owner's guide

hp workstation i2000

Manufacturing Part Number: A6037-90003
Edition: E0801

Printed in U.S.A.

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First Edition: May 2001

Printing Division:

Hewlett-Packard Co.
Technical Computer Division
3404 E. Harmony Rd.
Fort Collins, CO 80528-9599

hp hardware warranty

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Customer Responsibilities

The customer may be required to run HP-supplied diagnostic programs before an on-site visit or replacement part will be dispatched.

The customer is responsible for the security of its proprietary and confidential information and for maintaining a procedure external to the products for reconstruction of lost or altered files, data, or programs.

The customer must provide: access to the product; adequate working space and facilities within a reasonable distance of the product; access to and use of all information and facilities determined necessary by HP to service the product; and operating supplies and consumables such as the customer would use during normal operation.

A representative of the customer must be present at all times. The customer must state if the product is being used in an environment which poses a potential health hazard to repair personnel; HP or the servicing dealer may require that the product be maintained by customer personnel under direct HP or dealer supervision.

Obtaining Parts Warranty Service

When parts warranty service applies, the customer may be required to run HP-supplied diagnostic programs before a replacement part will be dispatched. The customer must be prepared to supply proof of purchase.

The customer shall return some defective parts upon HP demand. In that case, HP will prepay shipping charges for parts returned to the HP parts service center.

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HP free telephone support for your Workstation is available during the first year from date of purchase. This service will also provide technical assistance with the basic configuration and setup of your HP Workstation and for the bundled or pre-loaded operating system.

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(Rev. 17/03/98)

hp software limited warranty

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additional information and help

For more information on your hp workstation i2000 and the latest updates for this product, you can visit the following pages on HP's web sites:

- For documentation: http://docs.hp.com
- For the latest drivers, FAQs, and support information: http://www.hp.com/workstations/support/
- For HP Itanium™ information: http://www.hp.com/go/itanium

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acronyms

Acronym	Meaning
ACPI	Advanced Configuration and Power Interface
AGP	Accelerated Graphics Port
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Packet Interface
BIOS	Basic Input / Output System
BT	Base Transmit
CMOS	Complementary Metal Oxide Semiconductor
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual Inline Memory Module
DMA	Direct Memory Access
DMI	Desktop Management Interface
DRAM	Dynamic Random Access Memory
DVD	Digital Video Device
ECC	Error Checking and Correcting
EFI	Extensible Firmware Hub
EMC	Electro-Magnetic Compatibility
E-PAC	Environmental Packaging
FDD	Floppy Disk Drive
FSB	Front Side Bus
FWH	Firmware Hub
GB	Gigabyte
GXB	Graphic eXpansion Bridge
HBA	Host Bus Adapter
HDD	Hard Disk Drive
I/O	Input / Output
IA	Intel® Architecture
ICMP	Internet Control Message Protocol
IDE	Integrated Dual Channel Enhanced
IFB	I/O and Firmware Bridge
IOAPIC	Input / Output Advanced Programmable Input Controller
IRQ	Interrupt Request
ISA	Instruction Set Architecture
ITP	In-target Probe
KB	Kilobyte
LAN	Local Area Network
LBA	Logical Block Addressing
LED	Light Emitting Diode
LIF	Light Insertion Force
LVD	Low Voltage Differential
MAC	Memory Address Component
MB	Megabyte

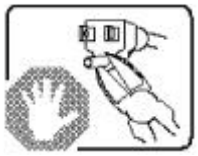
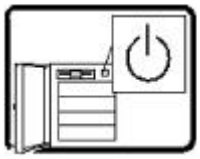
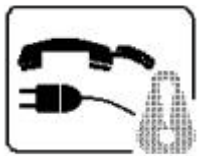
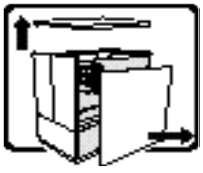
MDC	Memory Data Component
MEC	Memory Expansion Cards
MHz	Megahertz
mm	Millimeter
MMX	Multi-Media eXtensions
NIC	Network Interface Card
OEM	Original Equipment Manufacturer
OS	Operating System
PAL	Processor Abstraction Layer
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PFC	Power Factor Correction
PIO	Programmed Input / Output
PME	Power Management Event
POST	Power-On Self Test
PS/2	Personal System/2
PXB	PCI eXpansion Bridge
PXE	Pre-boot eXecution Environment
RAM	Random Access Memory
RTC	Real Time Clock
SAL	System Abstraction Layer
SCI	Special Circumstance Instructions
SCSI	Small Computer System Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIMD	Single Instruction Multiple Data
SIR	Surface Insulation Resistance
SMBIOS	System Basic Input / Output System
SMI	System Management Interrupt
SMP	Symmetric Multiprocessing
SPD	Serial Presence Detect
SSE	Streaming SIMD Extensions
TFTP	Trivial File Transfer Protocol
USB	Universal Serial Bus
VDC	Voltage Direct Current
WXB	Wide eXpansion Bridge

WARNING!

Please read all warnings and instructions BEFORE operating the system. Avoid Injury: To avoid personal injury when unpacking the system, use only a mechanical assist unit to lift it off the shipping pallet. The system weighs approximately 84 lbs.

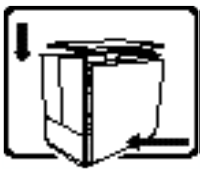
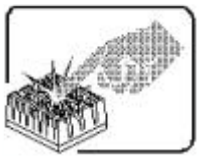
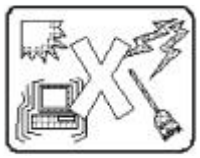
WARNINGS

The following caution notices apply whenever you remove the access cover to access components inside the system. Only a technically qualified person should integrate and configure the system.

	The power supply in this product contains no user-serviceable parts. Refer servicing only to qualified personnel.
	Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.
	The DC push-button on/off switch on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.
	**SAFETY STEPS:** Whenever you remove the chassis covers to access the inside of the system, follow these steps: 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by using the push-button on/off power switch on the system. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to the I/O connectors or ports on the rear of the system. 5. Provide some electrostatic discharge (ESD) protection by wearing an anti-static wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components. 6. Do not operate the system with the chassis covers removed.
	After you have completed the six SAFETY steps above, you can remove the system covers. To do this: 1. Unlock the system from the side using the keys provided. 2. Remove the thumbscrews to remove the side cover.

Continued

WARNINGS (continued)

	For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers: 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in boards, and other components are properly installed. 3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly. 4. Lock the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord to the system.
	The microprocessor, heat sink and Power Pod may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
	Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.
	The system is designed to operate in a typical office environment. Choose a site that is: 1. Clean and free of airborne particles (other than normal room dust). 2. Well ventilated and away from sources of heat including direct sunlight. 3. Away from sources of vibration or physical shock. 4. Isolated from strong electromagnetic fields produced by electrical devices. 5. In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your system during an electrical storm. 6. Provided with a properly grounded wall outlet. 7. Provided with sufficient space to access the power supply cords, because they serve as the product's main power disconnect.

WARNING

Do not open the power supply. Risk of electric shock. Refer servicing of the power supply to qualified service personnel.

CAUTION

Before removing the access cover for any reason, observe these cautionary guidelines.

- *Turn off all peripheral devices.*
- *Turn off the system by pressing the power button on the front of the chassis. Then unplug the AC power cord from the chassis or wall outlet.*
- *Label and disconnect all peripheral cables connected to the I/O connectors or ports on the back of the chassis.*
- *Provide some electrostatic discharge (ESD) protection by wearing an anti-static wrist strap attached to chassis ground—any unpainted metal surface—when handling components.*

CAUTION

The power button on the front panel does not disconnect the AC power. To remove power from the system, you must unplug the AC power cord from the AC supply or from the computer chassis.

CAUTION

ESD can damage disk drives, boards, and other parts. Perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground ¾ any unpainted metal surface ¾ on your system when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. Do not touch the connector contacts. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. If you place the server 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. Use a conductive foam pad if available but not the board wrapper. Do not slide the board over any surface. For proper cooling and airflow, always install the chassis side cover before turning on the system. Operating it without the cover in place can damage system parts.

1. introduction

The i2000 system is an Intel® Itanium™- based workstation. It features the Intel ® 82460GX PCI set, multiple 64-bit/ 66 MHz PCI expansion slots, support for AGP Pro* 110 graphics cards and large memory capacity (16 GB). The product is configured as follows:

- One- (1) 733 MHz or two- (2) 800 MHz Intel® Itanium™ processors
- Two- (2) Memory Expansion Cards supporting up to 16 GB SDRAM
- One- (1) I/O card supporting USB, IDE, PS/2, Audio, and 10/100 Mbps LAN
- One- (1) Quantum* Hard Drive (18 GB)
- One- (1) LS-120 drive or LS-240
- One- (1) DVD-ROM drive (Hitachi)
- One- (1) Qlogic* 12160 Dual Channel Ultra 3
- One- (1) nVIDIA Quadro2 Pro video card
- 800 WTX power supply
- PS/2 keyboard and mouse

1.1 Chassis Description

The i2000 workstation is housed in a WTX compliant chassis. It is designed to accommodate the needs of a variety of high-performance applications. As application requirements increase, the system can be upgraded with:

- Dual processor
- Additional memory modules
- Add-in PCI based adapters
- Additional SCSI devices
- Additional IDE devices
- Other peripheral devices

Table 1. Physical Specifications

Specification	Value
Height	44.45 cm (17.5 inches) without feet 45.72 cm (18 inches) with standard feet
Width	25.40 cm (10 inches)
Depth	64.52 cm (25.4 inches)
Weight	38.18 kg (84 lbs.)

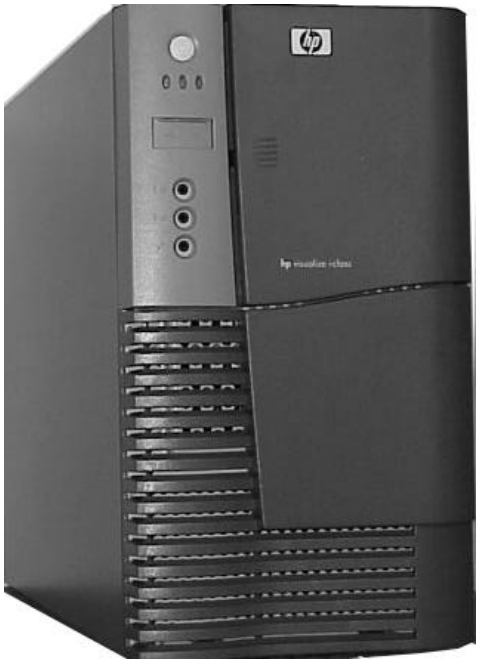


Figure 1. Workstation System Chassis

1.2 Chassis Features Summary

Table 2. Chassis Features Summary

Feature	Comment
Power system	An 800 W power supply that is capable of operating over input voltage ranges of 100-240 VAC. Includes two- (2) integrated 80-mm fans for cooling.
Workstation chassis	Designed to operate in a standard office environment. Mid-tower (desk side) design capable of operating from a standard AC power outlet.
	Peripheral bay can accommodate up to three- (3) 5.25-inch media and one- (1) 3.5-inch media devices.
	The hard drive bay accepts 3.5-inch-wide drives. It can accommodate up to five- (5) 1-inch or three- (3), 1.6-inch devices.
	The plastic front bezel provides airflow and easy access to the peripheral and hard drive bays. The removable top and side covers provide proper airflow and easy access to components inside the system. Only technically qualified personnel should remove the system covers.
Cooling system	The system has provisions for up to eight- (8) fans for cooling within four- (4) separate cooling zones. There are two- (2) 120-mm fans, one- (1) 92-mm fan, four- (4) 80-mm fans, and one- (1) 60-mm fan.
System security	A side lock and chassis intrusion switch provides security against system tampering. The intrusion switch can be used with system level software (when it becomes available) to warn of chassis intrusion.

1.2.1 Chassis Front Controls and Indicators

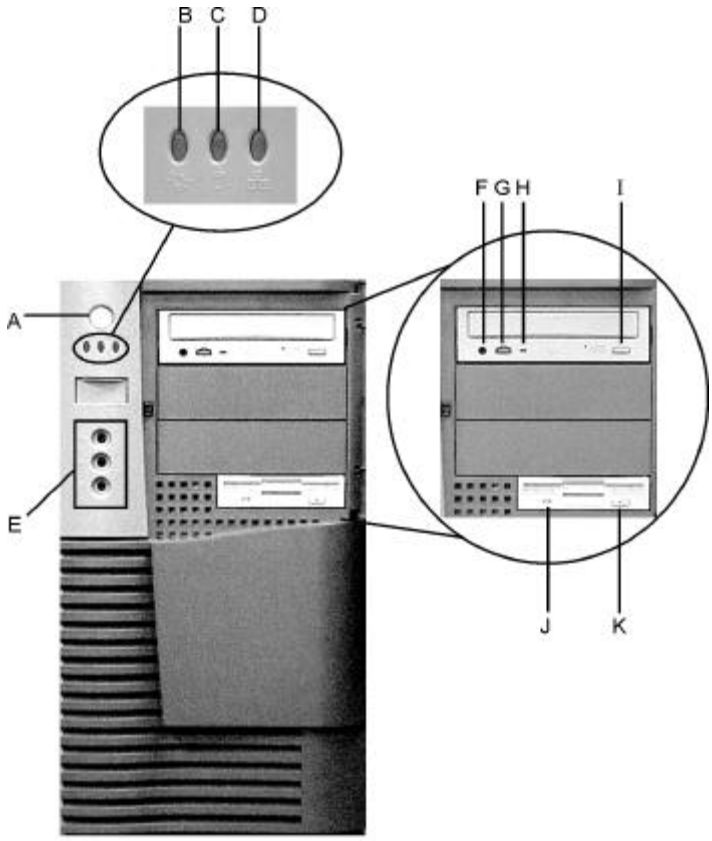


Figure 2. Front Controls and Indicators

Table 3. Front Panel Components

Item	Feature / Description
Front Panel	
A.	Power Switch
B.	Power LED
C.	Drive activity LED
D.	LAN LED
E.	USB ports and Audio Connections (Pink =MIC, Blue =Line In, Green =Speaker out)
DVD Drive	
F.	Headphone Jack
G.	Volume control
H.	Activity LED
I.	Open/Close button
3.5-inch Diskette Drive (LS-120)	
J.	Activity LED
K.	Ejector button

1.2.2 Chassis Rear Controls and Features

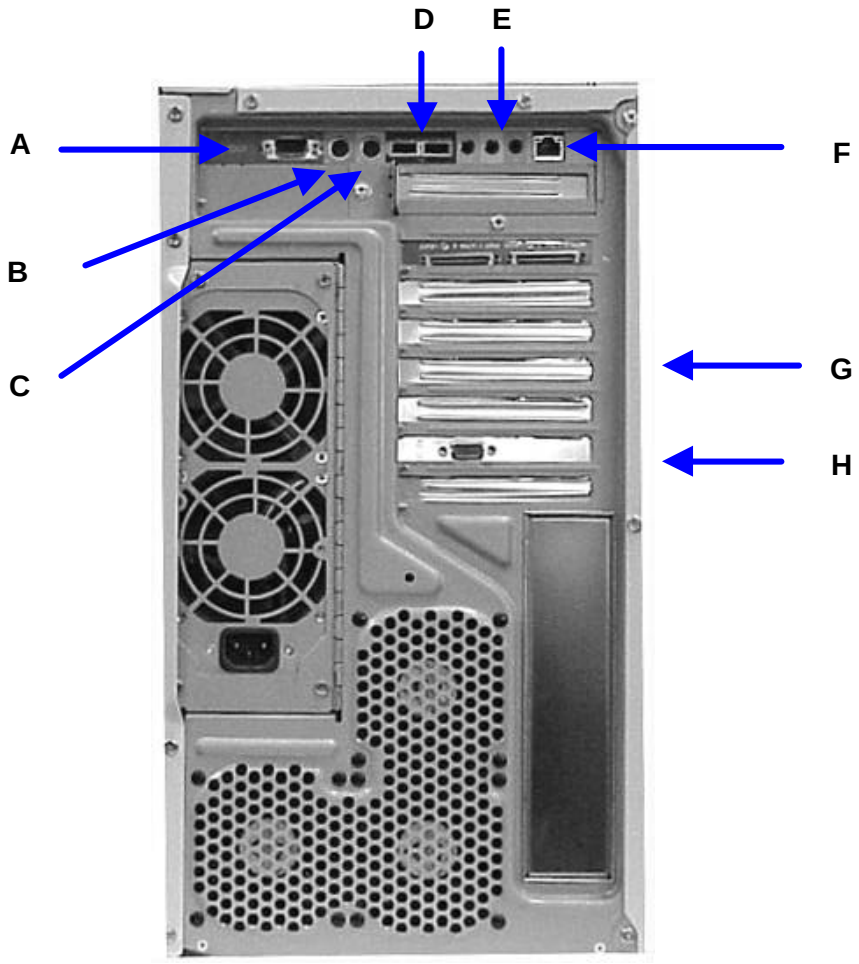


Figure 3. Chassis Rear View

Table 4. Chassis Rear Components

Item	Feature / Description
A.	Serial port
B.	PS/2 compatible, 6-pin mouse connector
C.	PS/2-compatible, 6-pin keyboard connector
D.	Two- (2) USB ports, 4-pin connector
E.	Audio Connections (Pink =MIC, Blue =Line In, Green =Speaker out)
F.	LAN (10/100 Mbps)
G.	One- (1) SCSI Qlogic* card
H.	AGP video card (nVIDIA Quadro2 Pro)

NOTE

The i2000 system has a Qlogic SCSI Host Bus Adapter installed with two- (2) external SCSI connectors accessible from the system rear panel.*

The components in the previous figure are for illustration purposes only. Actual card location may vary slightly.

1.3 Peripheral Bay

The peripheral bay can accommodate one- (1) 3.5-inch and three- (3) 5.25-inch devices. The DVD ROM and the LS-120 drives are housed in the peripheral bay. Both devices are accessible from the front of the chassis (Refer to Figure 3.)

NOTE

For continued safety compliance of the system, use only peripheral devices, which are marked as UL recognized compliant components and that are also CE marked. Additionally, for all optical drives such as CD-ROM, DVD, etc. laser safety compliance is required to both U.S. code 21CFR, chapter 1, subchapter J, part 1040.10 and International Standard EN60825-1, Safety of Laser Products.

For continued EMC compliance of the system, use only those peripheral devices having an external output connector (i.e., audio, video), which are marked as FCC tested for home or office use (FCC Class B), and marked as Canada ICES-003 Class B compliant. For European installations, these devices are required to be CE marked with declaration of conformity to the EMC directives (89/336/EEC).

NOTE

System EMI integrity and cooling are both protected by having drives installed in the bays or filler panels and EMI shields covering the bays. When you install a drive, save the panel and shields to reinstall incase you should later remove the drive and not reinstall one in the same bay.

1.3.1 LS-120 Drive

The LS-120 drive (located in the peripheral bay) supports 120 MB and 1.44 MB media.

1.3.2 DVD ROM Drive

In the i2000 system, the DVD ROM drive in the peripheral bay consists of an IDE device.

1.3.3 Hard Drive Bay

The hard drive bay is designed for 3.5-inch-wide hard drives. It can accommodate up to five- (5) 1-inch-high or three- (3) 1.6-inch-high drives.

1.4 Power Supply

The chassis is configured with a single, 800 W power supply. It is capable of providing full rated output power over a range of input voltages, 100-240 VAC. The power supply features automatic Power Factor Correction (PFC), and is connected to the system boards using the following connectors:

- A 24-pin baseboard connector providing +3.3 V_{dc} and +5 V_{dc}
- A 22-pin baseboard connector with +3.3 V_{dc}, +5 $V_{dc,}$ +12 V_{dc} and –12 V_{dc} outputs
- An 8-pin connector for memory power with an output voltage 12 V_{dc}
- A 6-pin connector for the processor Power Pod with an output voltage of 12 V_{dc}
- A 16-pin connector with outputs of +5 V_{dc} and +12 V_{dc} for peripherals

For ease of replacement, the connectors can be disconnected from the power supply and the power supply replaced without removing the system boards or unhooking any connectors from the boards.

1.5 System Cooling

Support for eight- (8) fans within four- (4) separate zones (regions of the system) is provided for the following configuration:

- **Zone 1 - Processor**: two- (2) fan headers for two- (2) 120-mm fans.
- **Zone 2 - Memory**: one- (1) fan header for one- (1) 80-mm fan.
- **Zone 3 - I/O**: two- (2) fan headers for one- (1) 92-mm and one- (1) 60-mm fan.
- **Zone 4 - Exhaust**: three- (3) fan headers for three- (3) 80-mm fans, **but only one- (1) is populated in the reference system configuration**.

i2000 utilizes three- (3) wire fans; two- (2) wires provide power, another provides the fan tachometer output. Utilizing a three-wire fan allows the system to monitor the fan speed and control the speed via the power source with sensing from a thermister (on-board or remote).

NOTE

If you replace a system fan, check the orientation. Replace any failed fans with the same or equal type as the one(s) failed. Replacement fans should have the same rated voltage, wattage, and CFM as the original fan(s) being replaced.

