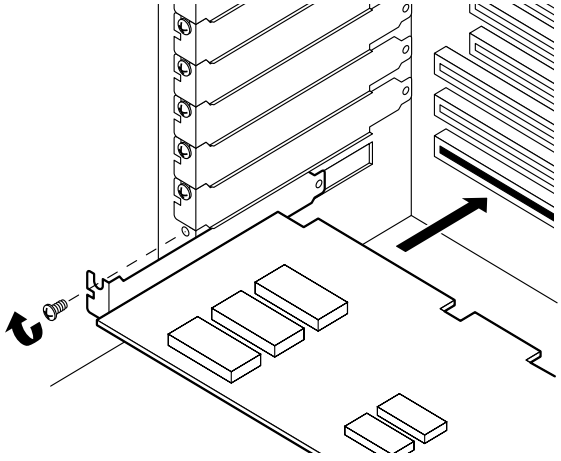


Figure 7-10. Installing an ISA Add-in Board, Component-side Up

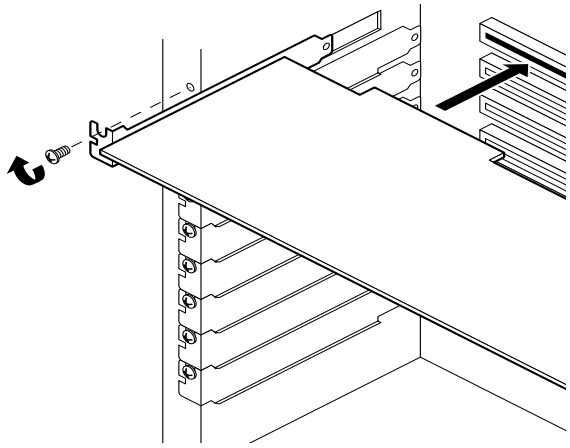


Figure 7-11. Installing a PCI Add-in Board, Component-side Down

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 7-9, 7-10 and 7-11.

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 7-9) 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 UPGRADING THE SERVER

The dual processor/memory module contains two ZIF sockets for installing one or two Pentium Pro processors and eight DIMM sockets for installing memory.

The motherboard may be upgraded with extra video memory to support higher resolutions or more display colours.

Contact your Apricot supplier for tested and approved upgrade components.

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 the advice in the Appendix A 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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.

The Processor/Memory module

This module is easier to work with if removed from the server. Follow the instructions given in chapter 7, 'System boards' for removal and installation.

Observe strict antistatic precautions at all times while handling this board and whilst the server is opened. See Appendix A for suitable antistatic precautions.

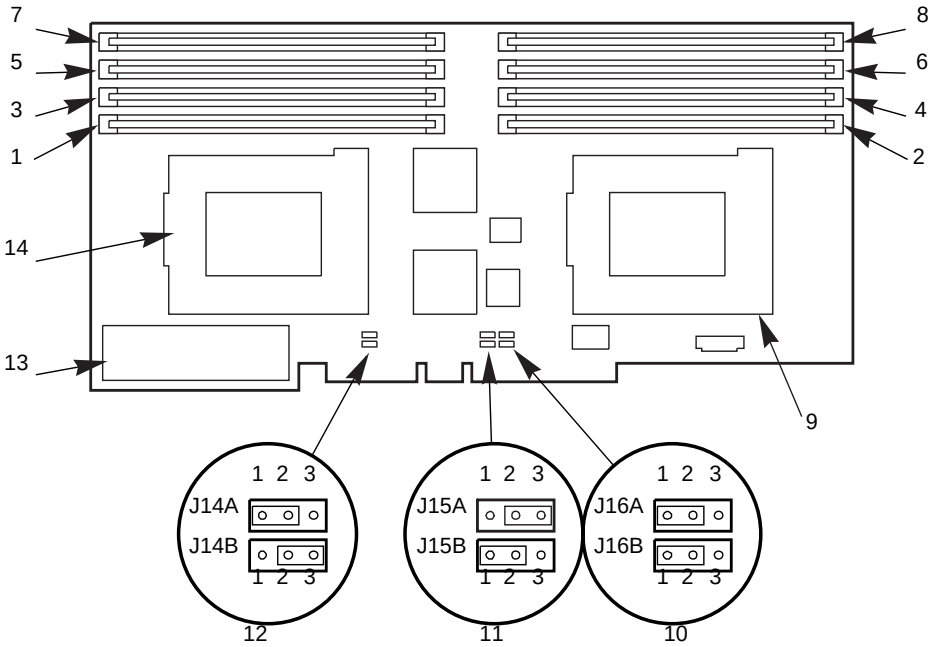


Figure 8-1. Dual Pentium Pro Processor/Memory Module

1	Bank 0, J1	8	Bank 7, J8
2	Bank 1, J2	9	Primary Pentium Pro processor 0, U10
3	Bank 2, J3	10	Jumper block, J16 (A and B)
4	Bank 3, J4	11	Jumper block, J15 (A and B)
5	Bank 4, J5	12	Jumper block, J14 (A and B)
6	Bank 5, J6	13	VRM 12V input, J9
7	Bank 6, J7	14	Secondary Pentium Pro processor 1, U7

Configuration Jumpers

When you install a Pentium Pro processor on the module, you must configure the jumpers according to the processor/bus speed. If you are installing two processors, both of them must have the same revision and identical clock frequencies.

Processor/Bus Speed	***J14A CLKSEL 1***	***J14B CLKSEL 0***	***J15A CLKDIV 2***	***J15B CLKDIV 1***	***J16A CLKDIV 0***
150/60	1-2	2-3	2-3	1-2	1-2
166/66	2-3	1-2	2-3	1-2	1-2
180/60	1-2	2-3	1-2	2-3	1-2
200/66	2-3	1-2	1-2	2-3	1-2

J16B, Reserved	
1-2	ITP Reserved
2-3*	Normal operation

* Jumper default setting.

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.

A plug-in DC to DC converter on the module provides power for the secondary processor.

If the supplied system is fitted with only a single processor, a second processor and DC converter may be fitted. The second processor must be identical to the one already installed.

Contact your Apricot supplier for additional processors and memory modules.

Pentium Pro Processor ZIF Sockets

The dual processor/memory module contains two ZIF sockets for installing one or two Pentium Pro processors. A plug-in DC to DC converter on the module provides power for the secondary processor. If you are installing only one processor on the module, you must install it in the "PRIMARY PROCESSOR" socket (U10). If you are installing two processors, both of them must have the same revision and identical clock frequencies.

When you install a second processor in the "SECONDARY PROCESSOR" socket (U7), you must install a plug-in +12 volt DC to DC VRM in the "VRM 12V INPUT" connector (J9).

WARNING

If the server has been running, any processor and heat sink already installed on the module will be hot. To avoid the possibility of injury, while removing an existing processor or installing and additional one, allow at least 15 minutes for processors to reach a safe temperature.

Installing a Pentium Pro Processor

See Figures 8-2 and 8-3.

1. Remove the server left side cover and dual processor/memory module as described in previous chapters.
2. Hold the module only by its edges, being careful not to touch its components or gold edge connectors, and place it processor-side up on an antistatic surface.
3. Remove the new processor from its antistatic package, being careful not to touch the exposed pins.
4. Unhook the lever from the locked position on the ZIF socket and raise it until it is in a vertical position.
5. Orient the Pentium Pro processor so that the bevelled corner with the dot on it is above pin 1 on the ZIF socket. Due to the pin pattern, it will only fit one way.