2. Board Set Description

The architecture of the i2000 system supports Symmetrical Multiprocessing (SMP). The system board set consists of:

- Baseboard
  - Seven- (7) PCI expansion slots (five- (5), 64-bit/66 MHz, two- (2) Intel® 64-bit /33 MHz)
  - AGP Pro* 110 connector
  - Processor board connector
  - Memory Expansion Card connectors (2)
  - Integrated Voltage Regulators

- Processor board
  - Two- (2) Intel® Itanium™ processor LIF sockets
  - ITP connector

- Memory board
  - Two- (2) Memory Expansion Cards
  - Eight- (8) DIMM sites on each MEC
  - Each MEC supports up to 8 GB
  - Memory DC-DC converters

- I/O board
  - ATA-33 IDE (primary & secondary channels)
  - USB (dual port)
  - Front panel connectors (Audio & USB)
  - LAN (10/100 Mbps)
  - PS/2 (keyboard & mouse)
  - Audio
  - 9-pin Serial

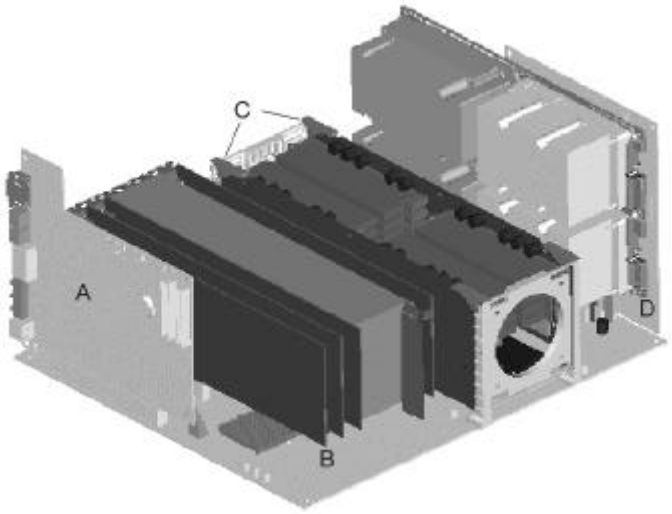


Figure 4. Board Set Overview

A	I/O Board
B	Baseboard
C	Memory Expansion Cards
D	Processor Board

2.1 Board Set Features

Table 5. Board Set Features

Feature	Description
Baseboard	The baseboard provides the interface for the processor board, memory expansion cards, I/O board, PCI peripherals and AGP Pro*.
Processor board	The processor board can support a maximum of two- (2) Intel® Itanium™ processors, two- (2) processor power pods and an ITP connector. An add-in bus terminator is not required for single processor configurations.
Intel® Itanium™ processor	Capable of supporting up to two- (2) Intel® Itanium™ processors.
Power Pod	Can support up to two- (2) Power Pods to supply power to the Itanium™ processors.
Memory Expansion Cards	Two- (2) plug-in expansion cards supporting PC100 registered SDRAM containing interleaved pathways to main memory. Each memory card supports from 256 MB to 8 GB of error correction code (ECC) memory using eight- (8) 72-bit dual inline memory modules (DIMMs). These modules interface to the baseboard through 300-pin connectors.

Feature	Description
I/O Board	The I/O board plugs into the SC242 connector at the left side of the baseboard (PCI connectors oriented top).
	The ATA-33 Integrated Drive Electronics (IDE) interface supports one- (1) primary and one- (1) secondary IDE channel.
	Four- (4) universal serial bus (USB) ports. Two- (2) rear I/O USB connectors and a header for two- (2) front panel USB ports.
	Audio Connections (Pink =MIC, Blue =Line In, Green =Speaker out)
	LAN (10/100 Mbps)
	One- (1) 9-pin serial port
Front panel	Audio and USB
	Push-button power switch
	LEDs indicate power and hard drive activity

2.1.1 Processor Overview

The Intel® Itanium™ processor is the first in a family of high-performance Itanium processors. Intel's Itanium™ Instruction Set Architecture (ISA) is referred to as Intel® Itanium™ architecture. The Itanium™ processor maintains full compatibility with Intel's current 32-bit Intel Architecture processor family while delivering industry-leading performance beyond existing architectures. Each Intel® Itanium™ processor is packaged in a PAC418 (418-pin array cartridge) format. The cartridge includes:

- The processor core
- L1 instruction cache (16 KB, on die)
- L1 data cache (16 KB, on die)
- Unified L2 cache (96 KB, on die)
- Unified L3 cache (2 MB or 4 MB)
- A thermal plate

NOTE

Each processor implements the MMX™ and SSE (Streaming SIMD Extensions) technology.

2.1.2 Memory Overview

Main memory resides on two- (2) add-in boards called Memory Expansion Cards (MECs). Each MEC contains sites for eight- (8) DIMMs and two- (2) power connectors for DC-DC converters. Each MEC is attached to the baseboard through a 300-pin connector. The memory controller supports PC100 registered SDRAM DIMMs. The memory sub-system can operate in two- (2) different modes.

- **Interleaved Mode:** (two- [2] MECs installed). This configuration offers the highest performance by dividing the total system RAM across two- (2) MECs. This reduces the probability of wait states, thus increasing speed on sequential accesses. To operate in interleaved mode, *BOTH MECs MUST BE USED WITH AT LEAST THE TOP FOUR- (4) DIMM SITES POPULATED ON EACH MEC*.
- **Single-port Mode:** (one- [1] MEC installed). The single MEC responds to all memory addresses.

2.1.3 DIMM installation sequence

The DIMMs must be installed within groups of four- (4). Each board has eight- (8) DIMM sites. The top four- (4) DIMM sites form the top, or right, stack while the bottom four- (4) DIMM sites form the bottom, or left, stack (on each of the two- [2] boards). Refer to Figure 5.

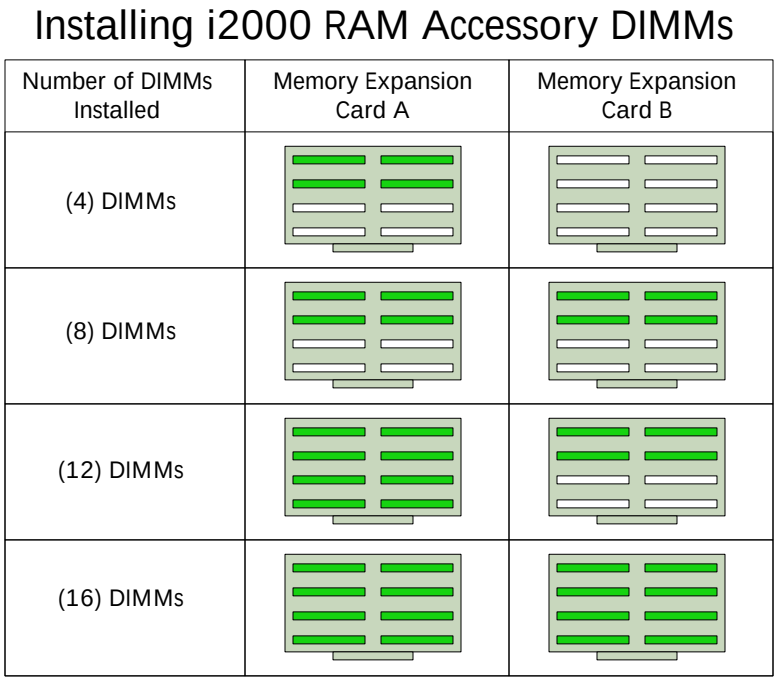


Figure 5. Memory Board Stacks

NOTE

DIMMs must be installed in groups of four- (4) with all DIMMs within a stack being of the same size, type, and manufacturer.

For optimum performance, the stacks must also be populated in the proper order with the same size of DIMMs. The memory subsystem can operate in two- (2) different modes, interleaved or single-port.

If a single memory board is used, a minimum of four- (4) DIMMs must be populated in the top stack. The minimum memory configuration is illustrated in Figure 5.

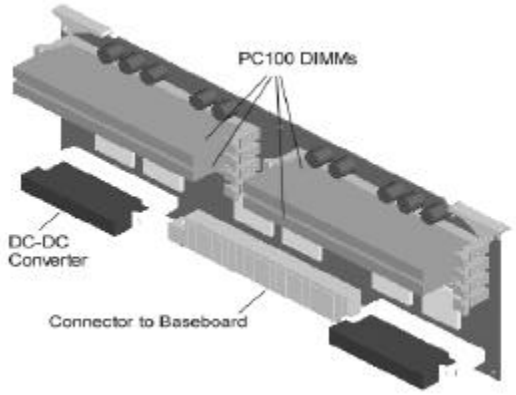


Figure 5. Memory Expansion Card

For optimum performance, both memory cards should be installed with the top four- (4) DIMM slots populated with the same size, type, and brand of memory. This recommendation utilizes both memory ports and achieves maximum memory bandwidth.

2.2 Peripherals

2.2.1 Product I/O

The LPC47B27 Super I/O device supports one- (1) serial port and PS/2-compatible Keyboard and Mouse ports. The system provides the connector interface for each port. The I/O and Firmware Bridge (IFB) on the I/O card contains an integrated USB host controller supporting two- (2) USB ports. These can be accessed from the back of the system. In addition, a USB hub provides support for two- (2) additional ports via the front panel of the system. Neither parallel ports nor Legacy FDD are supported.

a) Serial Port

The system features a single 9-pin serial port located on the rear I/O panel.

2.3 Baseboard Connectors

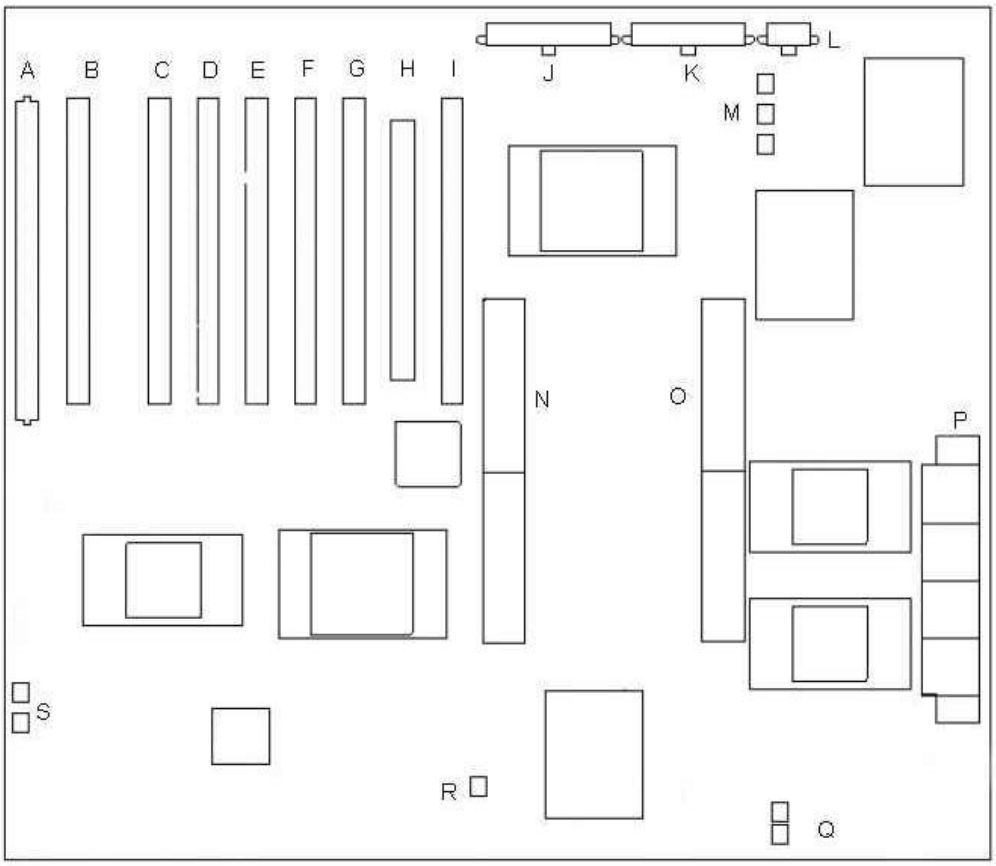


Figure 6. Baseboard Connectors

A	I/O board connector	K	22-pin power connector
B	PCI slot S2 (64-bit /66 MHz, 3.3 V)	L	8-pin power connector
C	PCI slot 1 (64-bit /66 MHz, 3.3 V)	M	Zone 4 (exhaust) fan connectors
D	PCI slot 2 (64-bit /66 MHz, 3.3 V)	N	Memory board connector A
E	PCI slot 3 (64-bit /66 MHz, 3.3 V)	O	Memory board connector B
F	PCI slot 4 (64-bit /66 MHz, 3.3 V)	P	Processor board connector
G	PCI slot 5 (64-bit /33 MHz, 5 V)	Q	Zone 1 (processor) fan connectors
H	AGP Pro 110 connector	R	Zone 2 (memory) fan connector
I	PCI slot 6 (64-bit /33 MHz, 5 V)	S	Zone 3 (I/O) fan connectors
J	24-pin power connector		

2.3.1 PCI

The baseboard has two- (2) 64-bit, 66 MHz PCI buses and one- (1) 64-bit, 33 MHz PCI bus.

- The WXB (Wide eXpansion Bridge) PCI bus 1 provides PCI slots 1, 2, and S2.
- The WXB (Wide eXpansion Bridge) PCI bus 2 provides PCI slots 3 and 4.
- The PXB (PCI eXpansion Bridge) PCI bus 0 provides PCI slots 5, 6, and IFB.
- The IFB controls communications to IDE, USB, and Super I/O.

NOTE

For continued EMC compliance of the system, use only those peripheral devices having an external output connector (i.e., audio, video), which are marked as FCC tested for home or office use (FCC Class B), and marked as Canada ICES-003 Class B compliant. For European installations, these devices are required to be CE marked with declaration of conformity to the EMC directives (89/336/EEC).

2.3.2 AGP

The baseboard provides support for AGP Pro 110 (4x @ 66 MHz) for high-end graphics capability.

2.4 Video

An *n*VIDIA Quadro2 Pro provides video on the hp workstation i2000.

2.5 LAN

The I/O board supports integrated 10/100 Mbps LAN support (using the Intel® 82559 Fast Ethernet controller). An RJ45 connector accessible via the rear I/O panel is provided for this purpose.

2.6 SCSI Controller

The i2000 workstation includes one- (1) QLogic* 12160 based SCSI Host Bus Adapter (HBA) capable of Ultra3 Low Voltage Differential (LVD) data and control transfers at 160 MB/s.

2.7 IDE Controller

IDE is a 16-bit interface for integrated disk drives with AT* disk controller electronics onboard. The IFB (I/O and Firmware Bridge) is a multifunction device on the I/O board that acts as a PCI-based Fast IDE controller. The device controls:

- PIO Mode 4 and DMA/bus master operations
- Transfer rates up to 22 MB/sec (33 MB/sec using Ultra DMA transfers)
- Buffering for PCI/IDE burst transfers
- Primary and secondary channels

2.8 Keyboard and Mouse

Two- (2) PS/2 ports are provided for keyboard and mouse. They are located at the rear of the system. USB keyboard and mouse connectors are available.

2.9 Front Panel Connectors

The chassis front panel includes:

- Power switch
- Power LED
- HDD activity LED
- LAN activity LED
- USB Connectors (two- [2] ports)
- Audio Connections (Pink = MIC, Blue = Line In, Green = Speaker out)

3. BIOS - Overview

This system uses Intel ® proprietary BIOS stored on the 82802AC FWH and can be upgraded using an LS-120 disk-based firmware flash utility. Table 6 provides an overview of the features supported by the i2000 BIOS.

Table 6. BIOS Features

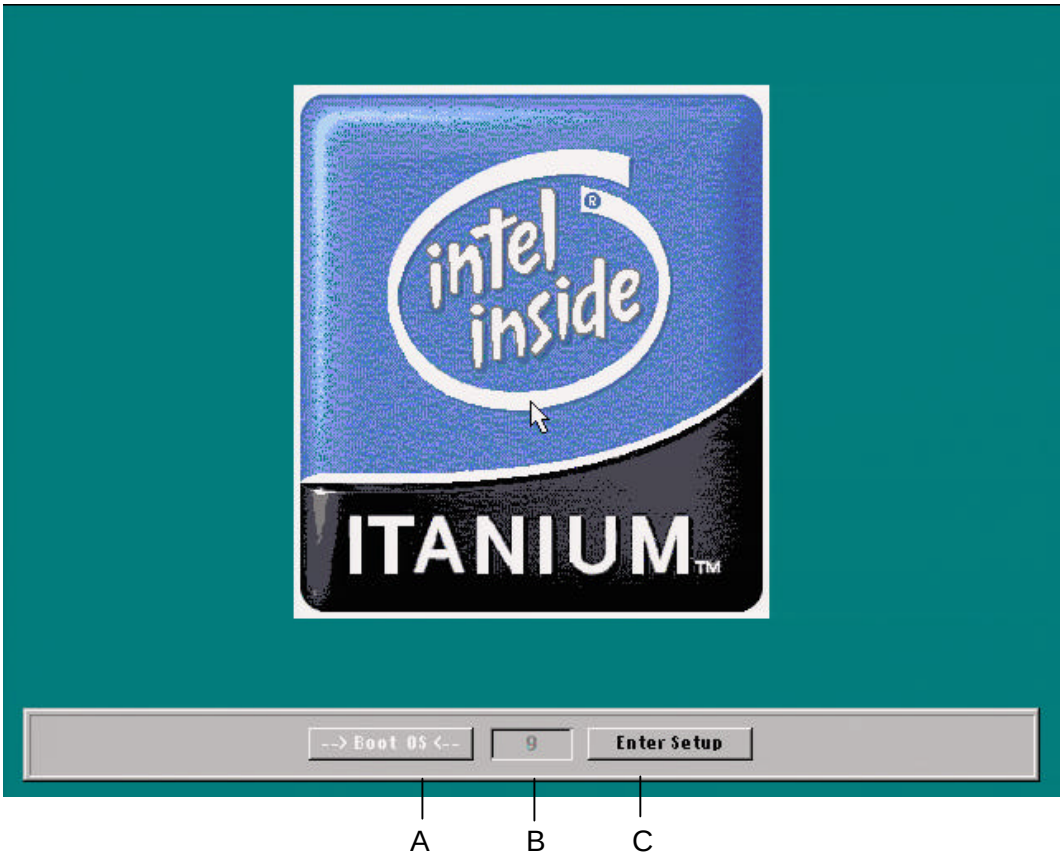
Feature	Description
BIOS Upgrades	Flash memory upgrades using LS-120
Enhanced IDE	• PIO Mode 4 • Ultra DMA 33* • Auto configuration • LBA • Two channels, support for master and slave drives on each channel
ATAPI	• LS-120 support • CD-ROM • DVD
System Management	System and chassis information is loaded into SMBIOS tables from IDROMs
ACPI	• Power management support • Software power off • The BIOS supports the following ACPI states: - S0 (Normal power on) - S1 (Processor Sleep) - S4 (Suspend to Disk) - S5 (Normal power off) • Supports wake up on: - Power/sleep switch - RTC alarm - LAN - Modem - PME
Video Support	• Supports 1X, 2X, or 4X AGP graphics • AGP Pro 110 support • 32 or 64-bit PCI graphics card support
Available Languages	English (U.S.)
Boot Options	• Hard drive (SCSI) • DVD • ARMD-HDD (LS-120) • Network boot support
OEM Logo or Scan Area	OEM logo area in flash
USB	Legacy USB keyboard and mouse support
BIOS Security Features	• User and Administrative passwords • Security for flash contents
BIOS Recovery	Recovery BIOS included in flash
SMBIOS	Compliant with SMBIOS 2.3

3.1 Entering and Exiting the Configuration Manager

The BIOS displays a screen with the manufacturer's logo (refer to Figure 7) shortly after the start of the boot sequence. You have two choices before proceeding:

1. Choose **Enter Setup** to view the Configuration Manager.
2. Choose **Boot OS** to dismiss the introductory screen and continue booting the operating system.

The label for the currently selected button is white and enclosed by right ("-->") and left ("<--") arrows. To move the current selection between the two buttons, left-click the desired button with the mouse. You may also press the Tab key or the left and right arrow keys. The text box between the two buttons (Figure 7) shows the number of seconds remaining before the BIOS automatically continues with the selected option.



A	Boot OS (operating system)
B	Time remaining before executing selected option
C	Enter Configuration Manager (Setup)

Figure 7. Full Screen Logo with Buttons to Enter Setup or Boot OS

To exit Configuration Manager, do the following:

1. Go to the **Save/Exit** Tab (refer to section 3.13).
2. If you have made changes in the Configuration Manager Settings, choose **Save New Settings** or **Discard Changes**.
3. Choose **Exit**.

3.2 Configuration Manager Tabs

NOTE

For reference purposes, before you begin record the current settings in Appendix B. When you make changes to the settings, update this record.

The Configuration Manager is accessed at the Intel® Itanium™ processor Splash Screen (refer to Figure 8) by tabbing to the "Enter Set-up" option and pressing enter. The Configuration Manager is organized into a set of tabbed panels. Table 7 summarizes the uses for each tab.

Table 7. Summary of Configuration Manager Screens

Tab Legend	Uses
Help	Help on using the Configuration Manager
System Processors	• Displays processor information • Displays the Front Side Bus (FSB) speed
System Memory	• Displays the amount of memory • Displays the memory speed • Displays the ECC setting • Displays the type of memory module in each slot
System Event Log	• Configure System Event Log • Mark System Event Log as read • View System Event Log
Integrated IDE	• Controller Enabled • Spin Delay • Configure the Primary and Secondary IDE channels
System BIOS	• Displays the BIOS version • Displays the SMBIOS version • Displays the PAL version • Displays the SAL version • Displays the Boot Block version
Power Events	Enable or disable the S5 wake-up events
Time/Date	Displays and sets the time or date

Tab Legend	Uses
General	• Set the amount of time the introductory screen remains visible • Enable or disable the on-board Network Interface Card (NIC) • Enable or disable the on-board audio device • Set resume after AC power failure to on or off • Enable or disable Num Lock at power-on • Sets the COM port for Serial Port 1
Security	Set or clear the User and Administrator Passwords
Save/Exit	• Save or discard the changes • Load the default settings • Exit Configuration Manager

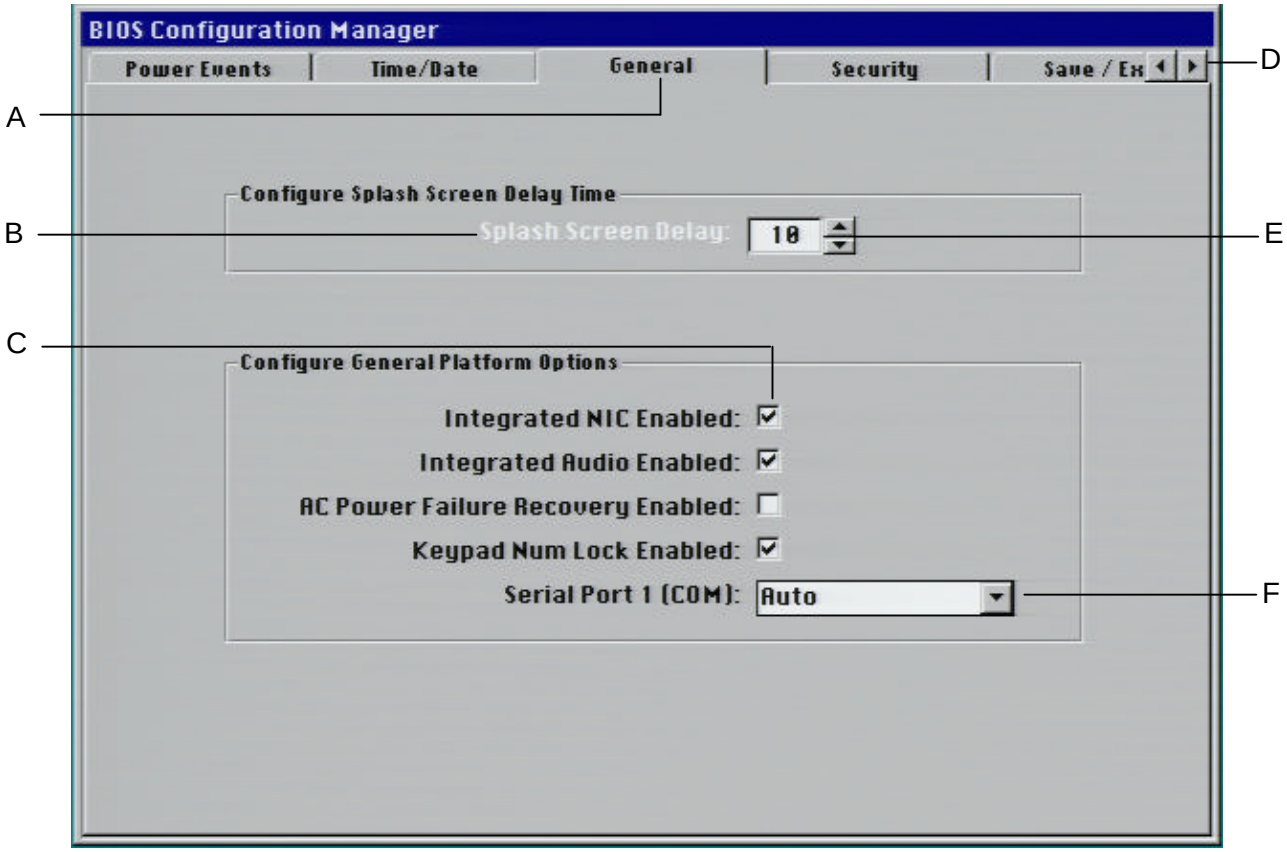
3.2.1 Using the Keyboard and Mouse in Configuration Manager

You can use your keyboard and mouse together to navigate in the Configuration Manager, however, the mouse is the preferred method.