6. Carefully insert the processor pins into the socket. Being careful not to bend the pins, press down on the processor until it seats in the socket.
7. Gently push the ZIF socket lever down until it snaps into place in the locked position.
8. Coat the underside of the heatsink evenly with thermal contact paste and place it centrally on the processor.

WARNING

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.

9. Position the clips on top of the heat sink so that they are over the outer tabs on each end of the ZIF socket.
10. Configure the jumpers on the module according to processor/bus speed.

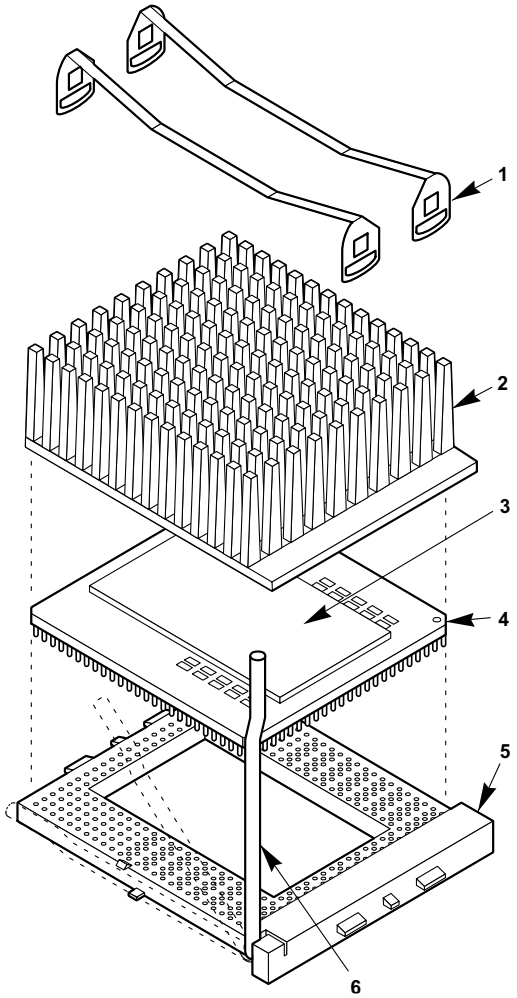


Figure 8-2. Processor Installation Assembly

1	Heat-sink clips	4	Bevelled corner with dot (pin 1)
2	Heat sink	5	ZIF socket
3	Heat spreader	6	Lever

11. Place the slot in the end of one clip over the plastic tab on the end of the ZIF socket (the end away from the lever). Make sure that the end of the clip is all the way over the tab; if not, the tab may break.
12. Firmly grasp the other end of the clip with needle-nosed pliers, and push down on it. When the end of the clip clears the bottom of the tab, push slightly in on it until the slot in the end of the clip is in place over the plastic tab.
13. To install the other heat-sink clip, repeat steps 11 and 12.

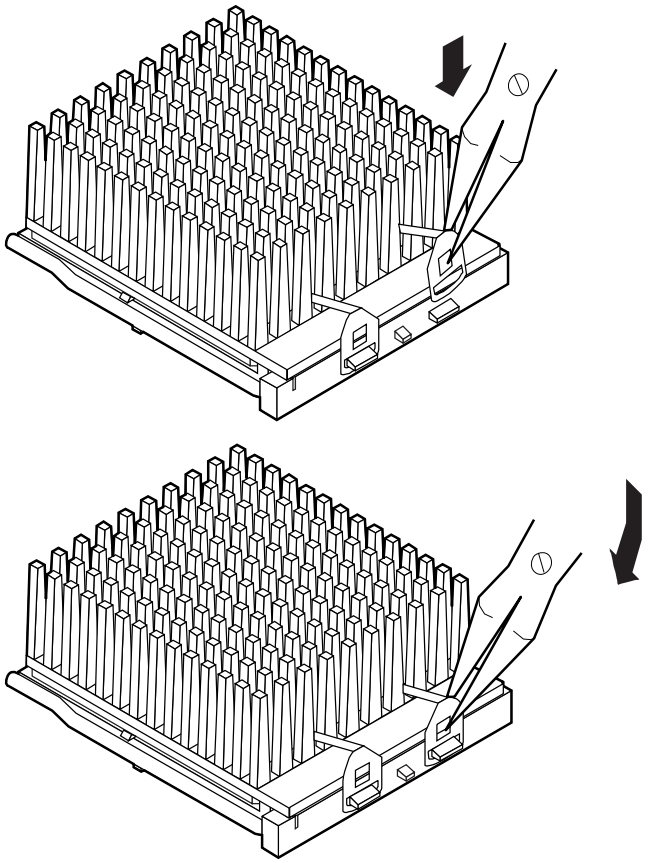


Figure 8-3. Installing the Heat-sink Clips

Installing the DC to DC Converter VRM

See Figure 8-4.

1. Remove the +12 V DC to DC converter VRM from its antistatic package.
2. Carefully insert the +12 V VRM in connector J9, 'VRM 12V INPUT', on the dual processor/memory module. Make sure you don't bend the connector pins.
3. Push down firmly on each end of the VRM until the ejector levers snap into place, locking the VRM in the connector.

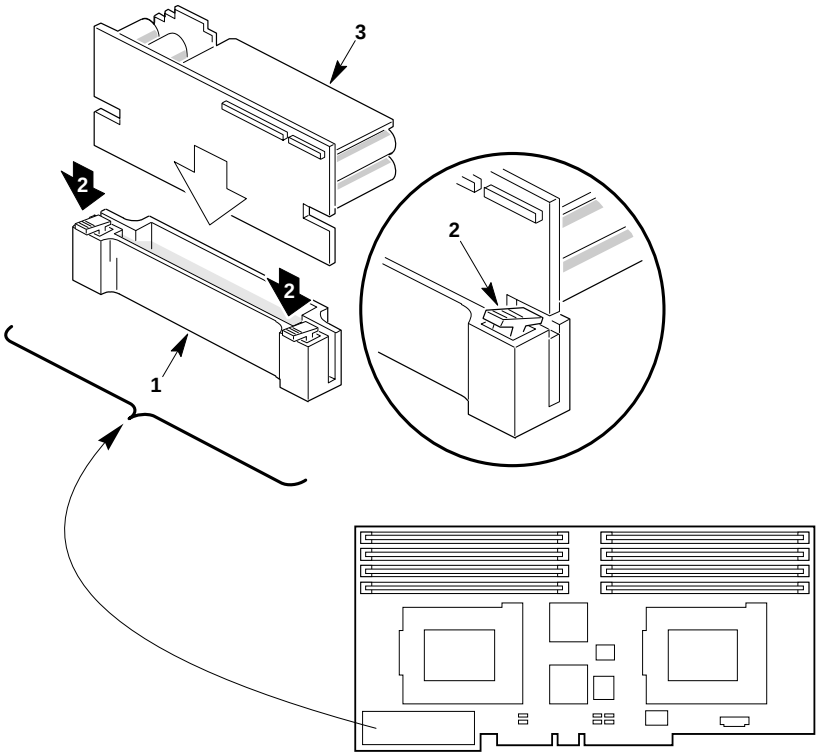


Figure 8-4. +12 V DC to DC Converter VRM

1	VRM 12V input socket, J9
2	Ejector lever
3	+12 V DC to DC Converter VRM

Removing the DC to DC Converter VRM

See Figure 8-4.