Table 8. Keyboard Usage in Configuration Manager

Mouse	Use the left mouse button to select tabs or buttons. Use the right mouse button to display the on-line help for the selected tab. If you have swapped the left and right mouse buttons in your Operating System that setting is not in effect while you are using the Configuration Manager.
Backspace	Use the Backspace key when entering text to erase the previous character.
Tab key	Use the Tab key to move to the next control.
Shift+Tab key	Use the Shift+Tab key to move back one control.
ESC key	Use the ESC key to jump to the Save/Exit Tab.
F1 key	Use the F1 key to display help text for the selected tab.
Right Arrow	Use the Right Arrow key to move to the next Tab panel to the right.
Left Arrow	Use the Left Arrow key to move to the next Tab panel to the left.
Space Bar	If the focus is on a checkbox, use the Space Bar to toggle the check box on or off.
Enter	If the focus is on a button, use the Enter key to activate the button.
Up/Down Arrows	If the focus is on a combo box (a text box with a drop down list), the Up and Down Arrows will select the previous or next option. If the focus is on a spin box, the Up and Down Arrows will select the previous or next value.

Figure 8 is an example of a tab in the Configuration Manager. The legend indicates options that you may find on various tabs.



A	Active tab panel	D	Previous tab and next tab buttons
B	Label turns white to indicate focus	E	Spin button
C	Checkbox	F	Drop-down list

Figure 8. Configuration Manager Controls

3.3 Help Tab

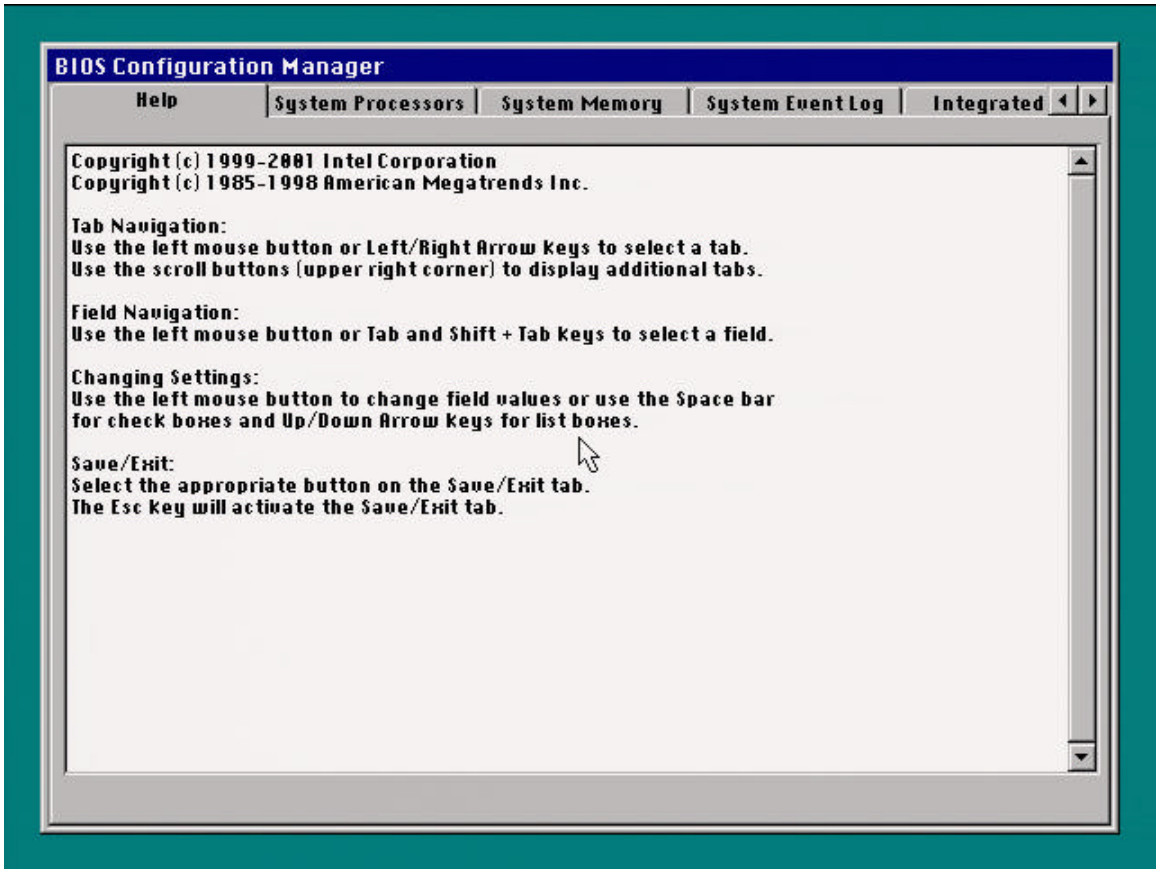


Figure 9. Help Tab

The Help Tab lists the keyboard navigation shortcuts used by Configuration Manager. For help on any Tab, press F1, or click the right mouse button.

3.4 System Processors Tab

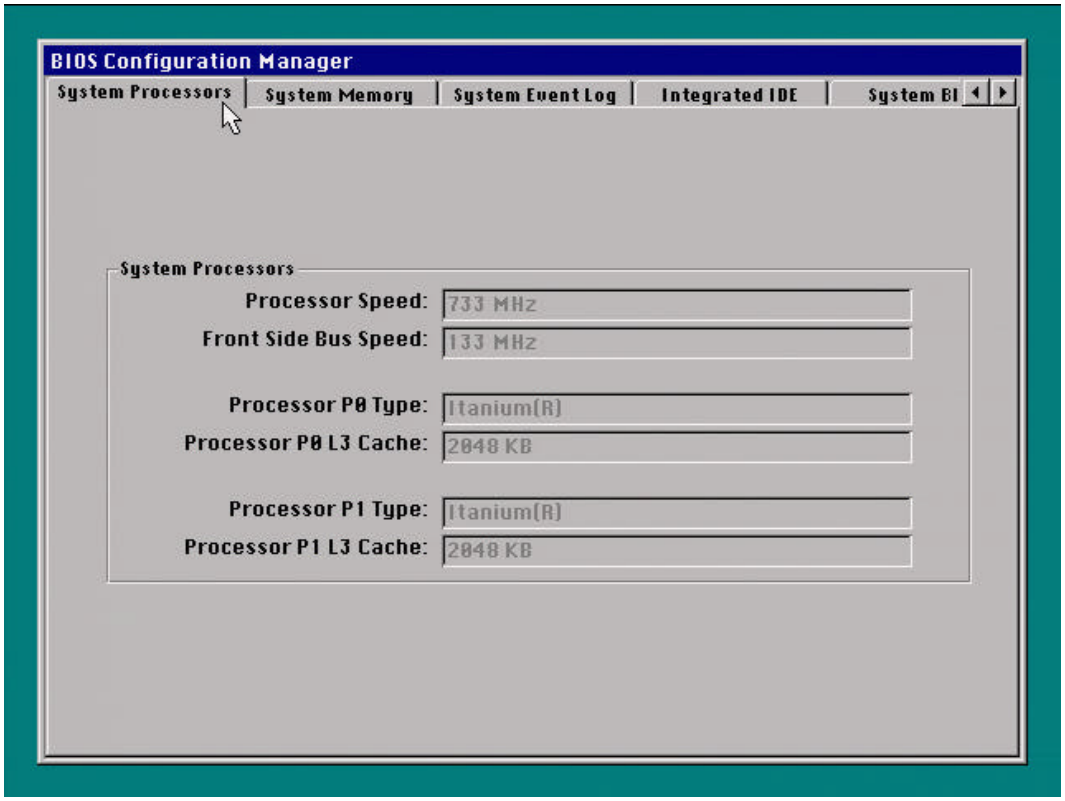


Figure 10. System Processors Tab Example

Table 9. Description of the System Processors Tab

Feature	Options	Description
Processor Speed	No options	Displays the processor speed detected by the BIOS. If two- (2) processors are installed, both processors have the same processor speed.
Front Side Bus Speed	No options	Displays the front side bus speed detected automatically by the BIOS.
Processor P0 Type	No options	Displays the processor type.
Processor P0 L3 Cache	No options	Displays the amount of L3 cache RAM for the processor. The L3 cache is located on the processor cartridge.
Processor P1 Type	No options	Displays the processor type.
Processor P1 L3 Cache	No options	Displays the amount of L3 cache RAM for the processor. The L3 cache is located on the processor cartridge.

3.5 System Memory Tab

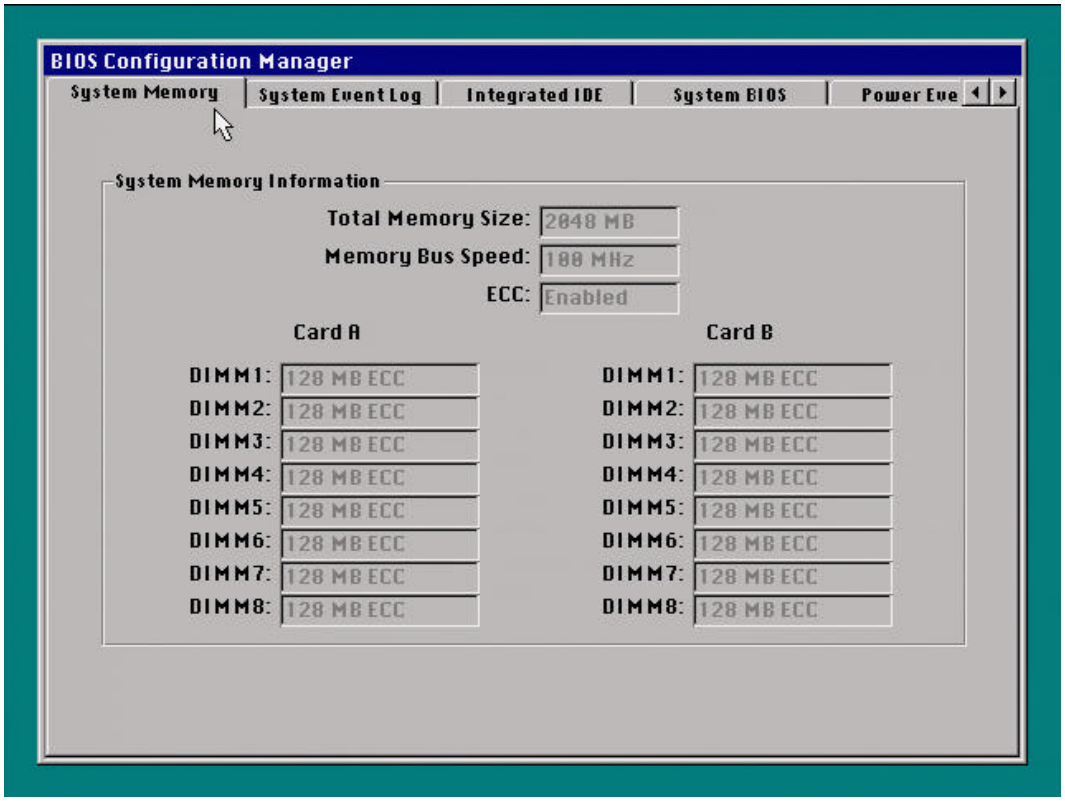


Figure 11. System Memory Tab Example

Figure 12. Description of the System Memory Tab

Feature	Options	Description
Total Memory Size	No options	Displays the total amount of SDRAM on the workstation board.
Memory Speed	No options	Displays the speed of the installed memory.
ECC Setting	No options	Displays whether or not ECC mode is enabled.
Card A DIMM 1	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 2	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 3	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 4	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 5	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 6	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 7	No options	Displays the size and type of memory installed in this slot.
Card A DIMM 8	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 1	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 2	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 3	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 4	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 5	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 6	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 7	No options	Displays the size and type of memory installed in this slot.
Card B DIMM 8	No options	Displays the size and type of memory installed in this slot.

NOTE

*An asterisk * on the screen indicates that the bank is invalid.*

3.6 System Event Log Tab

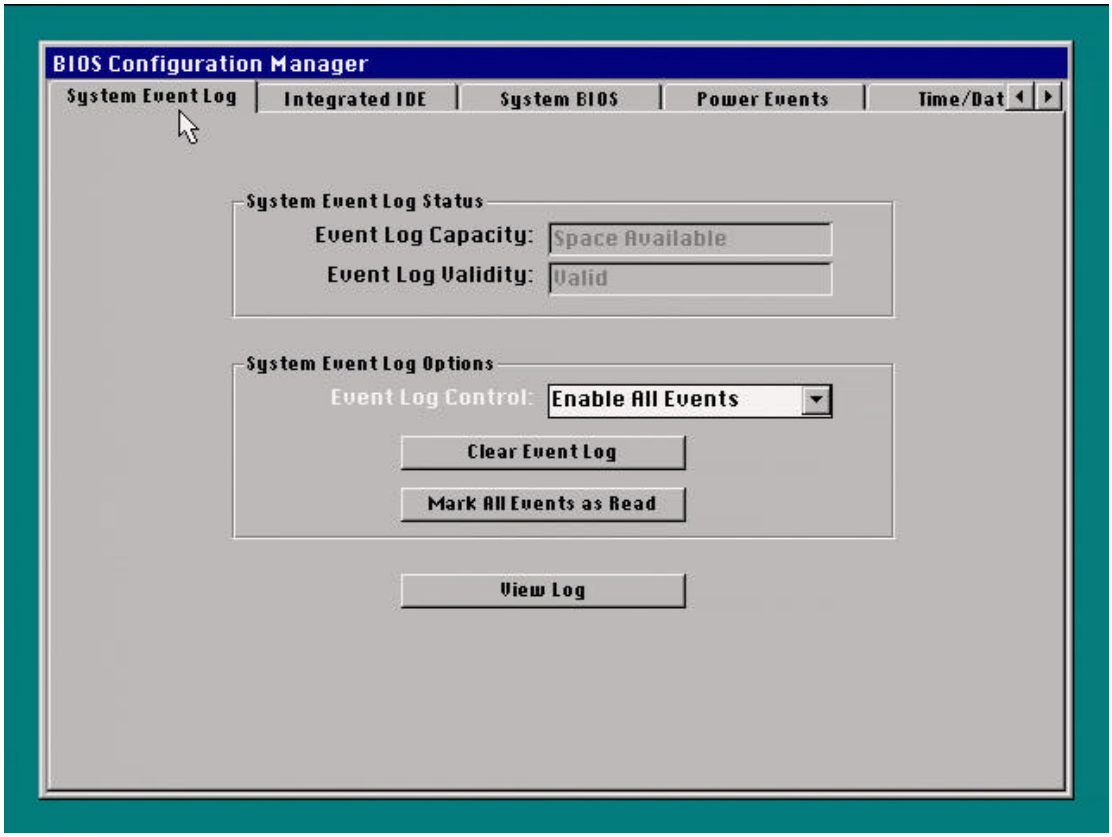


Figure 13. System Event Log Tab Example

Table 10. Description of the System Event Log Tab

Feature	Options	Description
Event Log Capacity	Display only	Shows space availability for the event log.
Event Log Validity	Display only	Shows the information in the event log as valid or invalid. If the System Event Log is marked as invalid, clear the Event Log and reboot.
Clear Event Log on Reboot	Enabled **Disabled** (default)	Enable this option to clear the event log each time the system is rebooted.
Event Log Control	**Enable All Events** (default) Disable All Events Disable ECC Events	Enable or disable event logging. Disable ECC Events will enable logging all events except for ECC events
Mark All Events as Read	Button	Mark all events in the log as read.
View Log	Button	Displays the system events in the System Event Log (refer to Figure 14). Read events are marked with an asterisk.

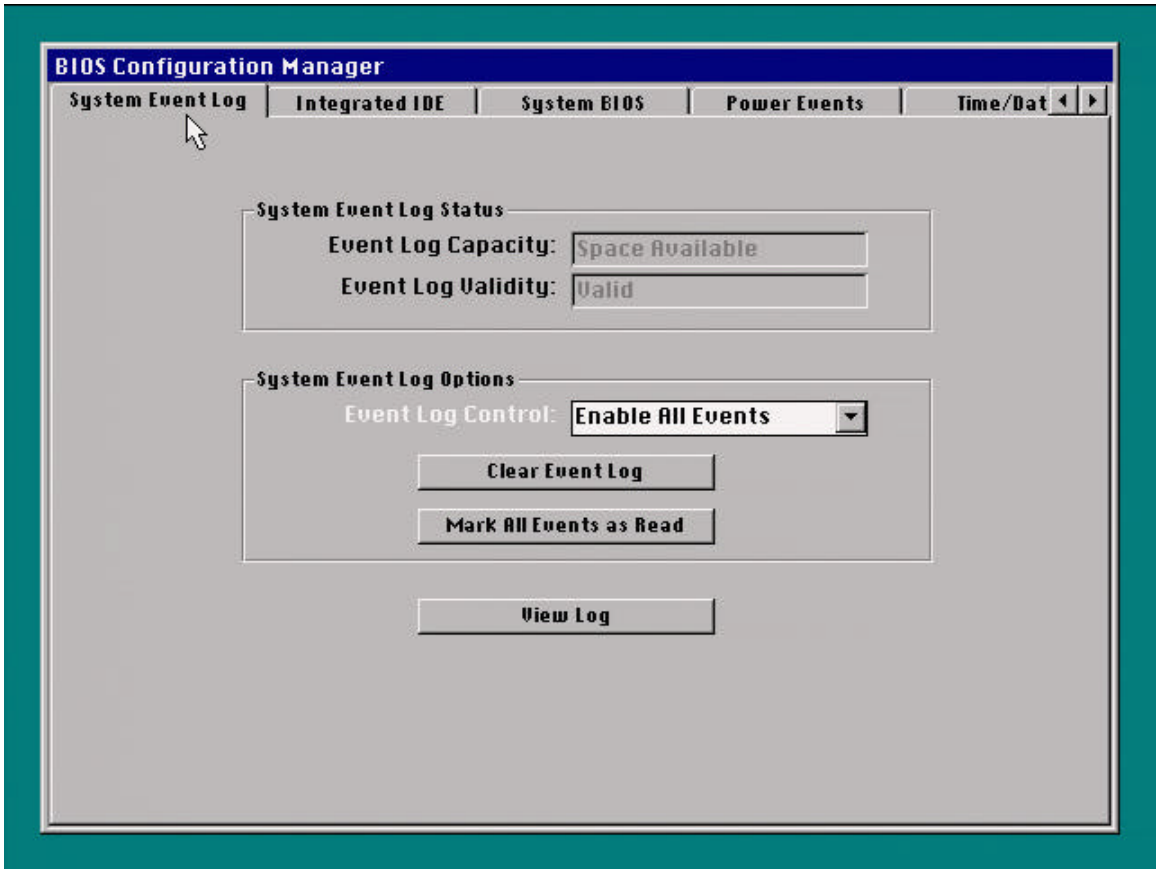


Figure 14. Sample View of System Event Log

3.7 Integrated IDE Tab

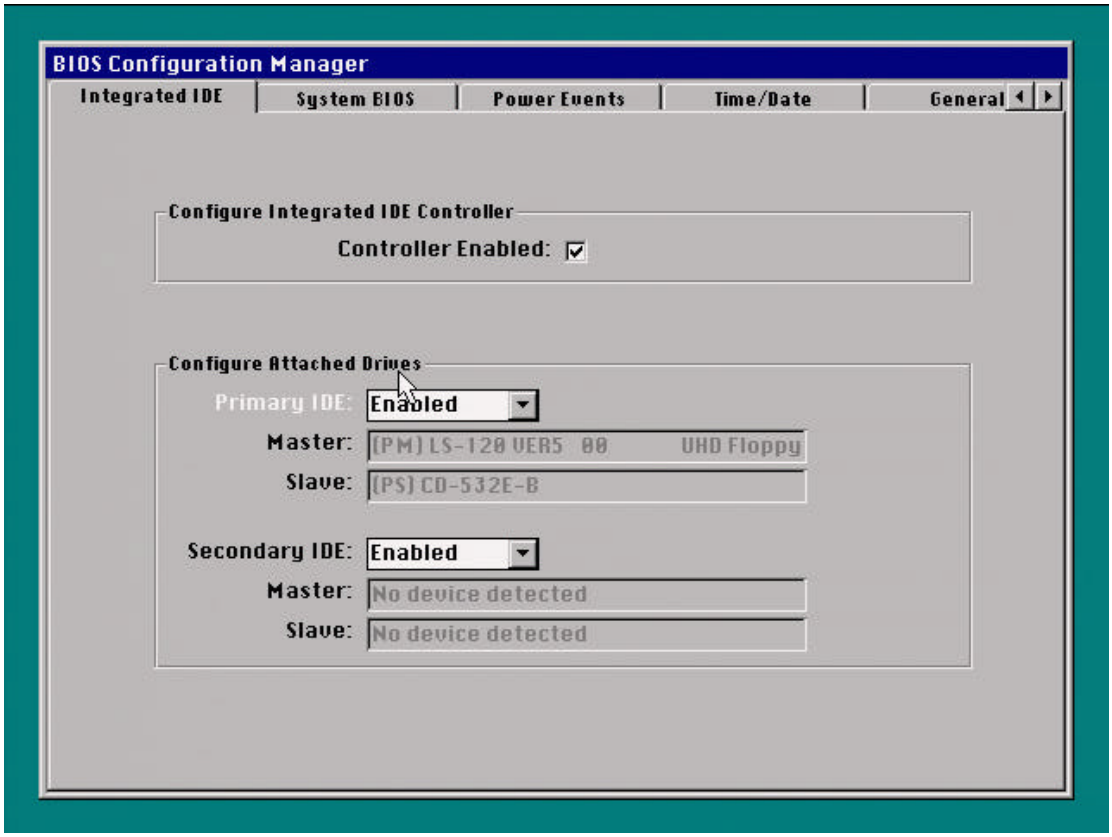


Figure 15. Integrated IDE Tab Example

Table 11. Description of the Integrated IDE Tab

Feature	Options	Description
Controller Enabled	**Enabled** (default) Disabled	*Disabled* will disable the dual-channel IDE controller. This option will prevent the IDE controller from using system resources. *Enabled* will enable the dual-channel IDE controller.
Spin Delay	0–60 seconds (**0** seconds is default)	Selects the hard disk drive pre-delay. Causes the BIOS to insert a delay before attempting to detect IDE drives in the system.
Primary IDE	**Enabled** (default) Disabled	*Enabled* automatically sets the values for the LBA mode, transfer mode, and Ultra DMA settings. *Disable* will disable the primary channel.
Master (Primary IDE)	No options	Reports the type of connected IDE device.
Slave (Primary IDE)	No options	Reports the type of connected IDE device.
Secondary IDE	**Enabled** (default) Disabled	*Enabled* automatically sets the values for the LBA mode, transfer mode, and Ultra DMA settings. *Disable* will disable the secondary channel.
Master (Secondary IDE)	No options	Reports the type of connected IDE device.
Slave (Secondary IDE)	No options	Reports the type of connected IDE device.