1. Orient the dual processor/memory module processor-side up so that the component side of the VRM faces away from you.
2. Using a small flat-bladed screwdriver, push the plastic ejector levers on each end of the connector away from the VRM to eject it out of the connector.
3. Place the VRM in an antistatic package.

Removing a Pentium Pro Processor

See Figure 8-5.

1. Orient the processor/memory module with the processor-side up so that hinged-lever ends of the ZIF sockets face toward you.
2. Firmly grasp the end of the heat-sink clip with needle-nosed pliers, and push down on it. When the end of the clip clears the bottom of the tab, push slightly out on it until the slot in the end of the clip clears the plastic tab.
3. Tilt the clip upward and remove it from the tab on the other end of the socket. Set the clip aside.
4. Remove the other heat-sink clip in the same way.
5. Remove the heat sink by sliding it off the processor, and set it aside, greasy-side up.

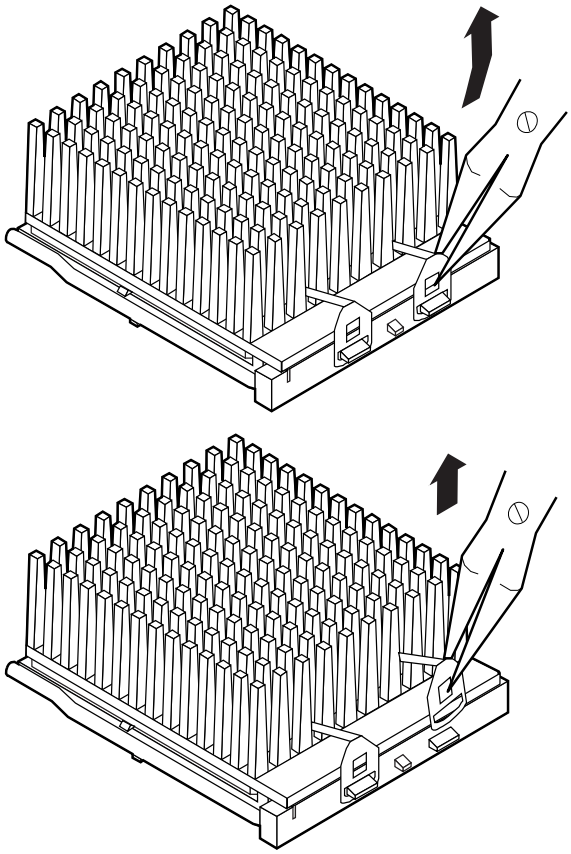


Figure 8-5. Removing the Heat-sink Clips

6. Gently push the ZIF socket lever out towards the DIMM sockets, and raise the lever until it is straight up. There will be a little stiffness at the beginning and end of the movement.
7. Grasp the opposite sides of the processor and, while applying equal upward force on each side, lift it out of the socket. Do not touch the exposed pins when it releases.
8. Place the processor on a non-conductive foam pad.
9. Use isopropyl alcohol and cloth wipes to remove grease residue from the processor. Store the processor in an antistatic wrapper. If you are not going to use the heat sink again, wipe off the grease residue and set it aside.

WARNING

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.

10. If you are not installing another processor, push the ZIF socket lever down until it snaps into place in the lock position.
11. Install the dual processor/memory module on the system board and replace the left side cover.
12. Connect all signal cables and power cables(s) to the system.
    - ◊ Some systems have more than one power cable.

Memory

The onboard PCI and memory controller (PMC) supports from 16 MB to 1 GB of ECC memory, either fast page mode (FPM) or extended data out (EDO) 3.3 V 60 ns DRAMs, mounted on JEDEC DIMMs. You may install mixed sizes and types of DRAM DIMMs in the eight memory banks; however, their speeds, 60 ns, must be the same. Always install the DIMMs in sequence by starting with bank 0 (socket J1), then bank 1 (socket J2), and so on with bank 7 (socket J8) as the last one. The PMC automatically detects and initialises the memory array, depending on the type, size, and speed of the devices.

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 PMC generates an SERR (system error) which usually halts the system. ECC is calculated on a 64 bit wide memory basis.

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

There is no memory on the system board. The dual processor/memory module contains an onboard PCI and memory controller (PMC) that controls server memory. The memory controller supports from 16 MB to 1 GB of ECC memory by using fast page mode (FPM) or extended data out (EDO) 64 Mbit DRAMs mounted on JEDEC 3.3 V 60 ns DIMMs.

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

ECC Memory

You may install mixed sizes and types of DRAM DIMMS in the eight memory banks; however, their speeds, 60 ns, must be the same. Always install the DIMMs in sequence by starting with bank 0 (socket J1), then bank 1 (socket J2), and so on with bank 7 (socket J8) as the last one.

CAUTION

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

To avoid potential memory problems, use only DIMMs from JEDEC-compatible manufacturers that have been tested for compatibility with the processor/memory module. Contact your Apricot supplier for approved DIMMs.

Memory starts at address 0 and is continuous up to the amount of DRAM installed in the server.

Table 8-1. ECC Memory Banks

If you fill one bank with	*Memory size for that bank will be*
8 MB DIMM, 1M x 72	8 MB
16 MB DIMM, 2M x 72	16 MB
32 MB DIMM, 4M x 72	32 MB
64 MB DIMM, 8M x 72	64 MB
128 MB DIMM, 16M x 72	128 MB

Table 8-2. Sample DIMM Size Combinations

Banks Filled								
0, J1	*1, J2*	*2, J3*	*3, J4*	*4, J5*	*5, J6*	*6, J7*	*7, J8*	*Total Memory*
8								8 MB
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
128	128	128	128	128	128	128	128	1024 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, 'Opening up the server'.
2. Remove the Processor/memory module as decribed in chapter 7, 'System boards'.
3. Hold the module only by its edges, being careful not to touch its components or gold edge connectors, and place it processor-side up on an antistatic surface.
4. Remove a DIMM from its antistatic package by holding the DIMM only by its edges.
5. Beginning with bank 0 (Figure 8-5), socket J1, orient the DIMM so that the two notches in the bottom edge of it align with the keyed DIMM socket.
6. Insert the bottom edge of the DIMM into socket J1, and press down firmly on the DIMM until it seats correctly (Figure 8-6).