3.8 System BIOS Tab

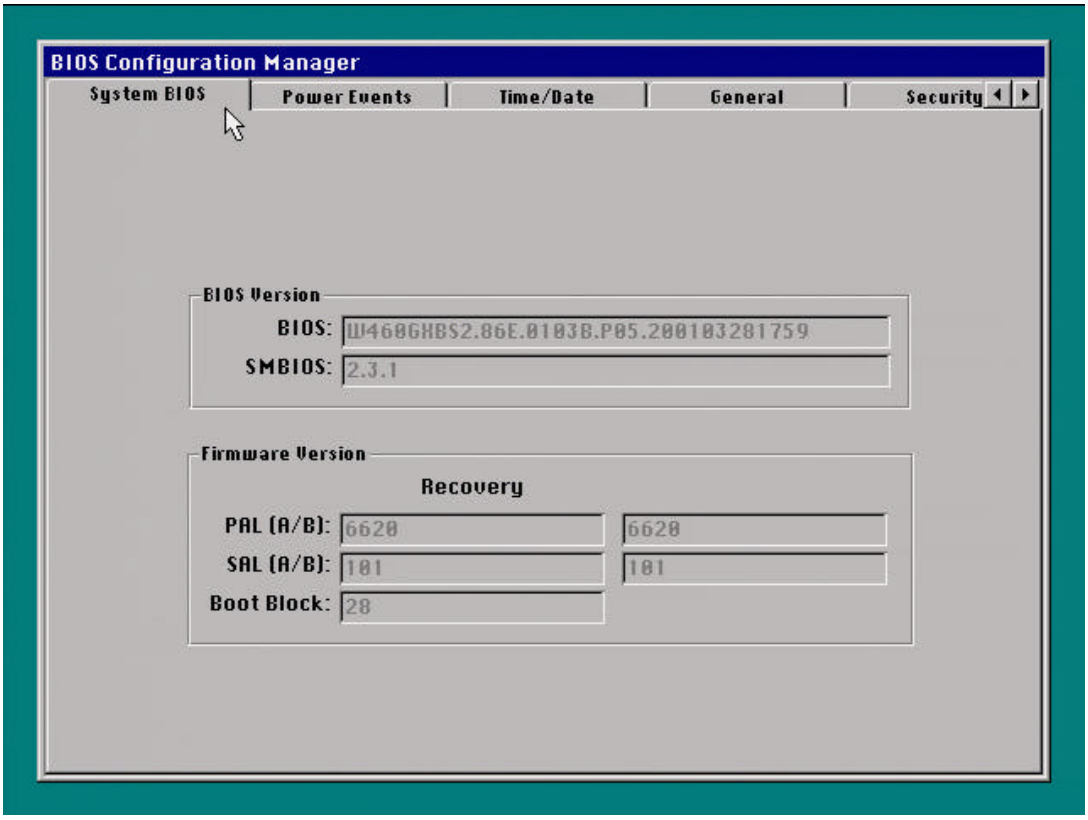


Figure 16. System BIOS Tab Example

Table 12. Description of the System BIOS Tab

Feature	Options	Description
BIOS Version	No options	Displays the BIOS version.
SMBIOS Version	No options	Displays the System Management BIOS (SMBIOS) version.
PAL A/B Version	No options	Displays the Platform Abstraction Layer (PAL) version.
SAL A/B Version	No options	Displays the Software Abstractions Layer (SAL) version.
Boot Block	No options	Displays the Boot Block version.

3.9 Power Events Tab

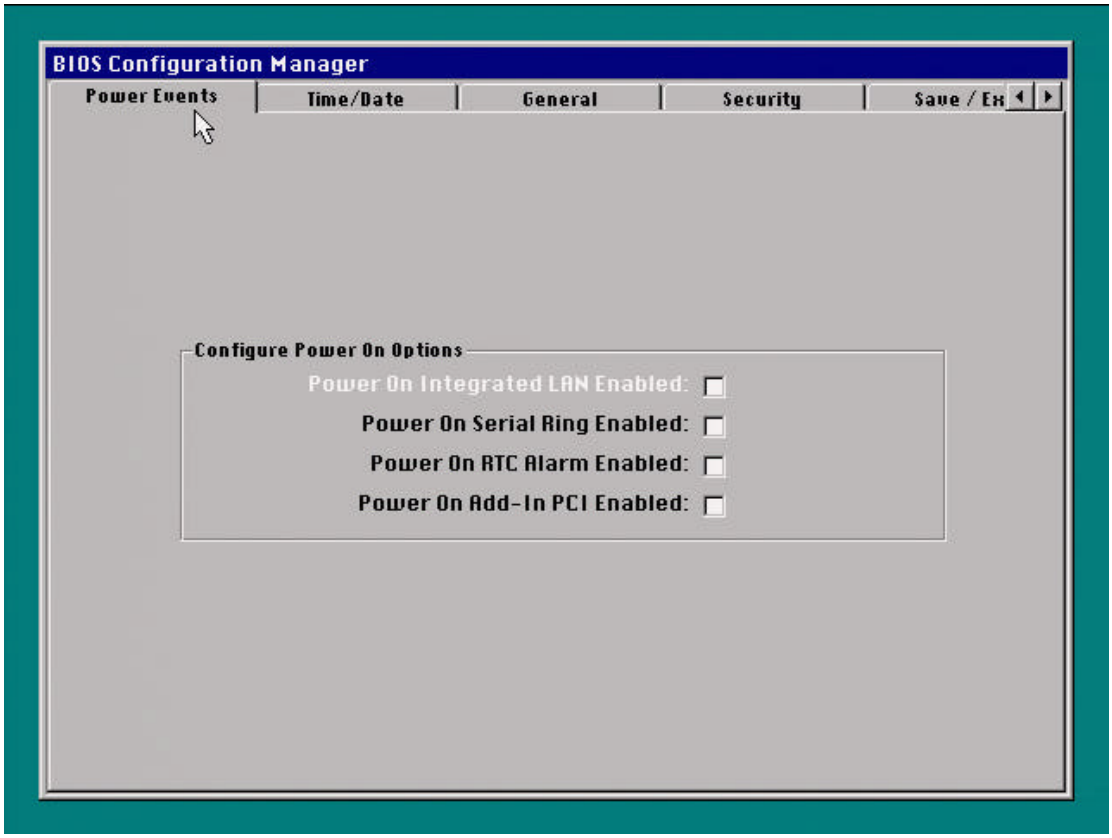


Figure 17. Power Events Tab Example

Table 13. Description of the Power Events Tab

Feature	Options	Description
Power On Integrated LAN Enabled	Enabled **Disabled** (default)	Choose this option to enable Wake on LAN from ACPI sleep state 5, or from the normal off state in non-ACPI operating systems. The default is disabled (the system will remain off). This option has no effect on the wake events in ACPI sleep state 1.
Power On Serial Ring Enabled	Enabled **Disabled** (default)	Choose this option to enable wake on ring for external modems connected to the serial port from ACPI sleep state 5, or from the normal off state in non-ACPI operating systems. The default is disabled (the system will remain off). This option has no effect on the wake events in ACPI sleep state 1.
Power On RTC Alarm Enabled	Enabled **Disabled** (default)	Choose this option to wake-up the system on an RTC Alarm. The default is disabled (the system will remain off). This option has no effect on the wake events in ACPI sleep state 1.
Power On Add-In PCI (PME) Enabled	Enabled **Disabled** (default)	Choose this option to enable wake on PCI PME (Power Management Event) for PCI modems or other PCI devices from ACPI sleep state 5, or from the normal off state in non-ACPI operating systems. The default is disabled (the system will remain off). This option has no effect on the wake events in ACPI sleep state 1.

3.10 Time/Date Tab

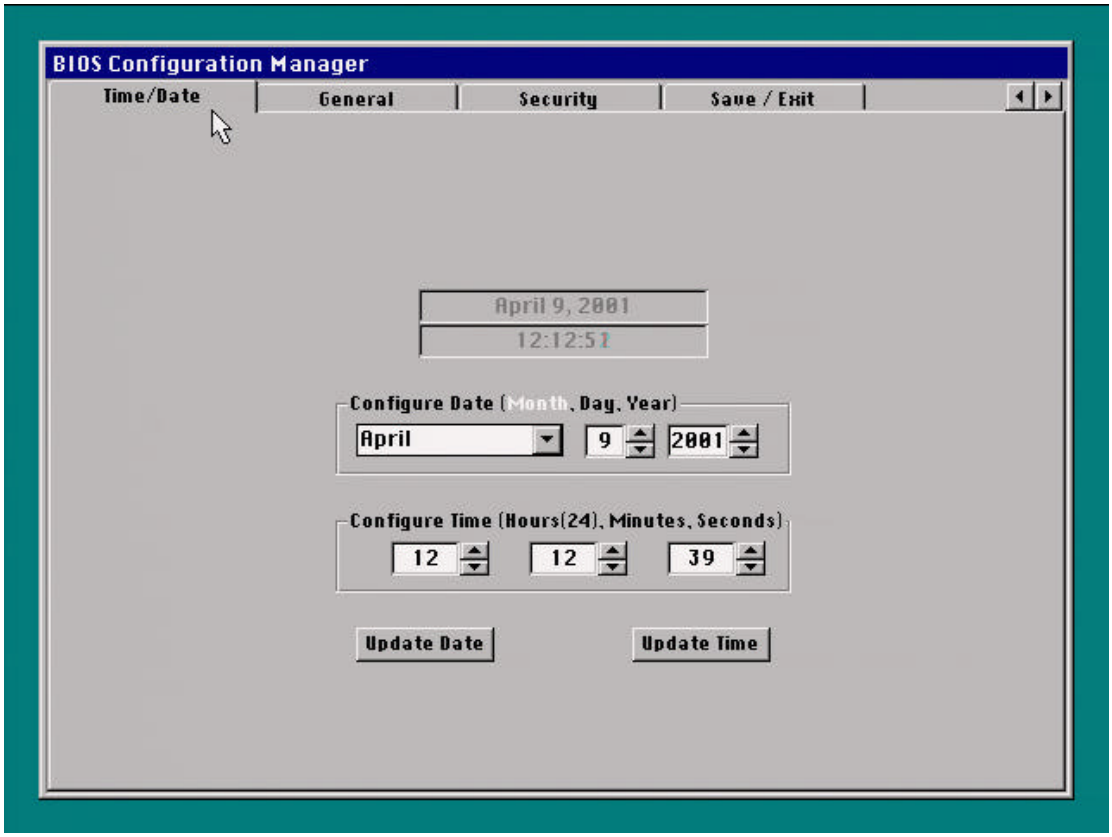


Figure 18. Time/Date Tab Example

Figure 19. Description of the Time/Date Tab

Feature	Options	Description
Date	No options	Displays the current date.
Time	No options	Displays the current time (using 24-hour clock).
Month, Day, Year	January - December, 1–31, 1980–2099	Specifies the current date.
Hours, Minutes, Seconds	0–23, 0–59, 0–59	Specifies the current time.
Update Date/Update Time	Buttons	Sets the date or time.

3.11 General Tab

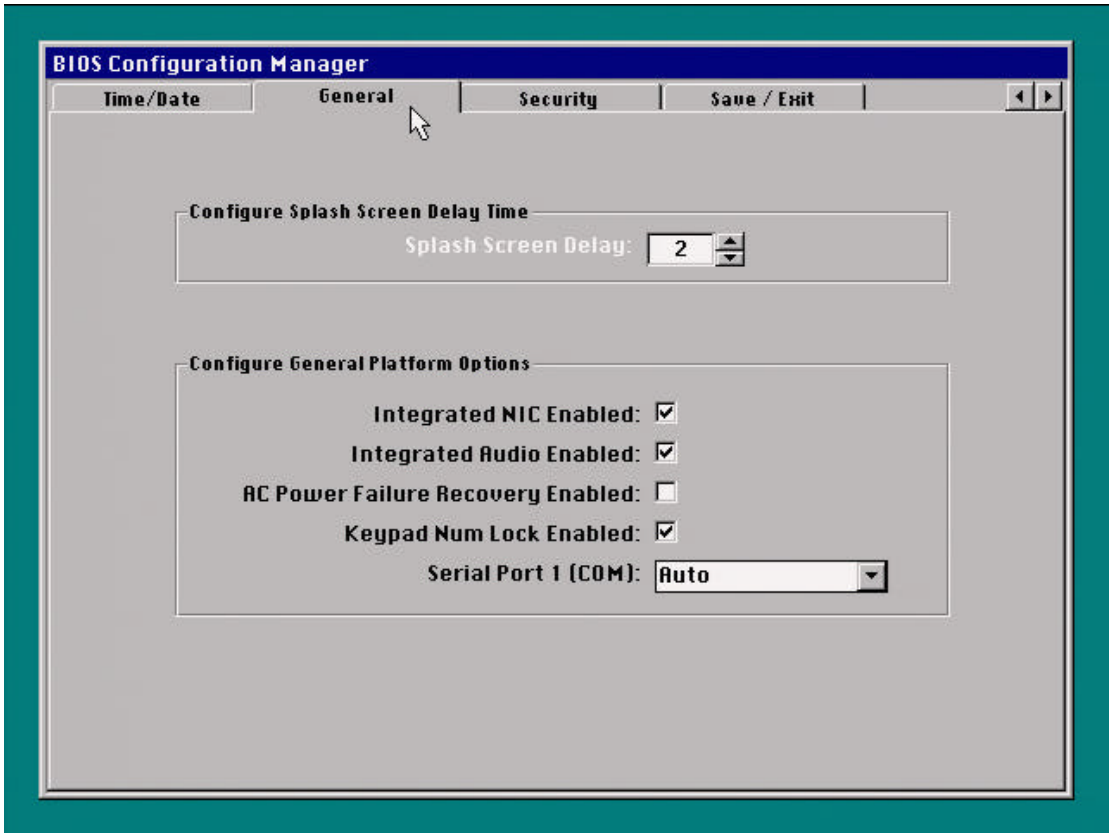


Figure 20. General Tab Example

Table 14. Description of the General Tab

Feature	Options	Description
Splash Screen Delay	2–30 seconds (**10** seconds is default)	Specifies the number of seconds to display the start-up screen before automatically booting the operating system.
Integrated Audio Enabled	**Enabled** (default) Disabled	Enables or disables the on-board audio.
AC Power Failure Recovery	**Off** (default) On	Specifies the response after an AC power failure. Choose Off to keep the system off after AC power is restored. Choose On to power-on the system after AC power is restored.
Keypad Num Lock	**On** (default) Off	Specifies the power-on state of the Num Lock feature on the numeric keypad of the keyboard.
Serial Port 1 (COM)	**Auto** (default) COM1 Disabled	Specifies the resources assigned for Serial Port 1.

3.12 Security Tab

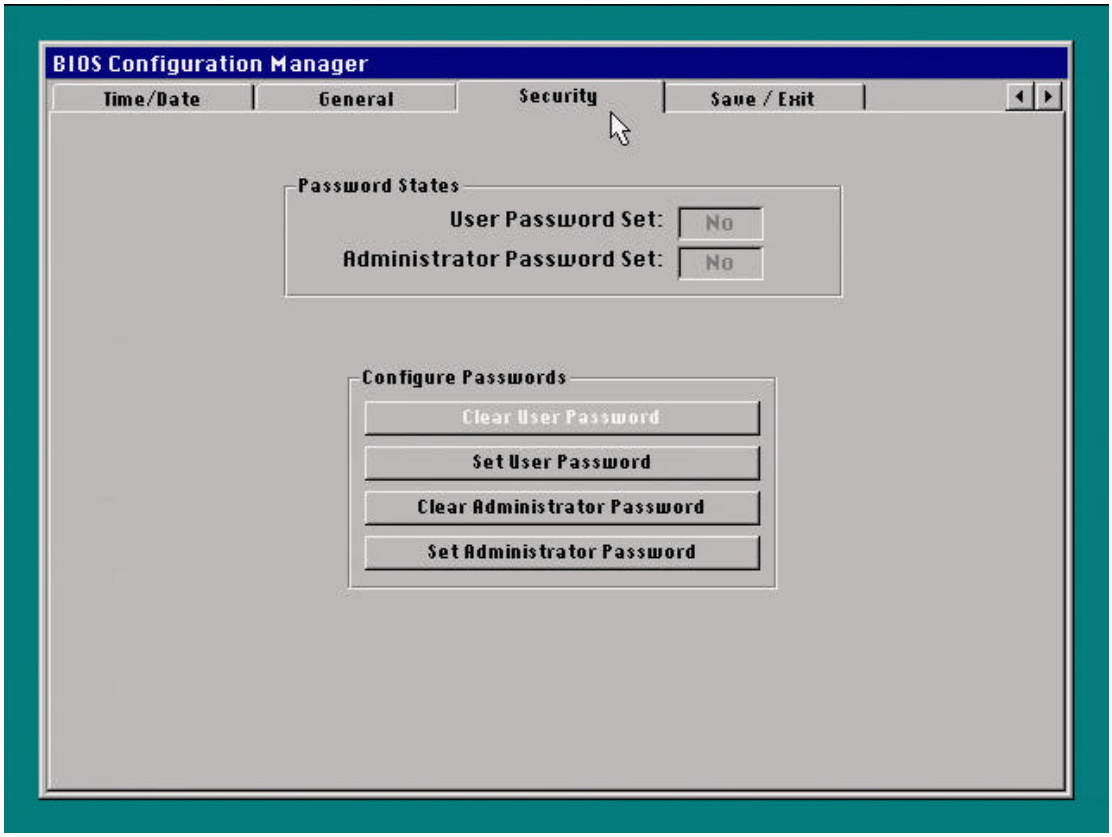


Figure 21. Security Tab Example

Table 15. Description of the Security Tab

Feature	Options	Description
User Password Set	No options	Reports if the User Password is set.
Administrator Password Set	No options	Reports if the Administrator Password is set.
Clear User Password	Button	Clears the User Password.
Set User Password	Button	Specifies the User Password. The User Password can be up to 15 characters long.
Clear Administrator Password	Button	Clears the Administrator Password.
Set Administrator Password	Button	Specifies the Administrator Password. The Administrator Password can be up to 15 characters long.

3.13 Save/Exit Tab

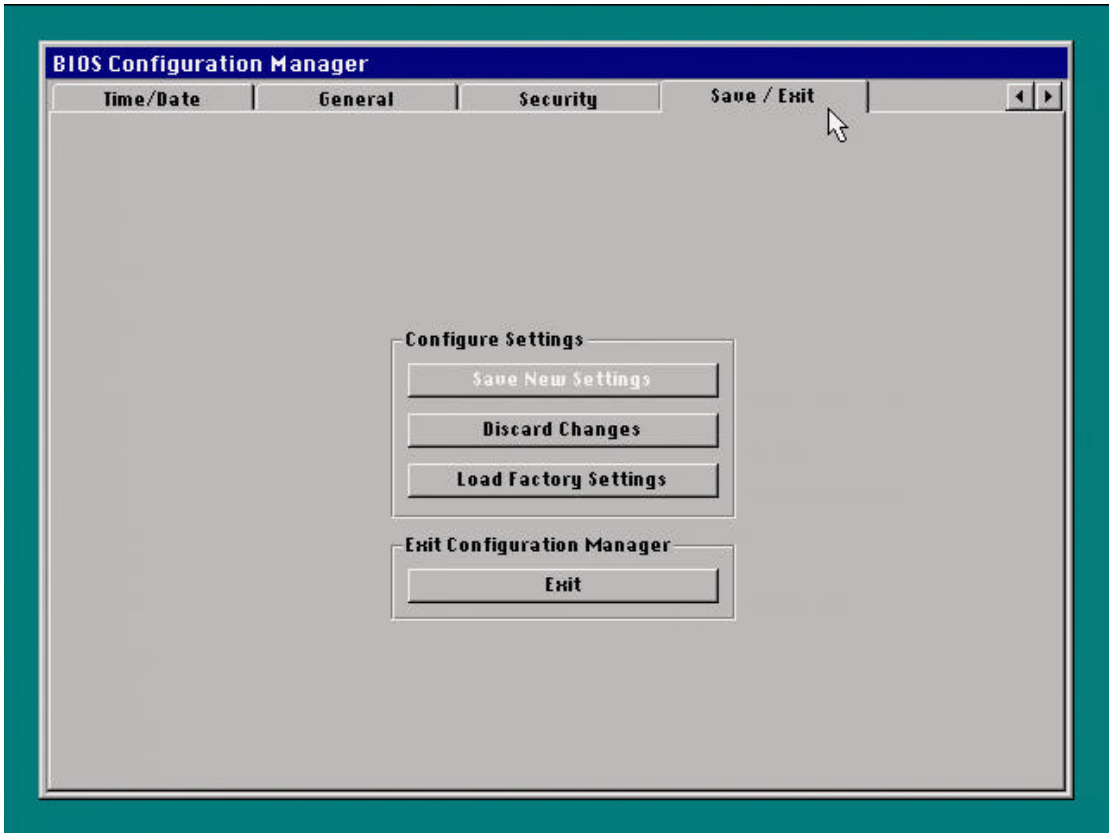


Figure 22. Save/Exit Tab

Table 16. Description of the Save/Exit Tab

Feature	Options	Description
Save New Settings	Button	Saves the changes in Flash memory.
Discard Changes	Button	Discards any changes made in Configuration Manager.
Load Factory Settings	Button	Loads the factory default values for all the Configuration Manager options.
Exit	Button	Exits Configuration Manager.

3.14 Using the EFI Shell and Boot Manager

1. Turn the power on, or restart the system.
2. Choose **Boot OS** from the Splash Screen or wait without making a choice (the BIOS will boot the EFI Shell if you do not choose **Enter Setup**).
3. If only the User Password is set, you must enter the User Password. If both the User and Administrator Passwords are set, you can enter either password.
4. The system boot manager will display similar to what is shown in Figure 23

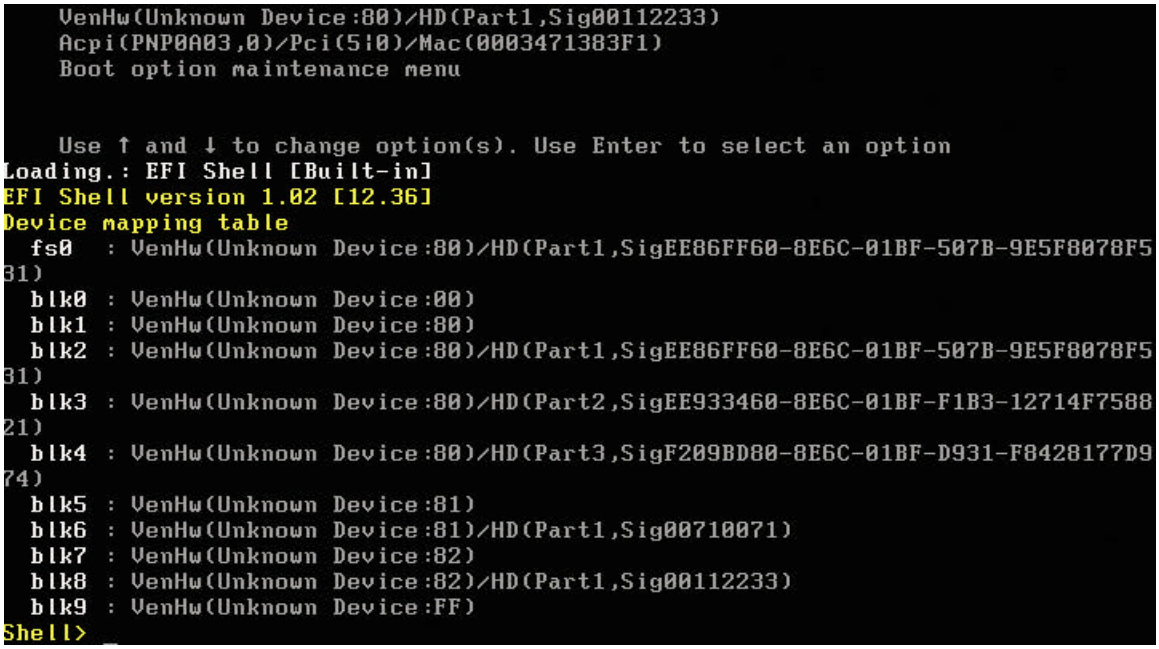


Figure 23. EFI Boot Manager Prompt

5. Selecting the EFI shell option displays the device-mapping table and launches the EFI command mode as shown in Figure 24.

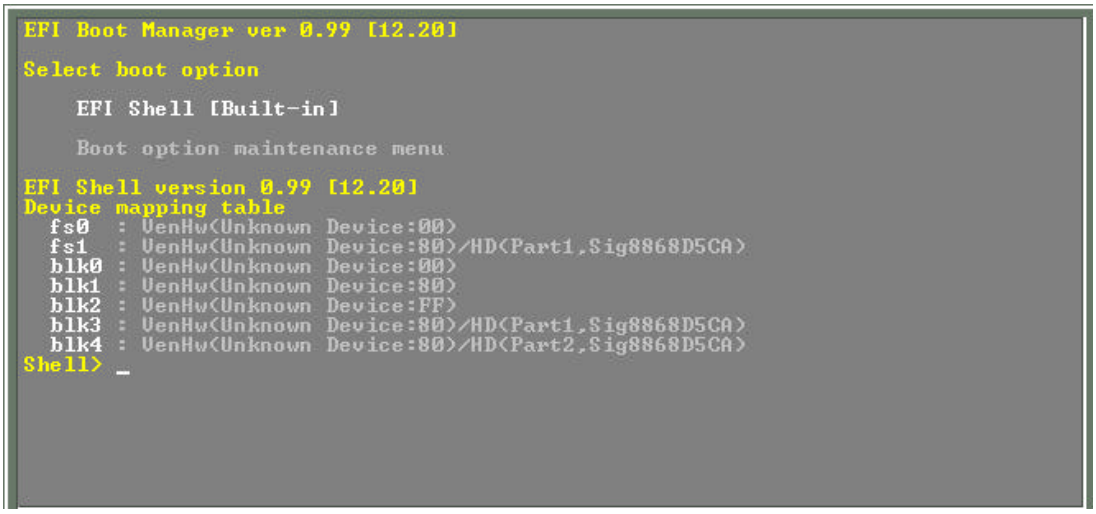


Figure 24. EFI Shell Command Mode

NOTE

Devices displayed in Figure 24 will change based on the various configurations. Refer to Table 17 for device ID descriptions.

Table 17. Device ID Descriptions

Device ID	Description
Device:00	Indicates an LS-120 drive
Device:8x	Indicates a hard drive
Device:FF	Indicates a CD-ROM drive

3.14.1 EFI Shell Commands

The EFI shell command descriptions are available at the EFI shell. Typing "help" at the EFI prompt displays a list of EFI Shell commands with brief descriptions.

NOTE

If a –b option is used after typing a command (i.e., help –b) the list will scroll one-(1) screen at a time.

3.15 Boot Option Maintenance Menu

NOTE

For reference purposes, you should record the current settings in Appendix B. When you make changes to the settings, update this record.

The boot option maintenance menu is organized into a set of menu options allowing you to select how your system boots. Table 18 summarizes the options.

Table 18. Boot Option Maintenance Menu Summary

Boot from a File	Allows browsing for a boot file.
Add Boot Option	Adds new boot option file to Select Boot Option menu.
Delete Boot Option(s)	Removes boot option file from Select Boot Option menu.
Change Boot Order	Changes order of option in Select Boot Option menu.
Manage Boot Next Setting	Sets or resets the option to which the system will automatically boot on the next reboot.
Set Auto Boot Time Out	Sets time delay before the system auto boots to the item selected in the BootNext option.
Select Active Console Output Devices	Allows output to be directed to selected options.
Select Active Console Input Devices	Allows input to be directed from selected options.
Select Active Standard Error Devices	Selects devices where errors are reported.
Cold Reset	Cold reboot of system.
Exit	Returns to EFI Select Boot Option Menu mode.

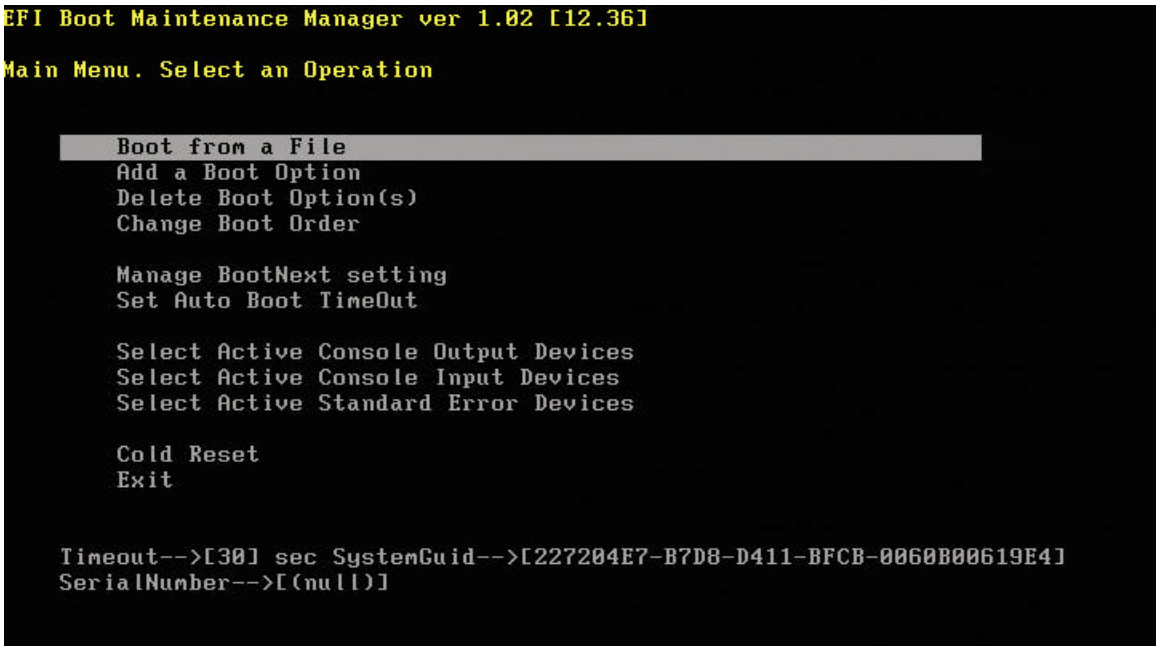


Figure 25. EFI Boot Maintenance Manager Main Menu

3.15.1 Boot From a File

Selecting **Boot from a File** allows you to browse for a boot file. Figure 27 shows a Boot from a File screen.

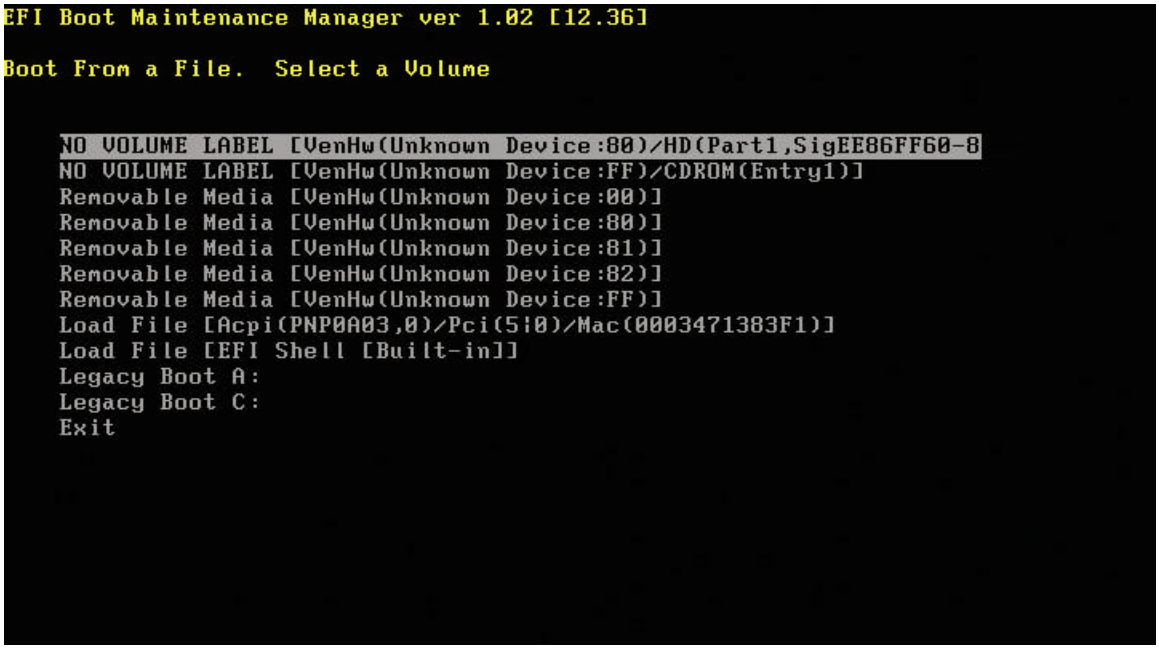


Figure 26. Boot From File Browser

3.15.2 Add A Boot Option

Selecting **Add a Boot Option** on the main menu allows new Boot Option information to be added to the EFI Shell. Use the following steps to add a Boot Option.

1. Select the device where the boot file is located (refer to Figure 28).
2. Select the file within the device.

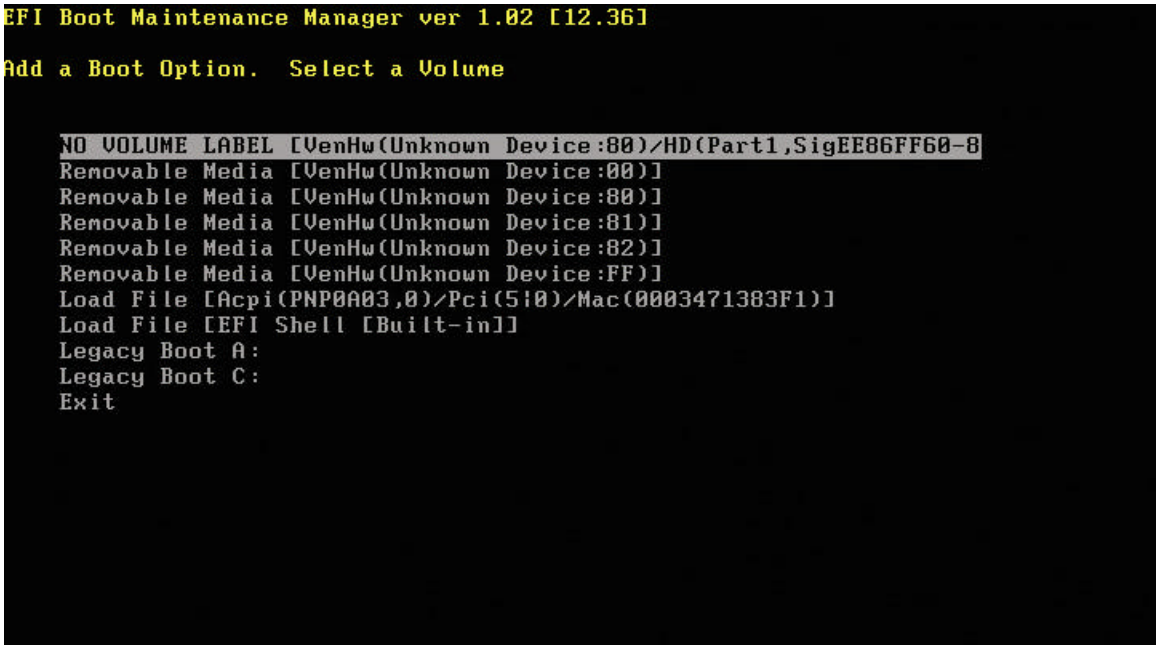


Figure 27. Add Boot Option

3. Enter the file description at the prompt (refer to Figure 29).
4. Type 'u' or 'U' to select Unicode and press **Enter**.
5. Save the changes once the new information has been added.

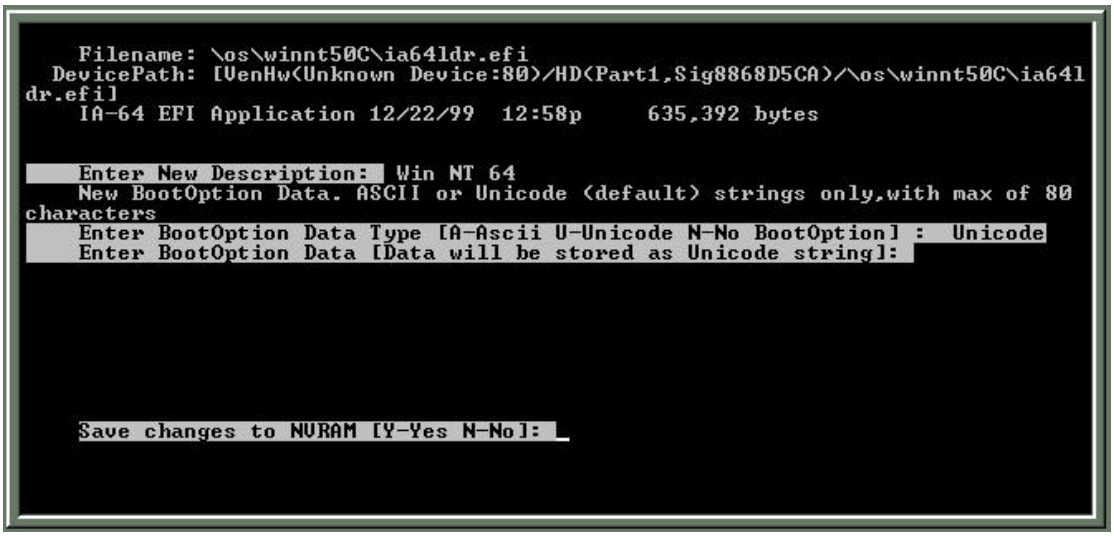


Figure 28. Add Boot Option Details

3.15.3 Delete Boot Option(s)

The **Delete Boot Option(s)** selection on the main menu allows you to delete a boot option. To delete an option, highlight that option using arrow keys and press **Enter**. You may also highlight an option and press 'd' or 'D' on your keyboard. To confirm your delete command, press 'Y' or 'N' at the prompt. To delete all the boot options, select **Delete All Boot Options** from the menu. Save your changes before exiting. Refer to Figure 30.

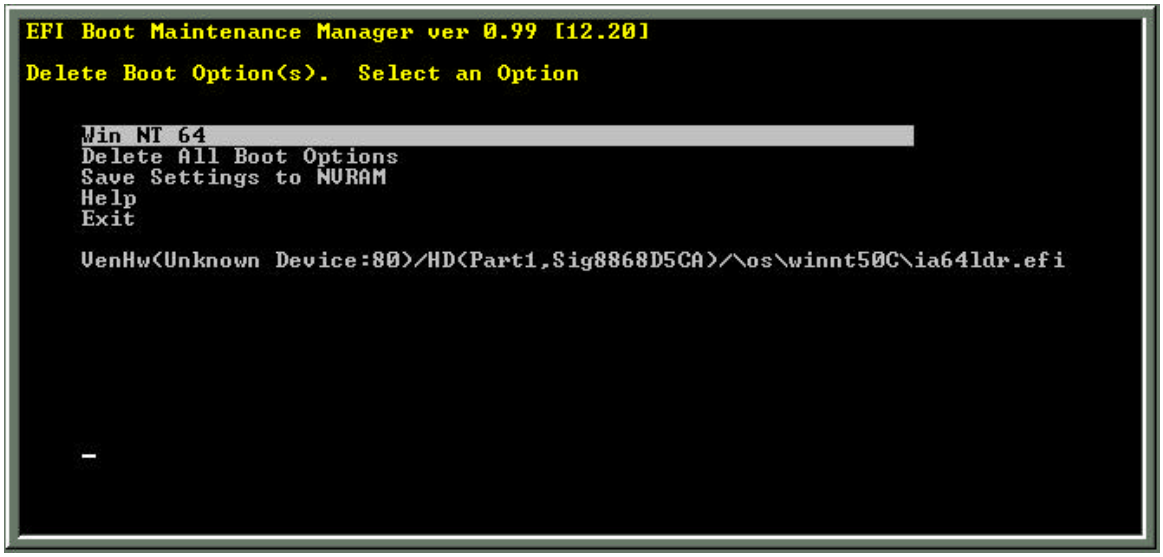


Figure 29. Delete Boot Option

3.15.4 Changing the Boot Order

You may set the boot order by selecting **Change Boot Order** on the main menu. On the Change Boot Order screen select a boot option using your arrow keys. Press 'U' or 'u' to move an option up the order chain and press 'D' or 'd' to move down the option order chain. Save the changes before exiting. Refer to Figure 31.

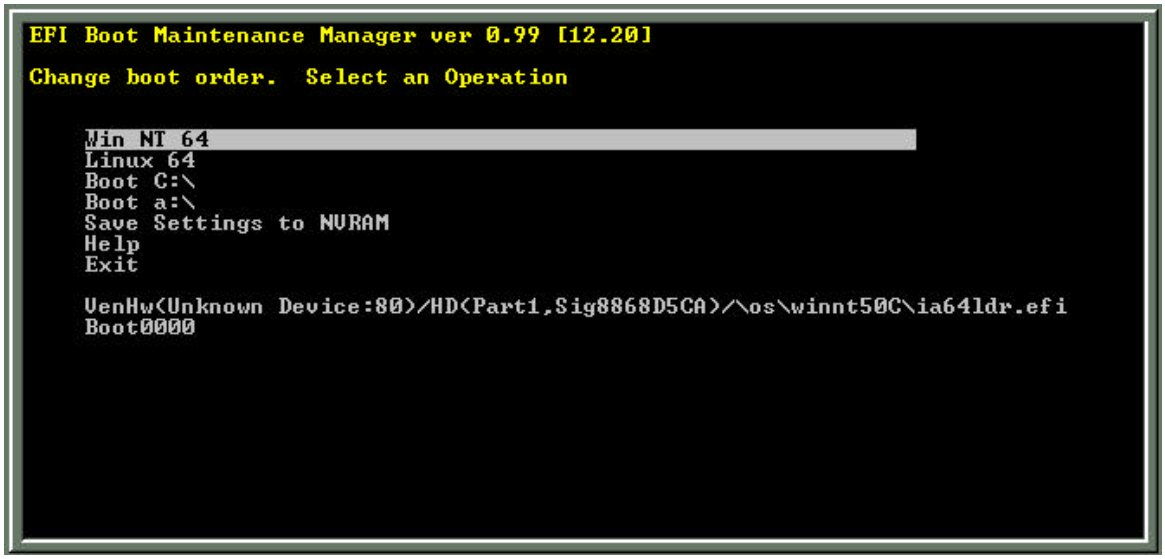


Figure 30. Change Boot Option Menu Order

3.15.5 Manage BootNext Setting

Selecting the **Manage BootNext Setting** on the main menu allows you to set or reset allowing the system to automatically boot on the next reboot cycle. At the BootNext Setting screen select a boot option using your arrow keys. Press **Enter**, 'b', or 'B' to designate this option as BootNext. To remove a BootNext setting, select **Reset BootNext Setting**, or press 'r', or 'R' when the option is selected. Save the settings before exiting. Refer to Figure 32.