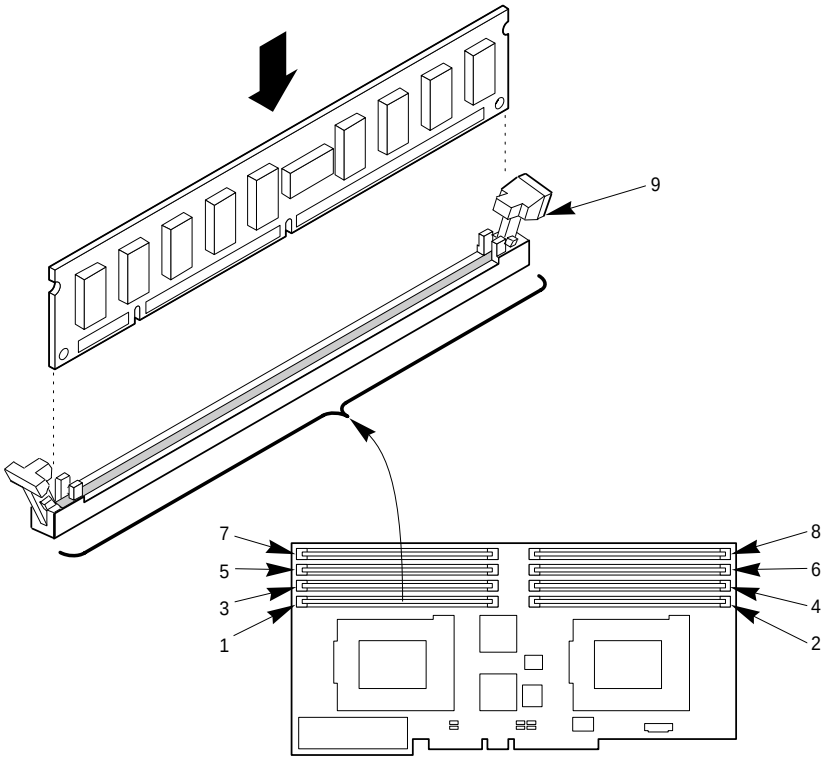


Figure 8-6. DIMM Orientation

1	Bank 0, J1	6	Bank 5, J6
2	Bank 1, J2	7	Bank 6, J7
3	Bank 2, J3	8	Bank 7, J8
4	Bank 3, J4	9	Ejector lever
5	Bank 4, J5		

7. Gently push the plastic ejector levers (Figure) on the socket ends to the upright position.

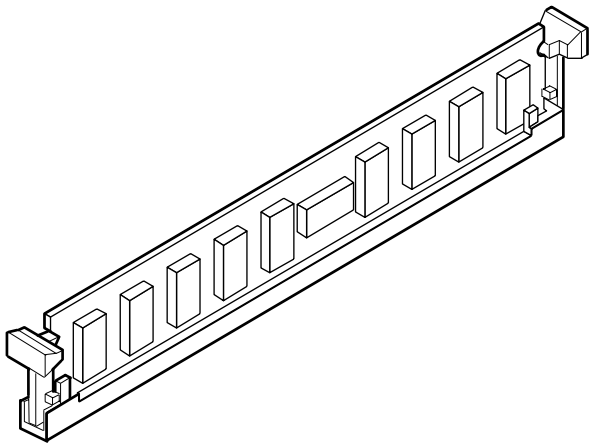


Figure 8-7. Properly Seated DIMM

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 dual processor/memory module and the server left side cover and as described in chapter 7, 'System boards'.
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, 'Opening up the server'.
2. Remove the processor/memory module as described in chapter 7, 'System boards'.
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. Starting with the first DIMM-filled socket closest to the top edge of the module, 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.

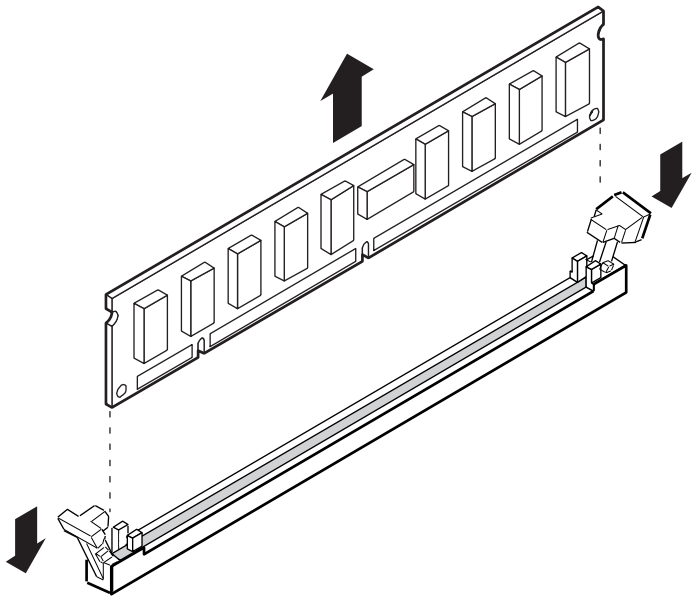


Figure 8-8. Removing a DIMM

8. Install the dual processor/memory module and the server left side cover and as described in chapter 7, 'System boards'.
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.
11. 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'.

Video Memory DRAM

The system board comes with 512 KB of onboard video memory. Increasing the video memory buffer size to 1 MB with a 40-pin 256 K x 16, 60 ns fast-page DRAM allows the controller to support 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.

NOTE

Only DRAMs from certain manufacturers have been tested for compatibility with the system. Contact your Apricot supplier for approved devices.

Installing the Video Memory DRAM

See Figure 8-9

1. Remove the server left side cover. See chapter 4, 'Opening up the server'.
2. Remove the 256 K x 16, 60 ns DRAM from its protective package, and align the dot on the DRAM with the beveled end of socket U25 on the system board.
3. Press the DRAM down firmly until it is fully seated in the socket.

WARNING

This memory chip is extremely sensitive to static damage. Handle with care.

4. Replace the server left side cover.
5. Connect all signal cables and power cables(s) to the system.
   ◊ Some systems have more than one power cable.

Removing the Video Memory DRAM

See Figure 8-9

1. Remove the server left side cover. See chapter 4, 'Opening up the server'.
2. Using an IC removal tool, remove the video memory DRAM from socket U25 on the system board, place it on a conductive foam pad, and store it in an antistatic protective package.
3. Replace the server left side cover.
4. Connect all signal cables and power cables(s) to the system.
   ◊ Some systems have more than one power cable.

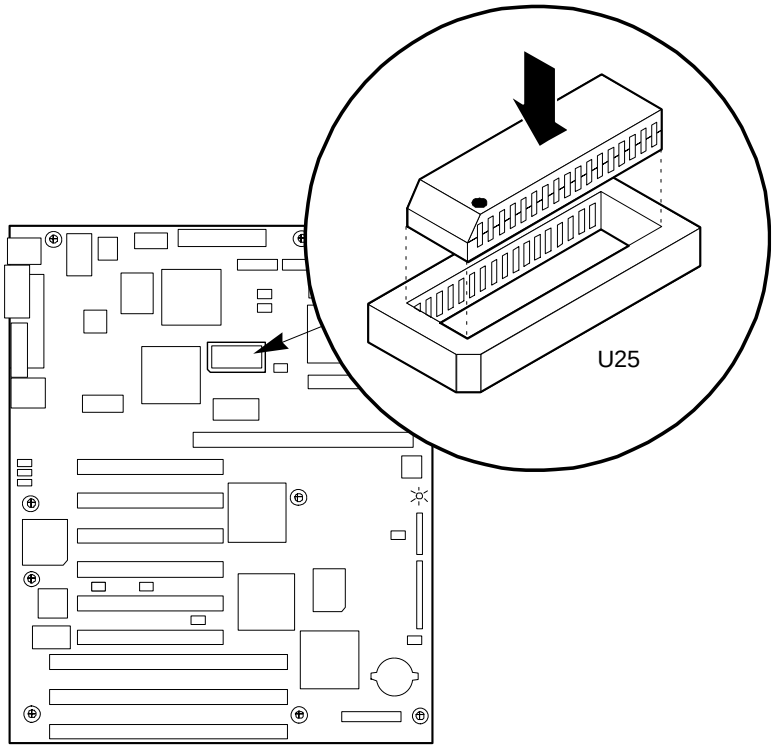


Figure 8-9. Video Memory DRAM

WARNING

Installing the video DRAM chip incorrectly in the socket could produce an extremely high case temperature, destroy the chip and possibly other components on the system board. If this happens, do not touch the chip until it has cooled down.

9 MOTHERBOARD CONNECTIONS & I/O

Signal States

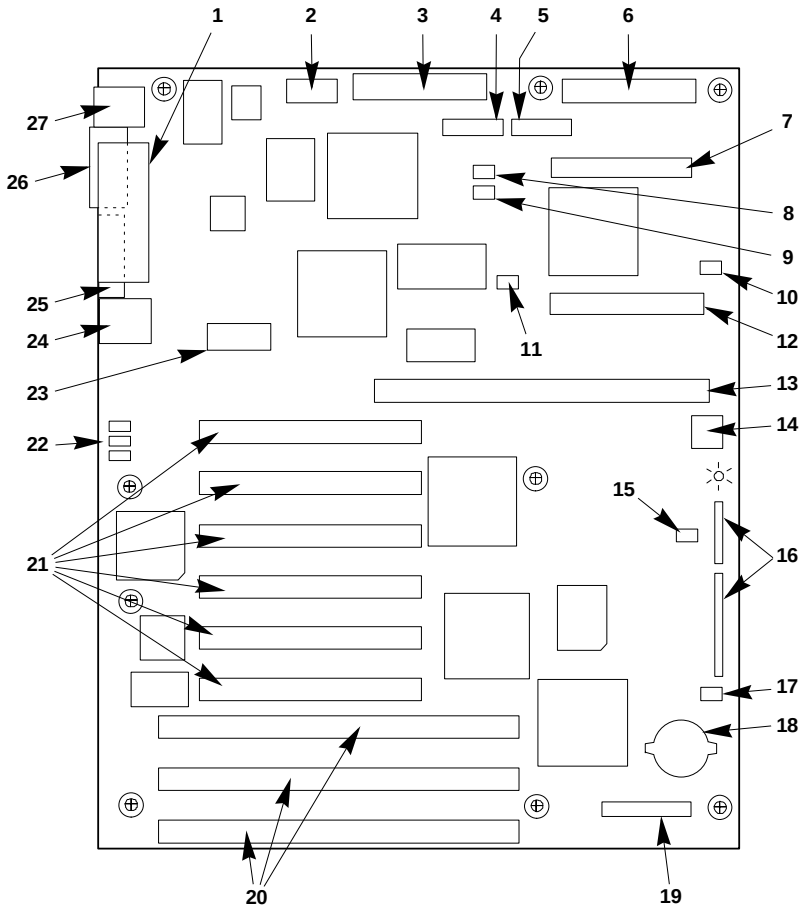
In all tables in this chapter, active-low signal names have an "_L" symbol following the name; for example, P_REQ_SLOT0_L. Active-high signal names do not have a "_L" suffix.

Server motherboard

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 connector for the dual processor/memory module
- A primary PCI bus with 4 expansion connectors and two embedded devices
- An ISA bus with 3 expansion connectors (one shares a slot with a PCI connector)
- A Super I/O chip providing all PC-compatible I/O and Xbus interfaces

Motherboard Layout



1. Parallel port (LPT)
2. Ribbon connector for COM2
3. Power
4. Auxiliary power
5. Front panel
6. Floppy drive port
7. SCSI
8. Fan 1
9. Fan 3
10. Fan 4
11. I^2C
12. IDE
13. Processor/Memory board socket
14. Speaker
15. HDD activity
16. Jumpers/options
17. Fan 2
18. CMOS battery
19. Server management port
20. ISA bus card slots
21. PCI bus card slots
22. Network status LEDs
23. PCI 3V3 DC regulator
24. Keyboard and mouse ports
25. Video
26. Serial port (COM1)
27. Net port

Power Connector

Pin	Signal	Color	Pin	Signal	Color
1	+5 V	Red	13	+5 V	Red
2	+5 V	Red	14	+5 V	Red
3	-5 V	White	15	+5 V	Red
4	-12 V	Blue	16	+5 V	Red
5	GND	Black	17	GND	Black
6	GND	Black	18	GND	Black
7	GND	Black	19	GND	Black
8	GND	Black	20	GND	Black
9	GND	Black	21	GND	Black
10	+3.3 V	Orange	22	+3.3 V	Orange
11	+12 V	Yellow	23	+3.3 V	Orange
12	+12 V	Yellow	24	+12 V	Yellow

Auxiliary Power Connector

Pin	Signal
1	+5 V Remote sense return
2	+5 V Remote sense
3	+3.3 V Remote sense
4	+3.3 V Remote sense return

Control Panel Connector

Pin	Signal	Pin	Signal
1	GND	9	Fan failure
2	Hard disk activity	10	Chassis intrusion
3	Reset system	11	Power fault condition
4	Toggle system power	12	5 V standby
5	VCC	13	I^2C-SDA
6	Spare	14	GND
7	NMI to CPU	15	I^2C-SCL
8	VCC	16	GND

I^2C Connector

Pin	Signal
1	LOCAL_I2C_SCL
2	GND (ground)
3	LOCAL_I2C_SDA

Fan Connectors

These connectors are identical.

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

SCSI Controller Activity LED Connector

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

Server Management Connector

Pin	*Signal*	*Description*
1	SMI_L (input)	System management interrupt
2	I2CCLK (output)	I^2C clock (8 MHz)
3	GND (power)	Electrical ground
4	KEY	No connection, pin missing
5	PWROFF_L (output)	Power supply off
6	I2CDATA (I/O)	I^2C data signal
7	LPOK (input)	Host line power okay
8	KEYUNLK (input)	Keyboard unlock (*not used*)
9	NMI (input)	Nonmaskable interrupt
10	+3.3 V (input)	+3.3 V power
11	RESET_L (output)	Reset system board
12	GND (power)	Electrical ground
13	GND (power)	Electrical ground
14	KEY	No connection, pin missing
15	SECURE (input)	Host in secure mode
16	GND (power)	Electrical ground
17	INTRUD (input)	Chassis is open
18	RESERVED	No connection, reserved for future use
19	KEY	No connection, pin missing
20	GND (power)	Electrical ground

ISA and PCI Connectors

The system board ISA and PCI connectors follow the standard pinouts.

Keyboard and Mouse Connectors

These identical PS/2 compatible connectors share a common housing. The pinouts are standard. The connector nearest the board is the 'Keyboard' port.

Parallel Port

The IEEE 1284-compatible parallel port, used primarily for a printer, sends data in parallel format. It has an industry standard 25-way 'D' connector. Both EPP and ECP modes are supported and can be selected within 'setup'. The port can also be disabled.

Serial Ports

Two serial ports are provided, COM 1 and COM 2. Both are industry standard 9-pin 'D' type connectors. Either or both can be disabled within the setup.

VGA Video Port

Pin	***Signal***
1	Red (analog colour signal R)
2	Green (analog colour signal R)
3	Blue (analog colour signal R)
4	NC (not connected)
5-8	GND (video ground)
9	NC (not connected)
10	GND (video ground)
11-12	NC (not connected)
13	HSYNC (horizontal sync)
14	VSYNC (vertical sync)
15	NC (not connected)

RJ45 Network Connector

Pin	***Signal***	***Description***
1	TX +	Transmit Data Plus. The positive signal for the TD differential pair contains the serial output data stream transmitted onto the network.
2	TX -	Transmit Data Minus. The negative signal for the TD differential pair contains the same output as pin 1.
3	RX +	Receive Data Plus. The positive signal for the RD differential pair contains the serial input data stream received from the network.
4	No connection	
5	No connection	
6	RX -	Receive data minus. The negative signal for the RD differential pair contains the same input as pin 3.
7	No connection	
8	No connection	

I/O Addresses and Resources

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

Address	*Resource*
03D4h–03DAh	Colour Graphics Controller
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

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

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 initialisation.)
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 non-traditional error sources (PERR_L, SERR_L, and others).