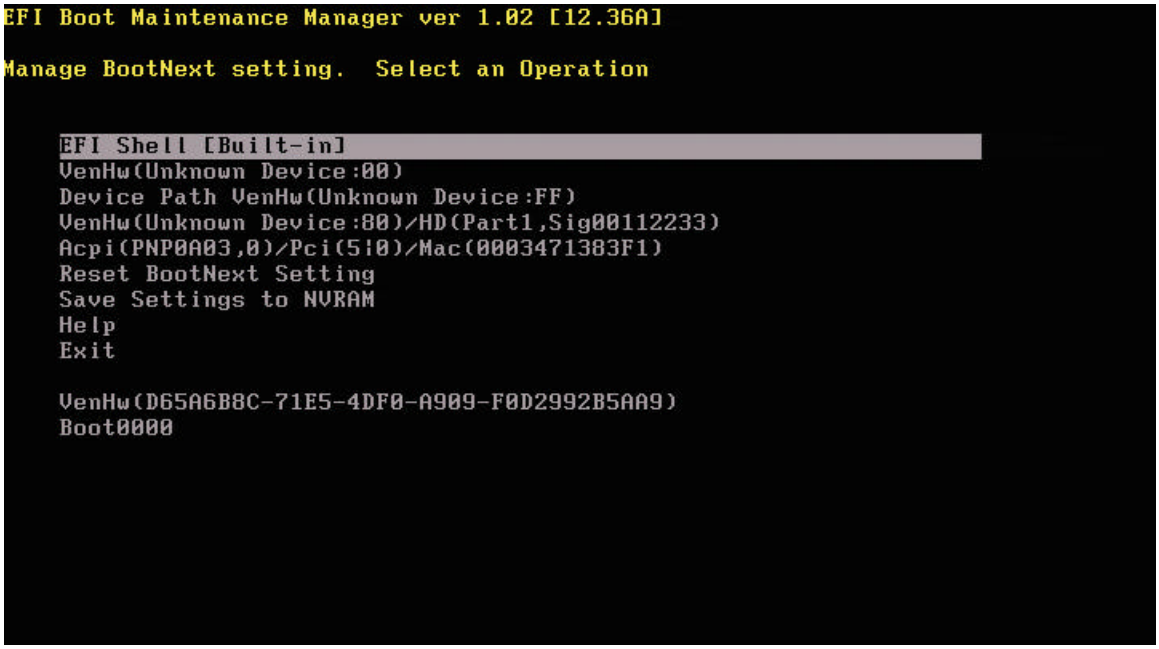


Figure 31. BootNext Selection

3.15.6 Set Auto Boot Timeout

The **Auto Boot Timeout** selection on the main menu allows you to set the Timeout Value before the OS automatically boots. Use the **Set Timeout Value** option to set the time, in seconds, to boot the default OS. If a value of zero- (0) is specified, there is no wait to boot the default OS. The following three- (3) choices are available to disable the timeout variable:

1. Use the **Delete/Disable Timeout** menu option to delete the timeout variable.
2. Set the timeout value to be **65535 <0xFFFF>.**
3. Press a key when the EFI is booting and the timeout count down is disabled.

The timeout value is saved when the **Set Timeout Value** menu option is selected. Refer to Figure 33.

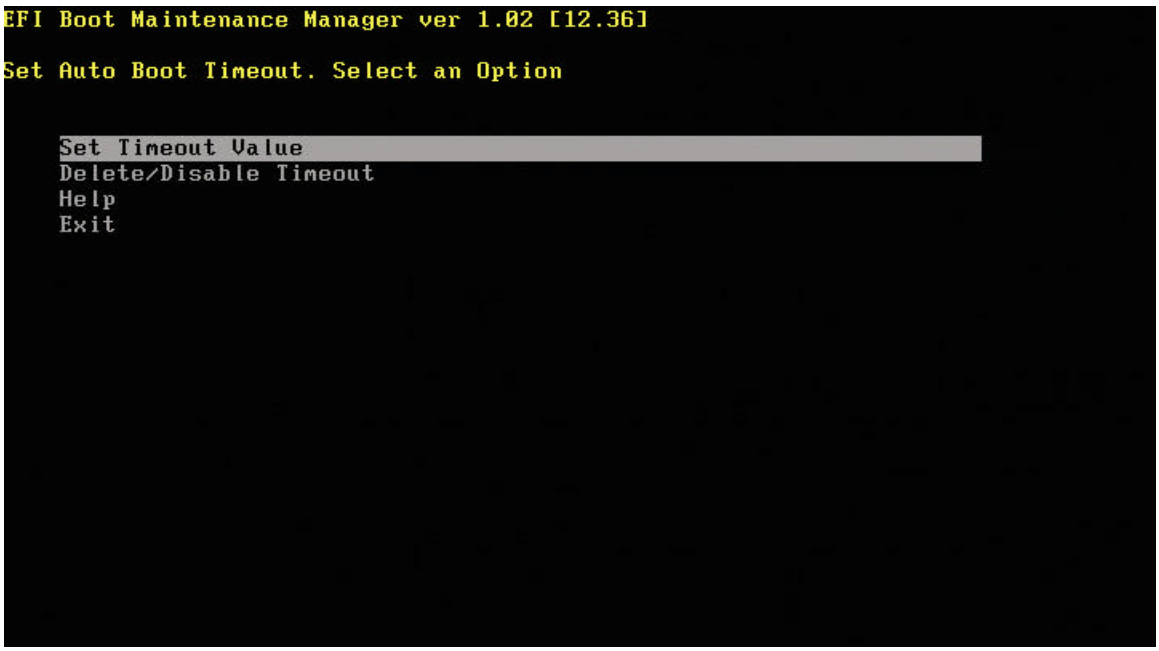


Figure 32. Auto Boot Time Delay

3.15.7 Select Active Console Output/Input Device

Choosing the **Select Active Console Output Device** option on the main menu allows you to direct output to selected device options, while the **Select Active Console Input Device** option allows input to be directed to selected device options. Use your arrow keys to select your preferred device and press **Enter** to activate the option. Save your settings before exiting. Refer to Figures 34 and 35.

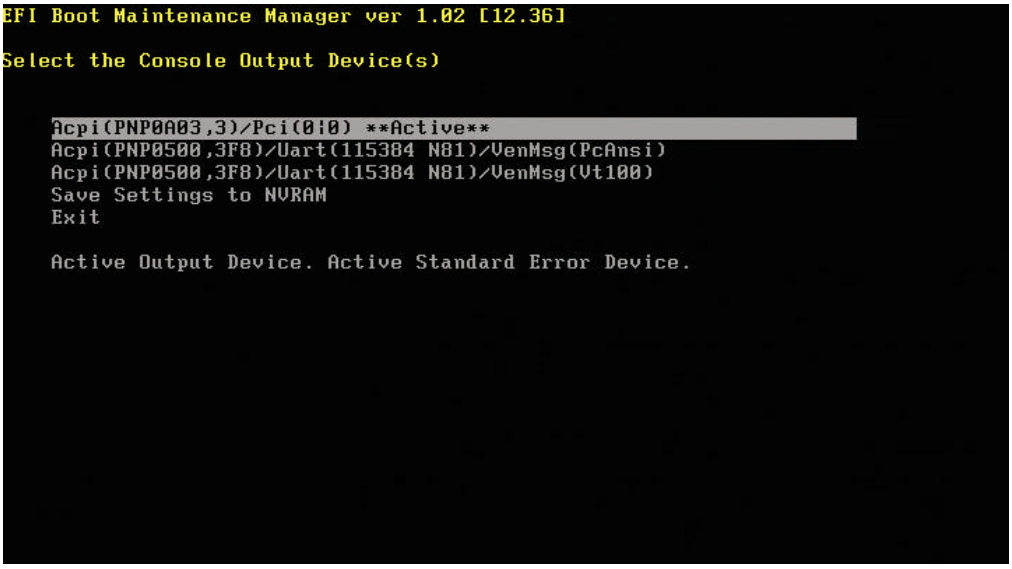


Figure 33. Select Active Console Output Device

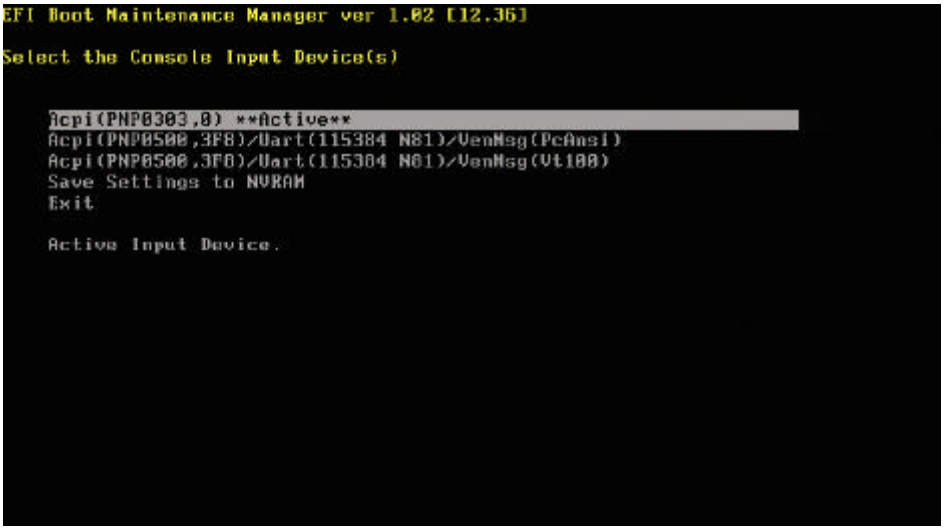


Figure 34. Select Active Console Input Devices

3.15.8 Select the Standard Error Device

Choosing the **Select the Standard Error Device** option on the main menu allows you to select the device where errors are reported. Use your arrow keys to select your preferred device and press **Enter** to activate the option. Save your settings before exiting. Refer to Figure 36.

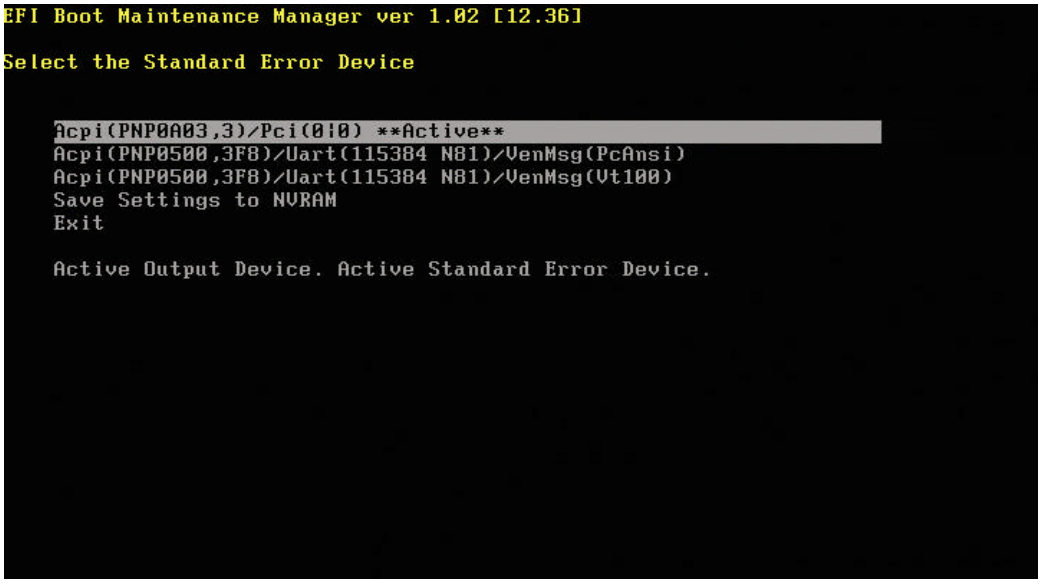


Figure 35. Select Active Standard Error Devices

3.15.9 Booting from a Network

To boot from a network use the following steps.

1. From the EFI Boot Manager Main Menu select **Add a Boot Option**.
2. Select the following option:

   Removable Media [Acpi(PNPA03,0)/Pci(4|0)/Mac(00XXXXXXXXXX)]

NOTE

The MAC address may vary with each board.

3. Enter a file description at the prompt (e.g., LAN or Network) and press **Enter**.
4. Save your settings.
5. Exit both the Add a Boot Option screen and the Boot Manager Main Menu screen.
6. The EFI Boot Manager screen reflects your network boot option. Select this option and press **Enter** to boot from the network.

3.16 BIOS Flash Memory Organization

The Intel* E82802AC Firmware Hub (FWH) includes an 8 Mbit (1024 KB) symmetrical flash memory device. There are four- (4) FWH devices located on the I/O board for a total of 4 MB of flash memory. Internally, each device is grouped into eight- (8) 64-KB blocks that are individually erasable, lockable, and unlockable with additional hardware protection for the top block.

3.17 BIOS Upgrades

The following section describes how to upgrade the System BIOS.

3.17.1 Obtaining the BIOS Upgrade File

You can upgrade to a new version of the BIOS by using the latest image and the current flash utility. The images and utilities are contained in a compressed, self-extractive archive that contains all the files you need to upgrade the BIOS.

NOTE

Please review the instructions distributed with the BIOS files for last minute notes before attempting a BIOS upgrade.

3.17.2 Recording the Current BIOS Settings

NOTE

Do not skip step 2. You will need these settings to configure your computer at the end of the upgrade procedure.

1. Boot the computer and choose the Enter Setup button.
2. Use the form in Appendix B: Configuration Manager Settings to record the current settings in the Configuration Manager.

3.17.3 Upgrading the System BIOS

Use the BIOS Flash Upgrade Utility to upgrade your system BIOS by following the steps outlined below:

1. Copy WFlash64.EFI and binary input file (bios103e.bin) to an LS120 disk.
2. Boot to the EFI shell.
3. Enter the following command line:
   WFlash64 /P
4. When prompted for the required system reset press 'y' key to continue.
5. On the system reset boot to the EFI shell.
6. Enter the following command line and follow screen instructions:
   WFlash64 bios103e.bin
7. Reboot the system after the update is completed.

3.17.4 Recovering the BIOS

WARNING

The inside of the chassis presents multiple risks of personal injury, including risk of electrical shock, burns due to hot components, and lacerations due to sharp edges! Refer to the Warnings section for important safety information.

Before opening the chassis, always turn the power off, unplug the power cord from the wall outlet, disconnect any telephone lines or LAN connections, and unplug all peripheral devices.

It is unlikely that anything will interrupt the BIOS upgrade. However, if an interruption occurs, the BIOS could be damaged. To recover the BIOS, use the following procedure:

1. Copy the firmware image to an LS120 (Super Disk™) with a filename of **bios103e.bin**
2. Remove the chassis cover to gain access to the jumper.
3. Remove the Configuration Mode jumper (J29). Save the jumper.

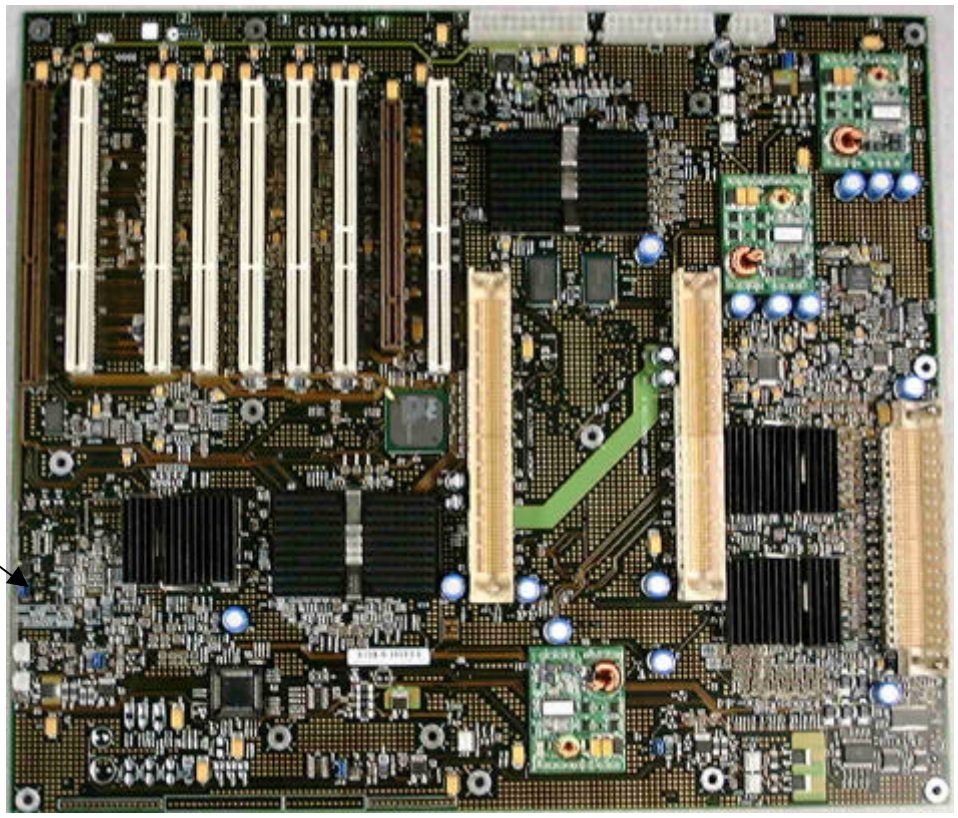


Figure 36. Location of Configuration Mode Jumper

4. Reassemble your system.
5. Insert the disk in the LS120 drive and turn the power on.
6. Listen for the startup beep sequence (3-3-1-0).
7. The LS120 drive light will come on and in about 2-3 minutes will turn off.
8. At this point FLASH will be erased and programmed. Losing power at this point will warrant a restart of the recovery process. This stage may take from 1-2 minutes.
9. When programming is complete (with SUCCESS) you will hear a beep sequence of (3-3-3-0). Otherwise you will hear a beep code specific to the type of failure.
10. Power down the system, restore the recovery jumper to the Normal setting (pins 2-3).

NOTE: In the event of a failure during recovery, the beep sequence indicating the type of failure will repeat until the system is powered down.

11. Reassemble the system.
12. Remove the Super Disk™ and reboot.
13. Choose **Enter Setup**.
14. Change the Configuration Manager settings to match your previous settings.
15. Save the changes and exit Configuration Manager.

NOTE: Additional information can be obtained from using the utility help option from the EFI Shell:

WFlash64 /?

3.17.5 Language Support

Only English is supported on the i2000 workstations.

3.18 Boot Options

The default boot device can be set in the Boot Option Maintenance Menu (refer to Figure 36).

4. Error and Informational Messages

4.1 Beep Codes

The BIOS uses a series of beeps on the internal speaker to alert the user to problems during the boot process. In the following table, numbers indicate beeps; dashes indicate a pause between beeps.

Table 19. BIOS Beep Codes

Beep Code	Description
1-1-5	Memory failure (all four rows have mismatched SPD data). Specification requires all four DIMMs of any row must have the same SPD data.
2-1-1	Cannot recognize file system on media, must be FAT12 or FAT16
2-1-2	File not present on the disk
2-1-3	Recovery device not found
2-1-4	Recovery device initialization failure
3-1-1	Flash device initialization failure
3-1-2	Flash Update Operation Failed
3-1-3	Recovery device failed during a read operation
3-1-4	Flash device erase failure
3-1-5	Flash device programming failure
3-1-6	File Verify Operation (Checksum) Failed
3-1-7	Processor Patch Installation Failed
3-2-1	File Verify Operation (Invalid BIOS) Failed
3-2-2	File Verify Operation (Mismatched Platform BIOS) Failed
3-2-3	Boot Block Incompatible with BIOS
3-2-4	Flash Verify after Write Failed
3-3-1	Recovery started
3-3-3	Recovery completed successfully

4.2 BIOS Messages

4.2.1 Run-time Messages

Searching for Boot record from [device name]...OK
: The BIOS is searching for, and found, a valid boot image. The *device name* can be LS-120, HDD-0, HDD-1, CD-ROM, SCSI, or Network.

Searching for Boot record from [device name]...Not Found
: The BIOS is searching for a valid boot image, but didn't find one.

Drive Not Ready. Insert BOOT diskette in FS0:
: The LS-120 drive is not physically connected, or the drive does not have a diskette in the drive.

Invalid Boot Diskette
: The diskette in the LS-120 drive contains an unformatted diskette.

Non-System disk or disk error. Replace and strike any key when ready.
: The diskette in the LS-120 drive contains a formatted diskette, but not a valid boot diskette.

4.2.2 Configuration Manager Messages

Password is incorrect!
: The password you entered does not match the required password.

Password must be cleared before a new password can be set!
: Use the Clear User Password or Clear Administrator Password button on the Security Tab to clear the password before entering a new password.

Password cannot be zero length!
: Passwords must contain one or more characters.

Password entries do not match!
: The passwords entered in the Password Verification dialog do not match. Enter the passwords again.

Altered settings have not been saved! Selecting "Continue" will discard changes.
: Configuration settings have been changed but not saved. Press Continue to exit without saving the changes, or Clear to return to Configuration Manager.

4.2.3 PXE Client Status and Error Messages

PXE-E05: Download buffer is smaller than requested file.
This error is displayed if the size of the requested file is larger than the allocated download buffer.

PXE-E07: Network device error.
Network device could not be initialized or had some other unexpected failure.

PXE-E09: Could not allocate I/O buffers.
This error is displayed if there is not enough system memory to allocate network I/O buffers.

PXE-E12: Could not detect network connection. Check cable.
Cable is not connected to NIC or something is wrong with NIC or cable.

PXE-E16: Valid PXE offer not received.
Client did not receive a valid PXE offer. This error is displayed for a number of reasons:

- There are no DHCP or proxyDHCP servers that can receive the clients DHCP discover packets.
- There are no DHCP or proxyDHCP servers that can transmit DHCP offer packets to the client.
- The DHCP and/or proxyDHCP offer packets received by the client do not contain enough information to complete a remote boot.