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 dual processor/memory board and system board 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, and the advice in the Appendix A 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

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

Equipment Log

Use the equipment log form provided in Appendix B, 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, 'Opening up the server'.
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.

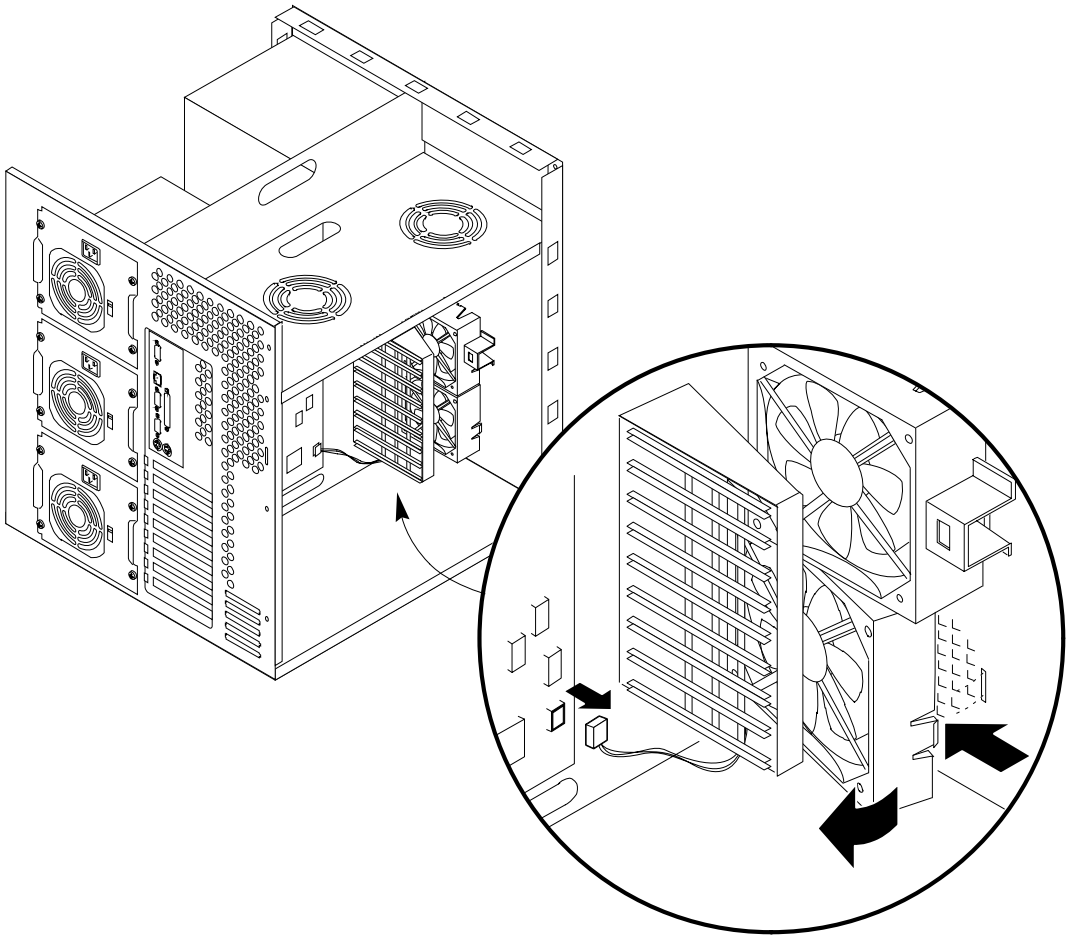


Figure 10-1. Front Panel Fans

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.

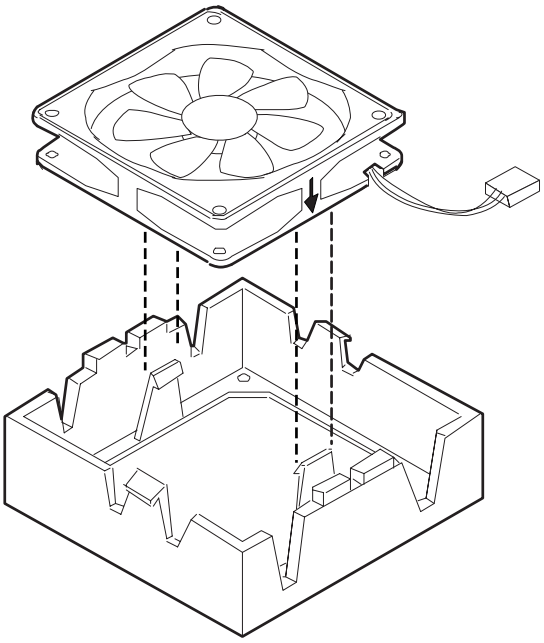


Figure 10-2. Front Fan Assembly

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 a Fan on the Panel Above the System Board

Depending on your server configuration, you may not have fans on the panel above the dual processor/memory module and system board.

See Figures 10-3 and 10-2.

The arrow on the fan indicates the direction of airflow. The fan pulls air into the server and blows it onto the processor/memory module.

1. Remove both side covers and the top cover. See chapter 4, 'Opening up the server'.
2. Depending on which fan you are removing, disconnect the fan power cable connector from the fan header, Fan 1 or Fan 3, on the system board.
3. Press the outer flexible tabs on the sides of the plastic housing and fan assembly toward the fan until you can pull them through the slots in the panel.

CAUTION

Support the assembly to prevent it from falling onto the dual processor/memory module.

4. Remove the assembly from the panel, and place it, fan-side up, on a flat surface.
5. Remove the fan from the plastic housing by pushing the inner flexible tabs on the housing away from the fan. Retain the housing.

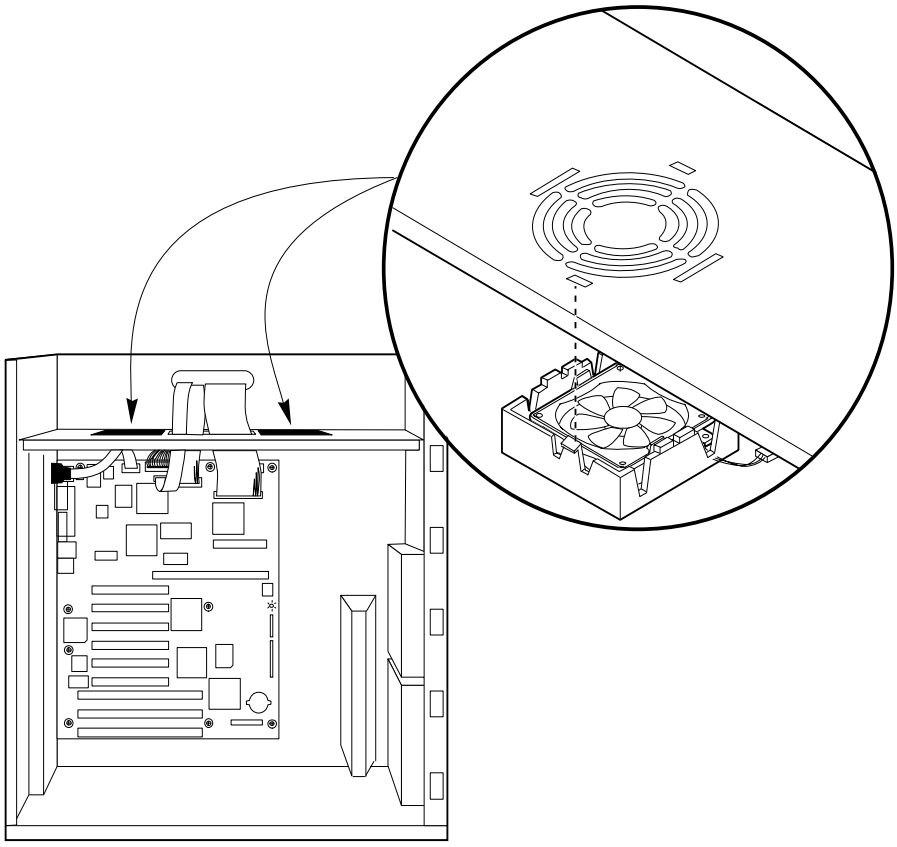


Figure 10-3 Fan Above the System Board

Replacing a Fan on the Panel Above the System Board

See Figures 10-3 and 10-2.

The arrow on the fan indicates the direction of airflow. The fan pulls air into the server and blows it onto the processor/memory module.

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 tabs on the plastic 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 underneath the built-in finger guard on the panel, and align the tabs with the slots in the panel.
5. Insert a flexible tab through the slot in the panel above it. Then press the other flexible tab through the panel until it snaps into place.
6. Connect the fan power cable connector to the fan header on the system board. The fan near the back panel connects to connector Fan 1 and the one near the front panel connects to connector Fan 3 on the system board.
7. Replace the top cover and both side covers.
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 10-4 and 10-5.

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, ‘Opening up the server’.
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.

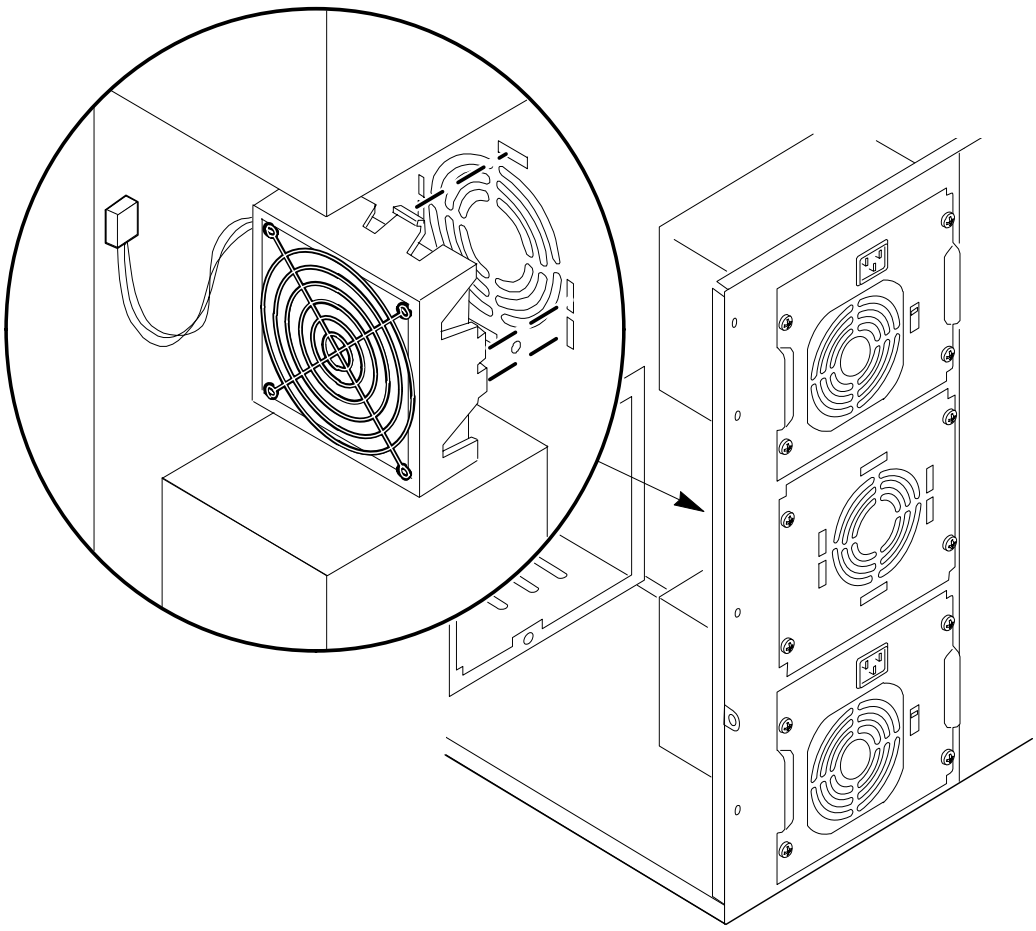


Figure 10-4. Fan Below the Top Power Supply

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.

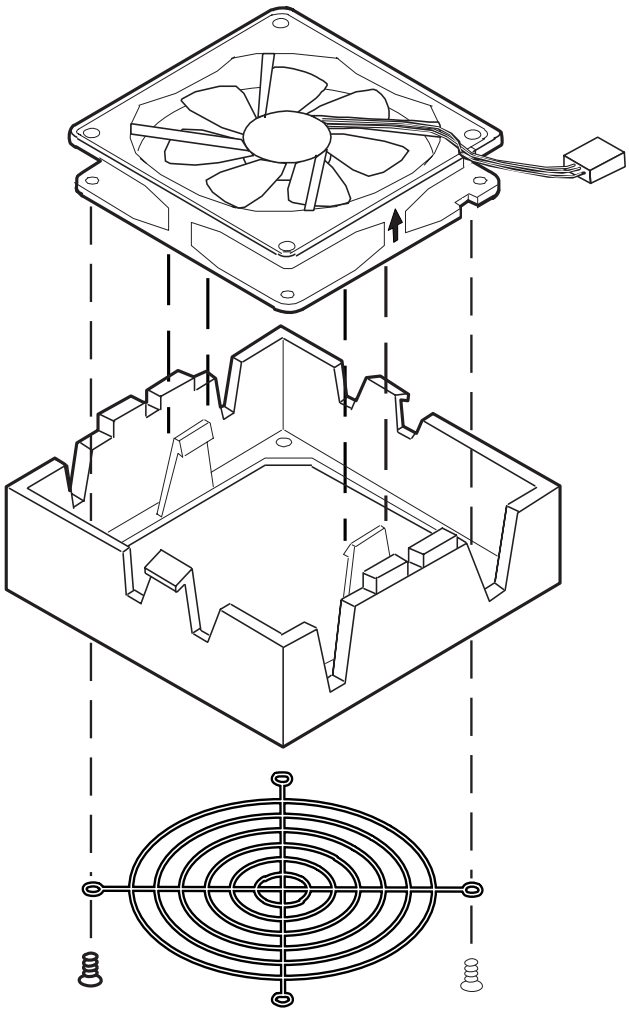


Figure 10-5. Rear Fan Assembly

Replacing the Fan Below the Power Supply

See Figures 10-4 and 10-5.