PXE-E21: Remote boot cancelled.
The user pressed <Esc> or <Ctrl+C> or selected a "Local Boot" option from the remote boot menu.
This message is also displayed when a DHCP/proxyDHCP server sends down a menu that auto-selects "Local Boot" and when a bootserver sends down a bootstrap program that returns control to the PXE LoadFile protocol.

PXE-E22: Client received an ICMP error from server.
An ICMP error was sent to the client by a PXE bootserver or M/TFTP server.

PXE-E23: Client received TFTP error from server.
A TFTP server sent a TFTP error packet to the client.

PXE-E98: <extra information about previous error code>
If available, extra error information will be displayed about the previous error message.

PXE-E99: Unexpected network error: XXh
This error is displayed if an EFI status code is returned by the network drivers that was not expected by the PXE LoadFile protocol.

5. Working Inside the System

5.1 Tools and Supplies Needed

A list of suggested tools and supplies is given below. Observe all warnings and cautions when accessing the system.

1. Phillips (cross-head) screwdriver (#2).
2. Small flat-bladed screwdriver.
3. Jumper-removal tool or needle-nosed pliers.
4. Anti-static wrist strap and conductive foam pad (recommended).
5. Torque driver (optional).
6. Pen or pencil.
7. Equipment log (found in Appendix B) to record the model and serial number of the system, all installed options, and any other pertinent information specific to the system.

 **CAUTION**

Only technically qualified persons shall perform integration/servicing of this chassis.

Follow these guidelines to meet and maintain safety and product regulatory compliance when integrating this chassis.

Read and adhere to all of these instructions and the instructions supplied with this assembly. If you do not follow these instructions, the UL listing and other regulatory certifications will be void, and the product may be non-compliant with regional product laws and regulations.

 **CAUTION**

Before removing or installing the i2000 system board or any other system component, observe all the safety guidelines for safety requirements and precautions. Always follow the steps in the procedure in the correct order (i.e., as written). Use Appendix B to record identification information about your computer. When working on any i2000 system board, wear an anti-static wrist wrap and place the board on a conductive foam pad.

WARNINGS

The procedures in this section assume that you are familiar with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment including, but not limited to the following:

Turn off system AC power by unplugging the AC power cord from the wall outlet. Disconnect the computer from any telecommunications systems, networks, and modems attached before performing any of the procedures described in this section. Not doing so may cause personal injury or equipment damage.

CAUTION

Electrostatic discharge (ESD) can damage components. Therefore, protect against ESD by performing the procedures described in this section only at an ESD workstation or by wearing an anti-static wrist wrap and attaching it to a metal part of your computer's chassis.

6. Accessing the System

NOTE

Due to the weight of the workstation system (approximately 84 lbs.), care must be taken when maneuvering the system during assembly and disassembly.

CAUTION

*The DC push-button on/off switch on the system **does not completely** turn off system AC power. To remove AC power from the system, **you must unplug each AC power cord from the wall outlet or power supply.***

Before servicing, first identify the component(s) that must be added or removed from the system. If replacing components, such as hard drives, CD-ROMs, or the LS-120 floppy drive, the front bezel (large plastic section on the front of the system) must be removed for access to the bays, as well as side access within the system. In cases not involving the peripherals or front panel ports, the bezel can remain in place. Use the following steps to access or open the system:

1. Starting with the system in an upright (normal) position, and resting on an anti-static surface, loosen the four- (4) Phillips-head screws from the rear (as shown in Figure 38).

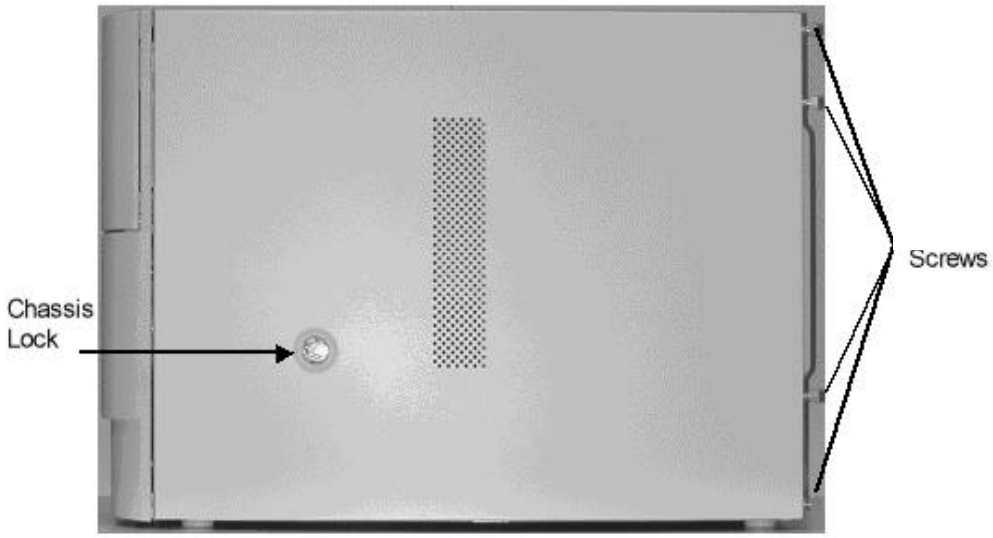


Figure 37. Removing the Four- (4) Chassis Screws

2. Carefully place the system on its side. The side containing the lock in the center should be facing upwards.
3. Pull the system out from the work area and grasp the bottom inside of the bezel. Locate the two- (2) bezel clips (as show in Figure 39) near the bottom of the system and press in to disengage the bezel from the chassis sheet metal. Once disengaged, gently pull the front bezel away from the system. There are four- (4) interlock clips that disengage from the slots within the system chassis.

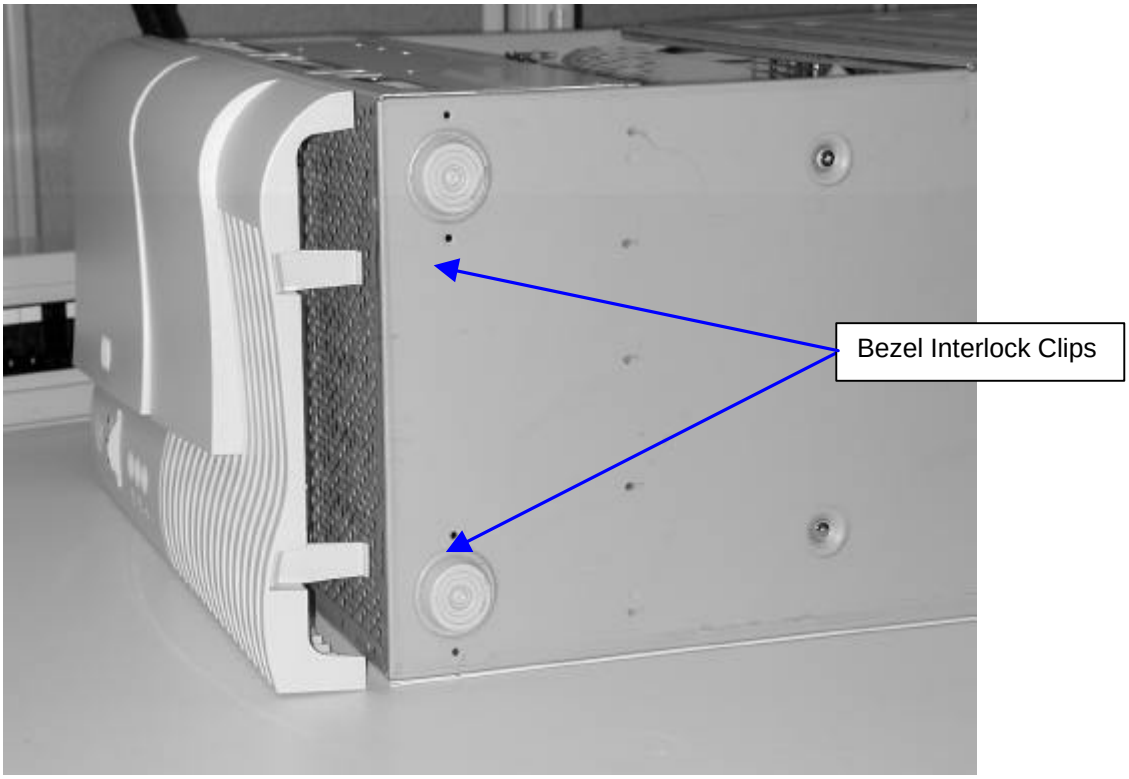


Figure 38. Bezel Interlock Clips

4. Remove the side cover by firmly pressing on the center of the panel and pushing, forcing the panel to slide backwards toward the rear of the unit.

5. Once the side cover has been removed the system should appear (as shown in Figure 40).

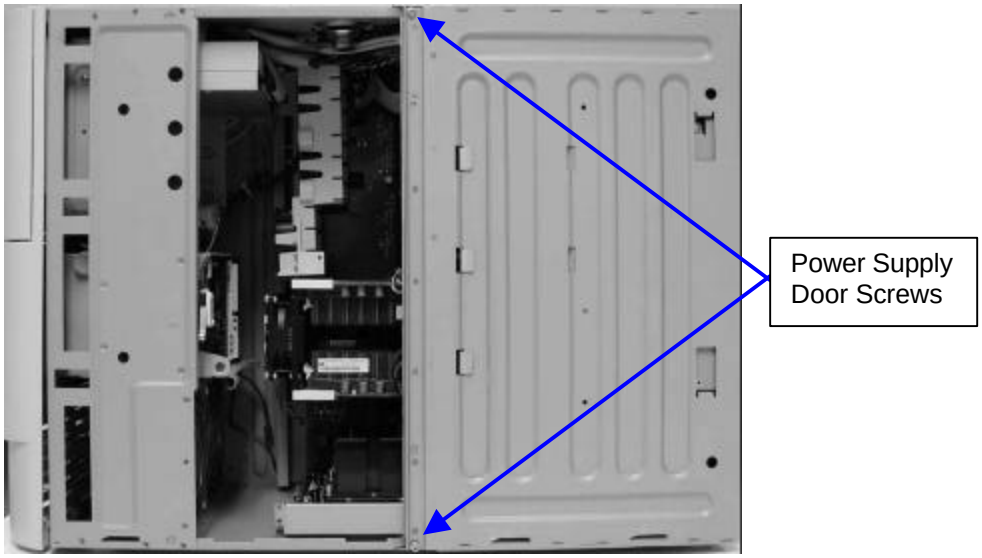


Figure 39. Internal System View after Side Door Removal

6. Remove the two- (2) Phillips-head screws from the power supply door and set aside for later reinstallation.

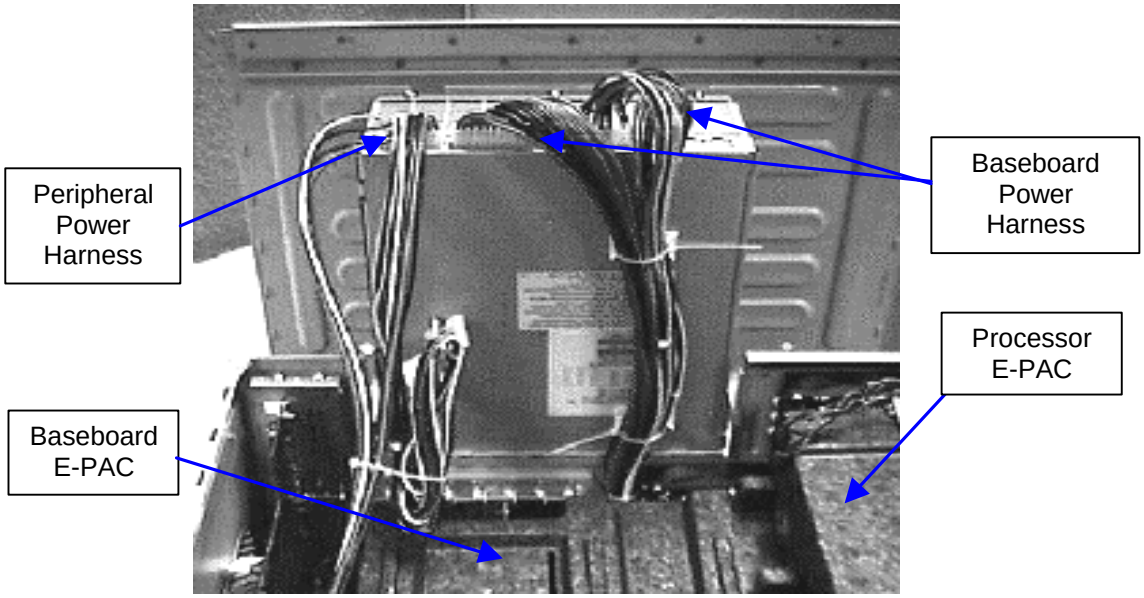


Figure 40. Power Supply Door in Opened Position

7. Open the power supply door (as shown in Figure 41) by pulling upwards and allowing the door to swing outwards until the metal clip (near the top of the system) is engaged with a "click". The power supply door is now locked into an open position for system access.
8. Remove the baseboard E-PAC (black Styrofoam protective material as shown in Figure 41).

7. Removal of the System Components

7.1 Removal of the Power Harness

1. Locate and then remove the peripheral power supply harness from the main power supply (as shown in Figure 42) in order to gain better access to the system boards.
2. Lay the harness aside.

NOTE

This step does not require the power harness to be disconnected from any internal peripherals or to be completely removed from the system chassis.

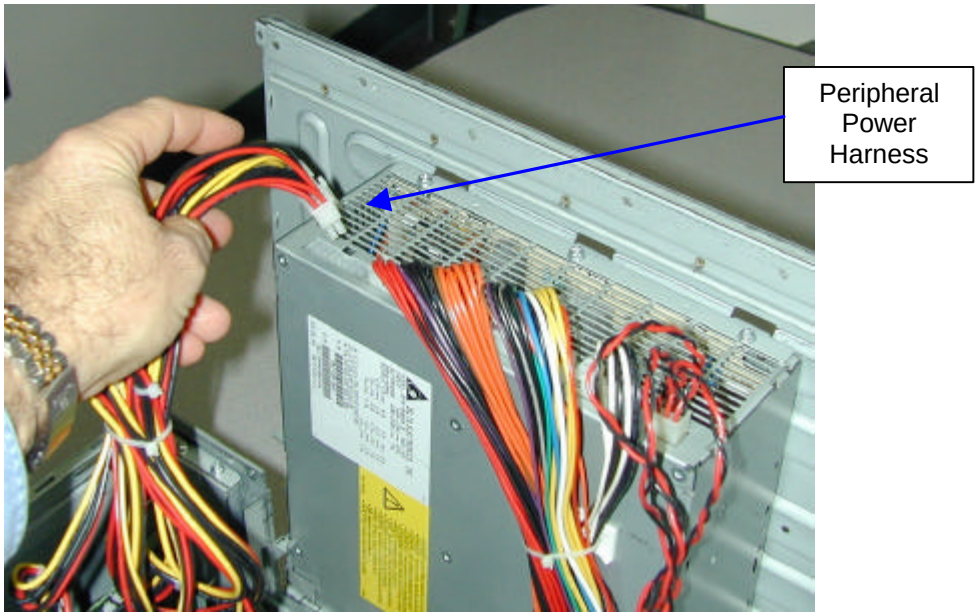


Figure 41. Peripheral Power Harness

7.2 Removing the Processor Board

1. Locate and remove the processor Power Pod's power harness from the main power supply (shown in Figure 43).

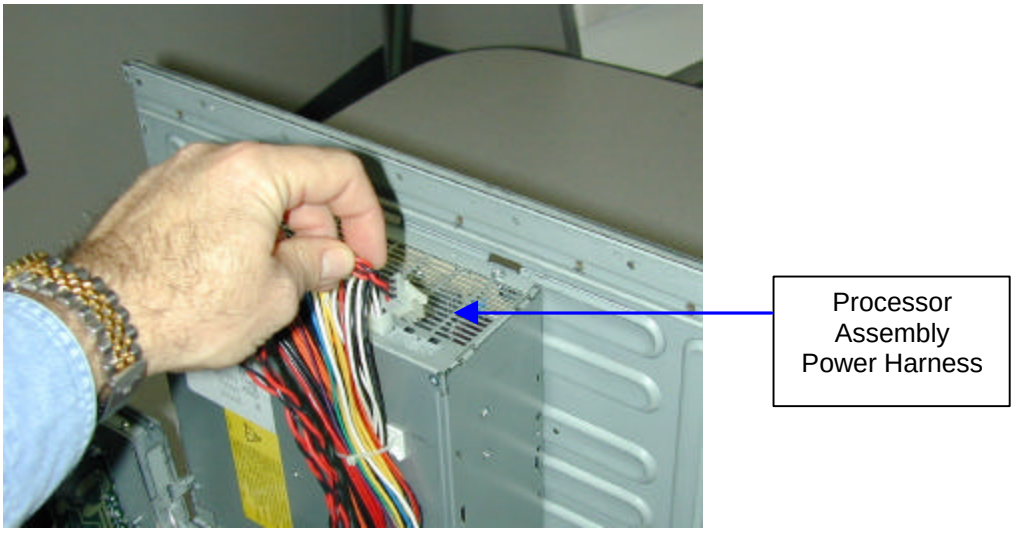


Figure 42. Processor Power Harness

2. Locate and remove the two- (2) screws securing the processor assembly to the system chassis and set aside for later reinstallation. Remove the processor assembly from the system chassis by lifting as shown in Figure 44. Place the entire assembly aside on an anti-static surface.

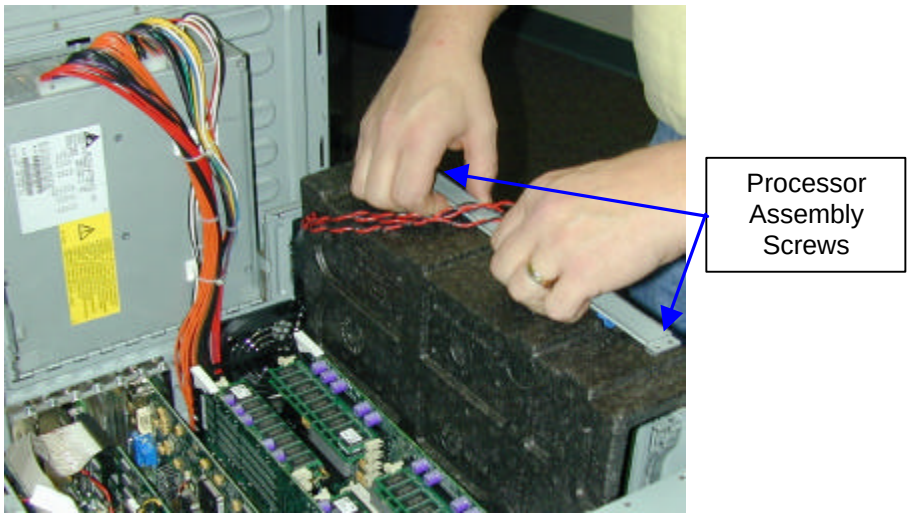


Figure 43. Processor Assembly

7.3 Removing Memory Boards

1. Use the white ejector tabs mounted on the top edges of the memory cards to remove either memory card from the system. Refer to Figure 45.

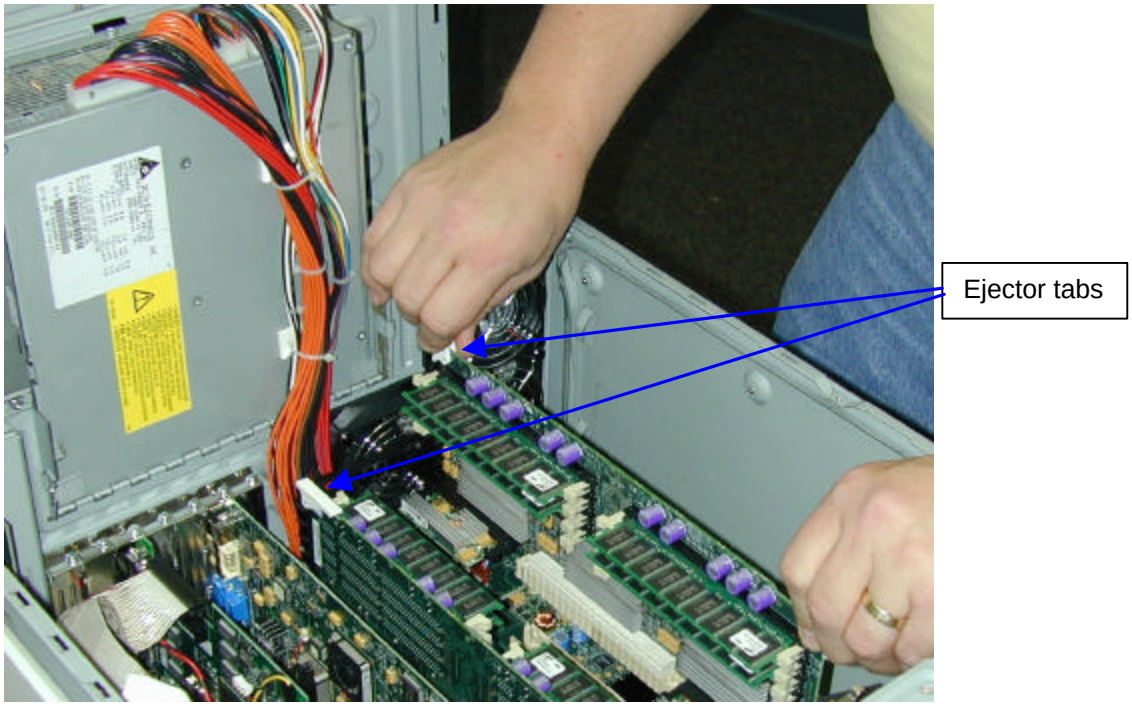


Figure 44. Memory Cards

2. Place these cards aside on an anti-static surface.

7.4 Removing Adapter Cards

1. Before disconnecting cables from any board, note location, function and port connections.
2. Locate the PCI or AGP card(s) to be removed.
3. Remove the rear panel retaining screw and lift the card from the system connector slot using care not to angle the card.
4. Place these cards aside on an anti-static surface.