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.
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.

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 a variety of ways.

Manually

Press	***To***
<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?
- Is the processor/memory module 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 the jumper settings on the processor/memory board correct? For information see chapter 8, ‘Upgrading the server’.
- 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 processor/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’.

- 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.

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.
- The server powers up and immediately powers down.

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.
    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.

Server Powers Up and Immediately Powers Down

If the server powers up after a DC power failure and then immediately powers down, check the power supply failure LED. If it is lit, wait until it goes out before turning the server back on.

If the LED does not go out, you may have to unplug the power cable of each power supply from the AC wall outlets. When the LED goes out, plug the power cables back into the outlets.

If the problem persists, the power share backplane may be defective. Contact your Apricot dealer or authorised maintainer 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	Refresh failure; memory refresh circuitry on the baseboard is faulty
2	ECC double-bit error can not be reset
3	First 64 KB memory failure
4	Timer not operational; timer on baseboard not operational or memory failure in first 64 KB memory
5	Processor failure; processor on the processor/memory module generated an error
6	Keyboard controller gate A20 is off; BIOS cannot switch to protected mode. Keyboard controller may be bad.
7	Processor exception interrupt error
8	Display memory read/write error; system video adapter is missing or its memory is faulty (not a fatal error)
9	ROM checksum error; ROM checksum value does not match encoded value in BIOS
10	Shutdown register read/write error; shutdown register for CMOS RAM failed

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.

Recovery Port-80 Codes and Countdown Codes

These are the port-80 codes and the POST countdown codes that are displayed during the recovery boot process. During this process the floppy disk in drive A is booted and a BIOS image is automatically installed. See Recovering the BIOS.

Port 80 Codes	Countdown Codes	Reason
02h		Disable internal cache
08h		Disable DMA controller #1 and #2, disable interrupt controller #1 and #2, and reset video display
13h		Initialize all chipset registers (LCD enabled at this point)
15h	900	Initialise system timer
1Bh	800	Real mode base 64 KB memory test
20h	700	16 KB base RAM test
23h	650	Setup interrupt vectors
40h	600	Test memory in virtual mode
65h	500	Initialise 8237 DMA controller
67h	400	8259 interrupt controller test
80h	300	Unmask diskette, keyboard, and timer interrupts
88h	200	Floppy unit initialisation
A0h	100	Cache enable
00h	000	Boot OS

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 Codes	***Countdown Codes***	***Reason***
D0h		Early MP initialisation, enter real big mode
D1h		Power on initialisation
D2h		Disable NMI
D3h		Reset video controller
D4h		Enter real mode
D5h		Checksum the 8 KB loader BIOS
D6h		Loader BIOS checksum good
D7h	900	Check if keyboard controller (KBC) buffers are free
D8h		Issue BAT (basic assurance test) command to KBC
D9h		Read BAT results
DAh		Check if KBC passed BAT
DBh	820	Keyboard initialisation passed
DDh		Disable keyboard and auxiliary devices
DFh		Disable both DMA controllers
E0h	780	Preliminary initialisation of PICs
E1h		Enter real big mode and initialise chipset, size memory
E2h		Initialise timer 2 for speaker
E3h	760	Initialise timer channel 0 for system timer
E4h		Clear any pending parity errors
E6h	740	Test RAM from 0 - 640 KB
E7h		Test and initialise first 1 MB of memory
E8h		RAM failure, remap memory partitions and test again
E9h		RAM test complete, passed; clear parity errors
EAh	730	Set up stack at 30:100, enable cache, and shadow BIOS
EBh		Initialise code dispatcher
ECh		Make F000h DRAM R/W enabled
EDh		Dispatch POST
23h	700	Initialisations before setting up vector table
24h		Setup interrupt vector table
0Dh		Check CMOS clear jumper
0Eh	690	Check validity of CMOS
0Fh		Force CMOS defaults if required
10h		CMOS initialisation complete

Port 80 Codes	*Countdown Codes*	*Reason*
25h		Nothing
28h		Set monochrome mode
29h		Set color display
2Ah		Clear parity status if any, initialize warm reset flag
2Bh		Video auto-configuration and initialisation
F0h		ISA slot initialisation
2Ch	580	Conventional video option ROM search
2Dh		Scan user binary
2Eh	570	Initialise monochrome display if no other video present
2Fh	560	Test buffer memory for monochrome
30h		Check vertical and horizontal retrace
31h		Test for color display memory if no external video BIOS found
32h		Check vertical retrace
34h		Sign on message
36h		Initialise messaging services and clear screen
37h	500	Custom sign on display
80h	370	Keyboard/mouse port check
81h		KBC initialisation and testing
83h		Check if keyboard is locked
F5h	330	Initialise mouse
39h		Keyboard, mouse, and other sign-ons
3Bh		Prepare for memory test
43h	290	Decide memory size from chipset
4Fh		Disable cache, test memory, and display memory size on screen
52h		Initialise for the other processors in MP system, reset DMA controller
61h	250	DMA register tests
62h		DMA test OK
65h		Initialise 8237 DMA controller
66h		Clear DMA write request register and mask set/reset register
67h	220	8259 interrupt controller test
F4h		Enable extended NMI sources
8Ch	140	Initialise remaining Plug and Play devices (i.e., other than video), initialise IPL, initialise IDE controller
8Fh	130	Floppy initialisation
92h		Set printer, RS-232 timeout
96h		Option ROM scan and initialisation above C800h
97h	080	Scan user binary and conventional option ROM scan

Port 80 Codes	***Countdown Codes***	***Reason***
98h		Scan user binary area
9Ah		Clear soft reset flag, complete MP Table
9Dh	070	Timer data area initialisation
A0h		Printer setup
A1h		RS-232 setup
A2h		Check for stuck key
ABh		Before NPX (numeric processor instructions) test and initialisation
ACh	060	NPX test and initialisation
ADh		Update coprocessor information in CMOS and recalculate checksum
AEh		Set typematic rate
AFh	050	Keyboard READ ID command
B0h		Wait for READ ID response
A3h		Display POST errors
A6h		Before Setup
A7h	030	Call Setup if required, prompt for password if enabled
B1h		Enable cache for boot
B3h		Setup display mode set
B4H		Jump to pre-OS code
BBh	020	Initialise SMI code, prepare for boot
00h	000	Execute BOOT

A 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.

Static electricity can be generated by moving on a chair, brushing against desks or walls, or simply walking across an ordinary carpet. Items handed from one person to another, or being wrapped or unwrapped, can acquire a static charge. Air conditioning systems can also result in very high levels of static.

Clothing made of synthetic fibres is particularly likely to generate static electricity. Static electricity is often completely unnoticed by the wearer, but can be sufficient to cripple or destroy sensitive electronic components in computers.

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.

B 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			

Component	Manufacturer Name and Model Number	Serial Number	Date Installed
CD-ROM Drive			
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			

Component	Manufacturer Name and Model Number	Serial Number	Date Installed

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.

MITSUBISHI

apricot

MITSUBISHI ELECTRIC PC DIVISION

APRICOT COMPUTERS LIMITED
3500 PARKSIDE
BIRMINGHAM BUSINESS PARK
BIRMINGHAM B37 7YS
UNITED KINGDOM
Tel +44 (0)121 717 7171 Fax +44 (0)121 717 3692

http://www.apricot.co.uk