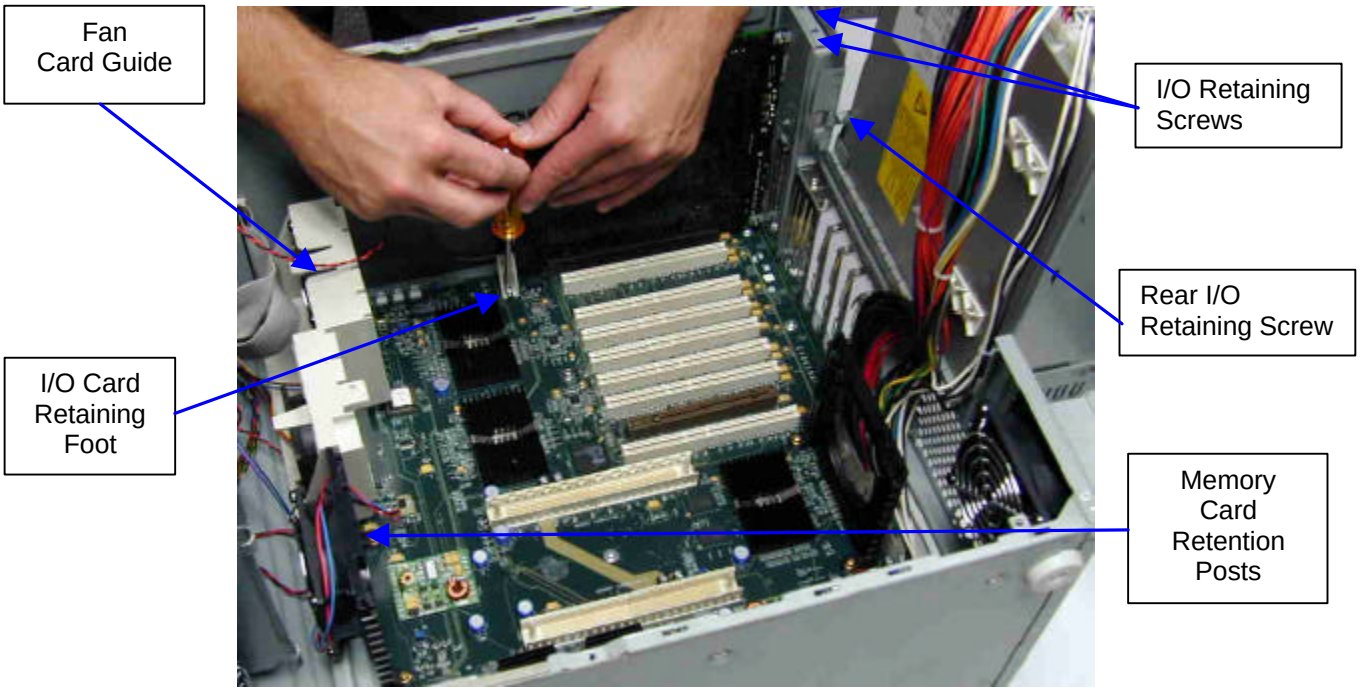


Figure 45. Internal Component Locations

7.5 Removal of the I/O Board

1. Disconnect all I/O card cables and connectors.
2. Remove the two- (2) screws at the top of the I/O bracket located inside the system.
3. Remove the screw holding the I/O bracket to the rear of the system (external). Refer to Figure 46.
4. Remove the screw fastening the plastic retaining foot, at the front of the I/O board, from the baseboard. Refer to Figure 46.
5. Place this card aside on an anti-static surface.

7.6 Removal of the Baseboard

1. Prior to removing the system baseboard, all board and cards described previously must be removed.
2. Remove all fan power connectors from the baseboard.
3. Locate and remove the four- (4) screws (two- [2] each) from the memory card retention posts. Refer to Figures 47 and 48.
4. Locate the fan card guide, refer to Figure 48 and remove the one- (1) screw securing the module to the chassis. Apply pressure along the top of the card guide (from the rear) pushing it inward (toward the baseboard) to disengage the mounting clips located at the bottom.

NOTE

The forward memory, card retention post has a cooling fan mounted to it. Do not remove the fan from the retention post. Refer to Figure 47 and Figure 49.

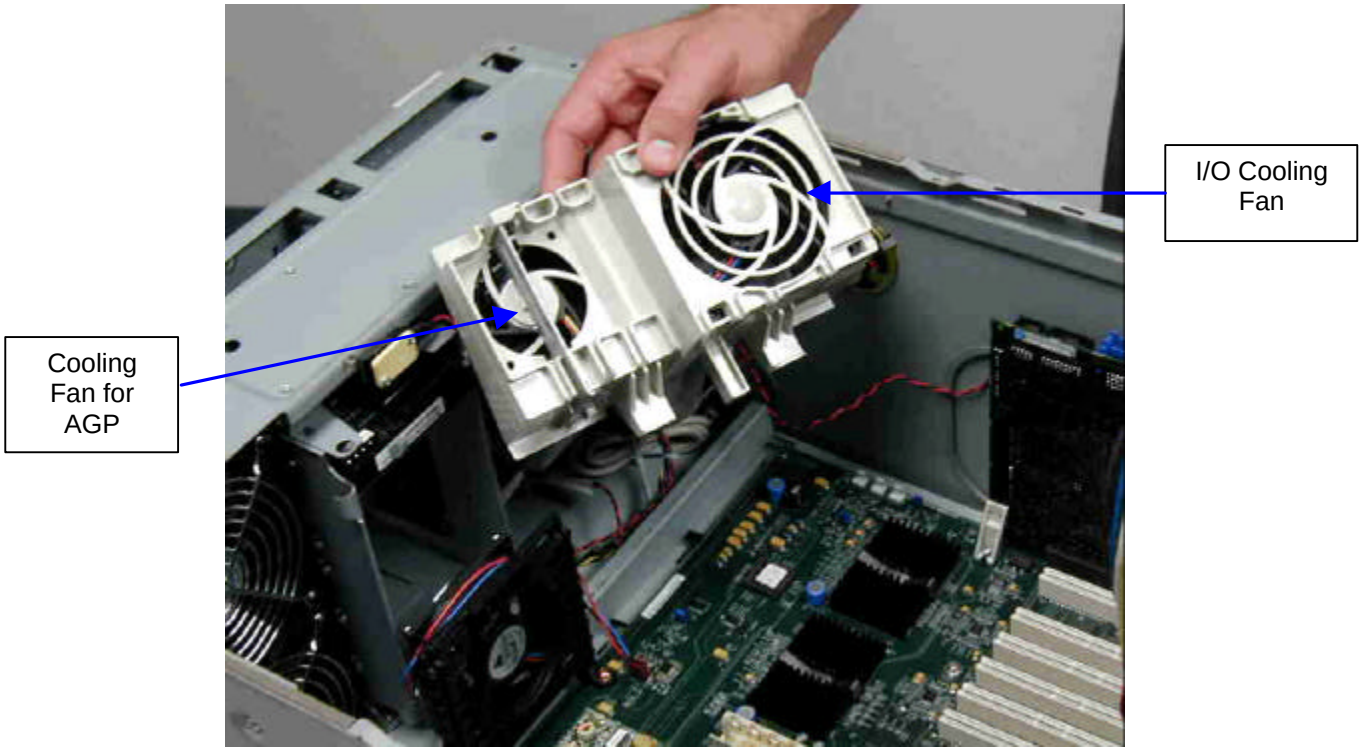


Figure 46. Fan Card Guide

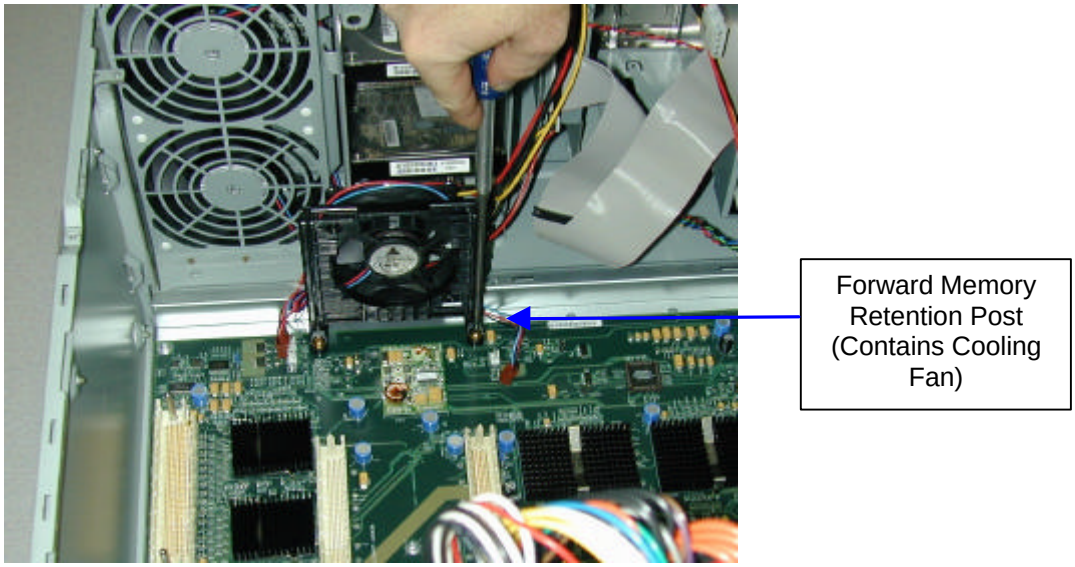


Figure 47. Memory Card Retention Post (Front)

5. Remove the remaining three- (3) main power supply connectors from the rear of the baseboard. Refer to Figure 49.

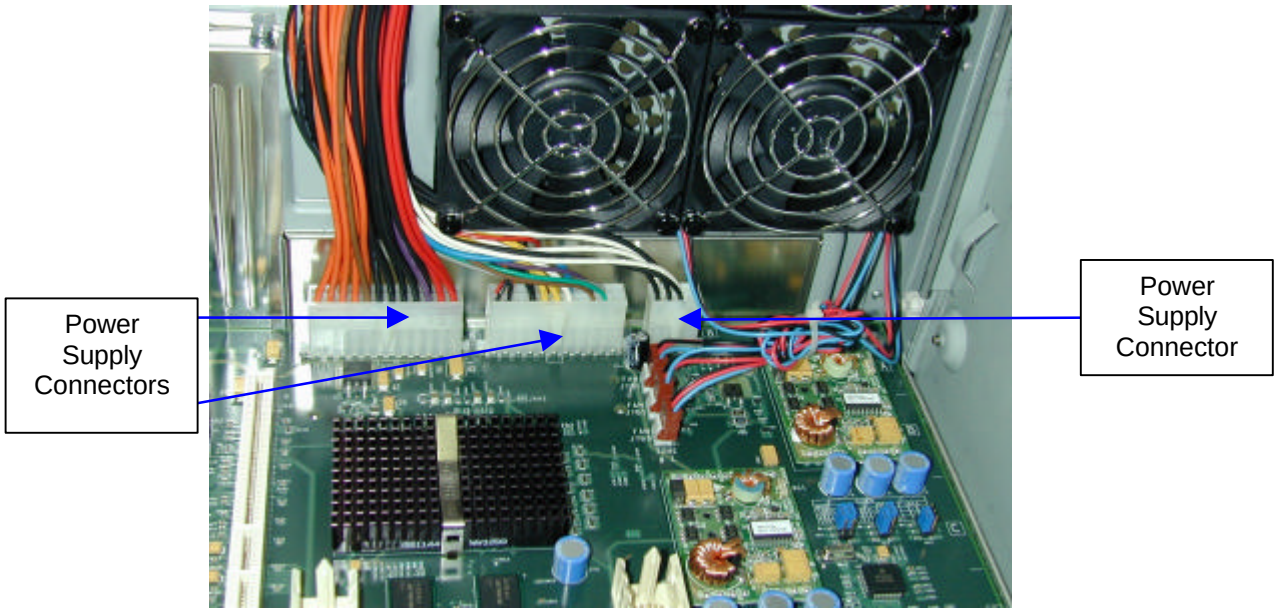


Figure 48. Main Power Connection

6. Remove the eight- (8) remaining screws securing the baseboard to the chassis and then remove the baseboard from the system chassis. Refer to Figure 50 for mounting screw locations.

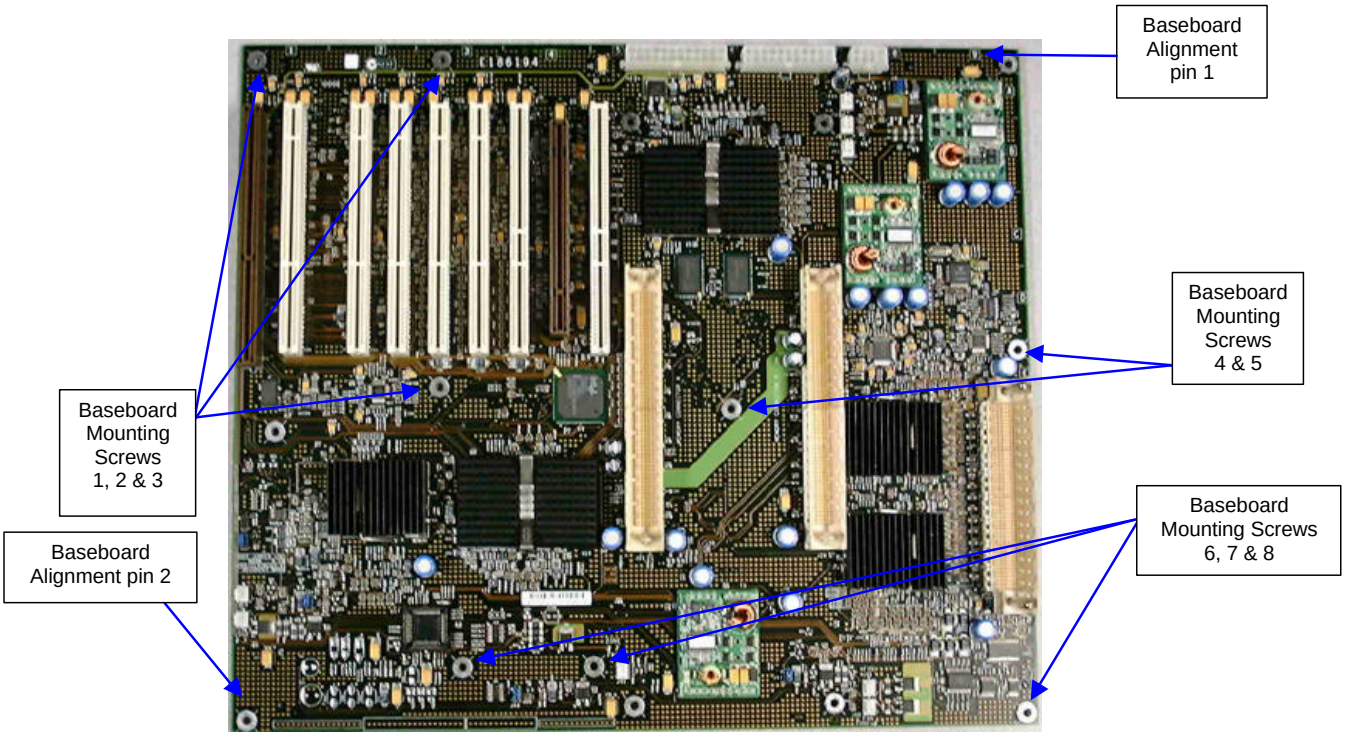


Figure 49. Baseboard Mounting Screw Locations

7.7 Removal of the Front Panel Assembly

1. Remove the Phillips-head screw from the bottom of the front panel assembly. Refer to Figure 51.

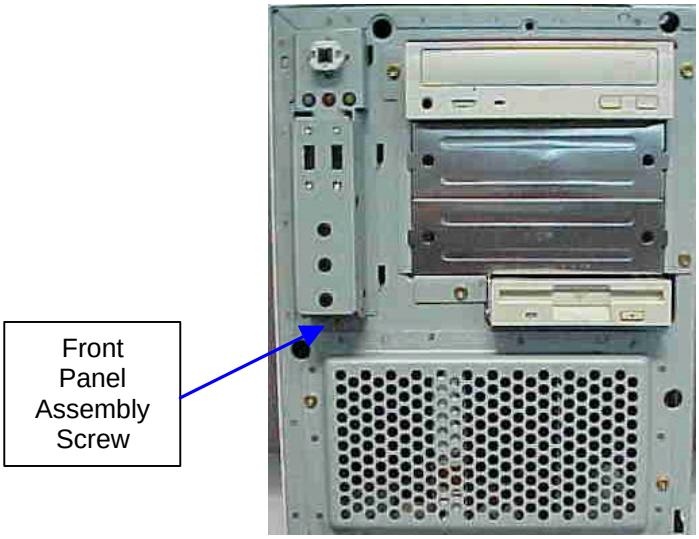


Figure 50. Chassis Front With Bezel Removed

2. Lift the assembly upward and pull forward while feeding cables through from the inside. Note the routing of the cable. Refer to Figure 52.

Figure 51. Front Panel Assembly

3. To reinstall, feed the power switch / audio and USB assembly cables through the chassis where the prior cables were removed.
4. Reattach with the screw that was removed in step 1.
5. Reconnect the cables.

8. Installation of Upgrade Components

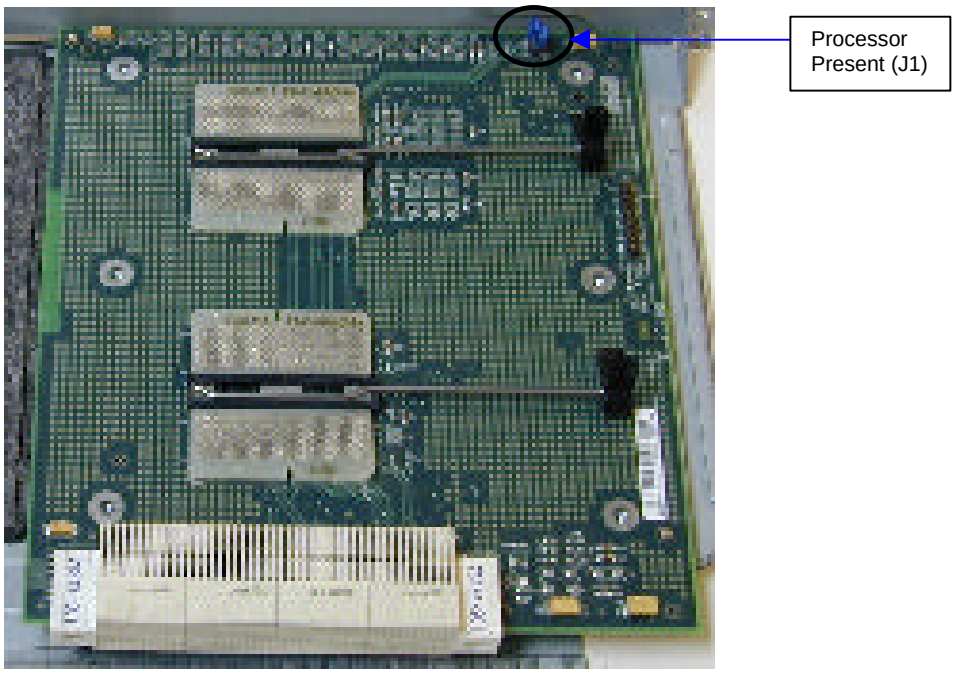
8.1 Verification of the Jumper Settings

The following section describes the jumper settings on the boards in the i2000 system. The Processor Present jumper (J1) on the processor board (refer to Table 20) configures the ITP scan chain for single or dual processor mode. The jumper should be configured to match the number of processors in the system, but is on necessary for functional performance.

8.1.1 Processor Jumpers

Table 20. Processor Present (J1)

Single Processor Scan Chain	
Present (valid)	**1-2***
Not Present (invalid)	2-3
Dual Processor Scan Chain	
Present	4-5
Not Present	**5-6***
DEFAULT*	



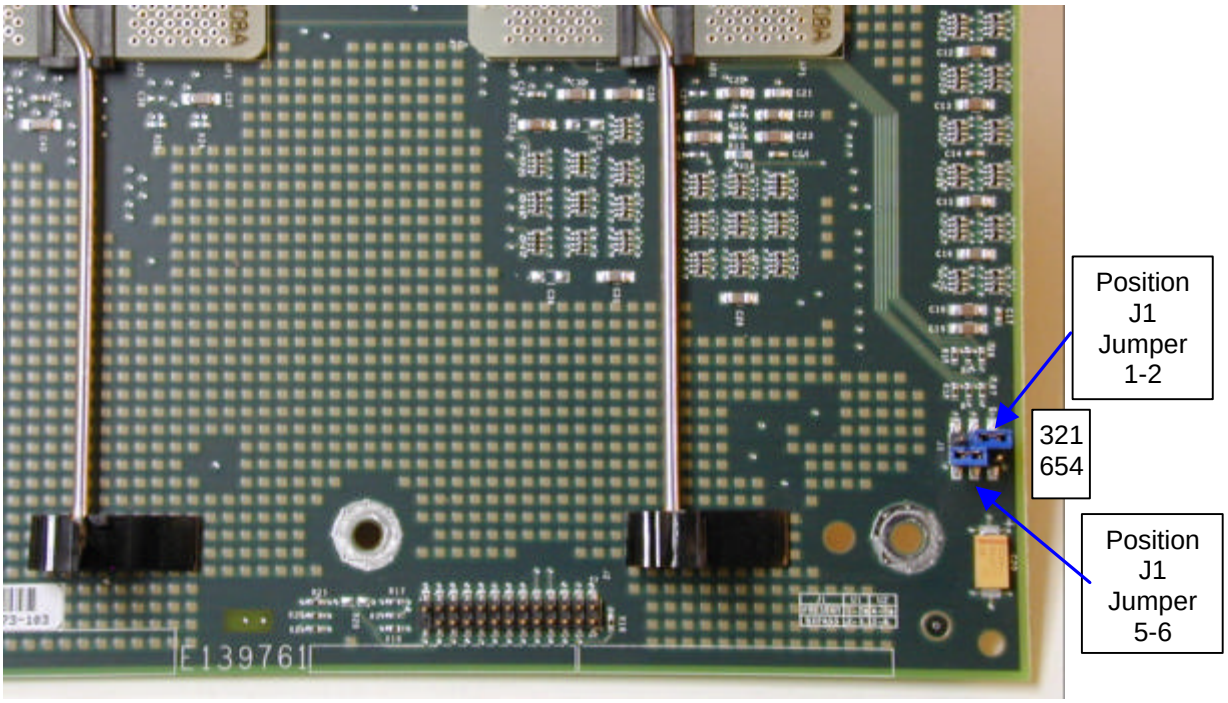


Figure 52. Processor Board Jumper Settings

8.1.2 Baseboard Jumper Settings

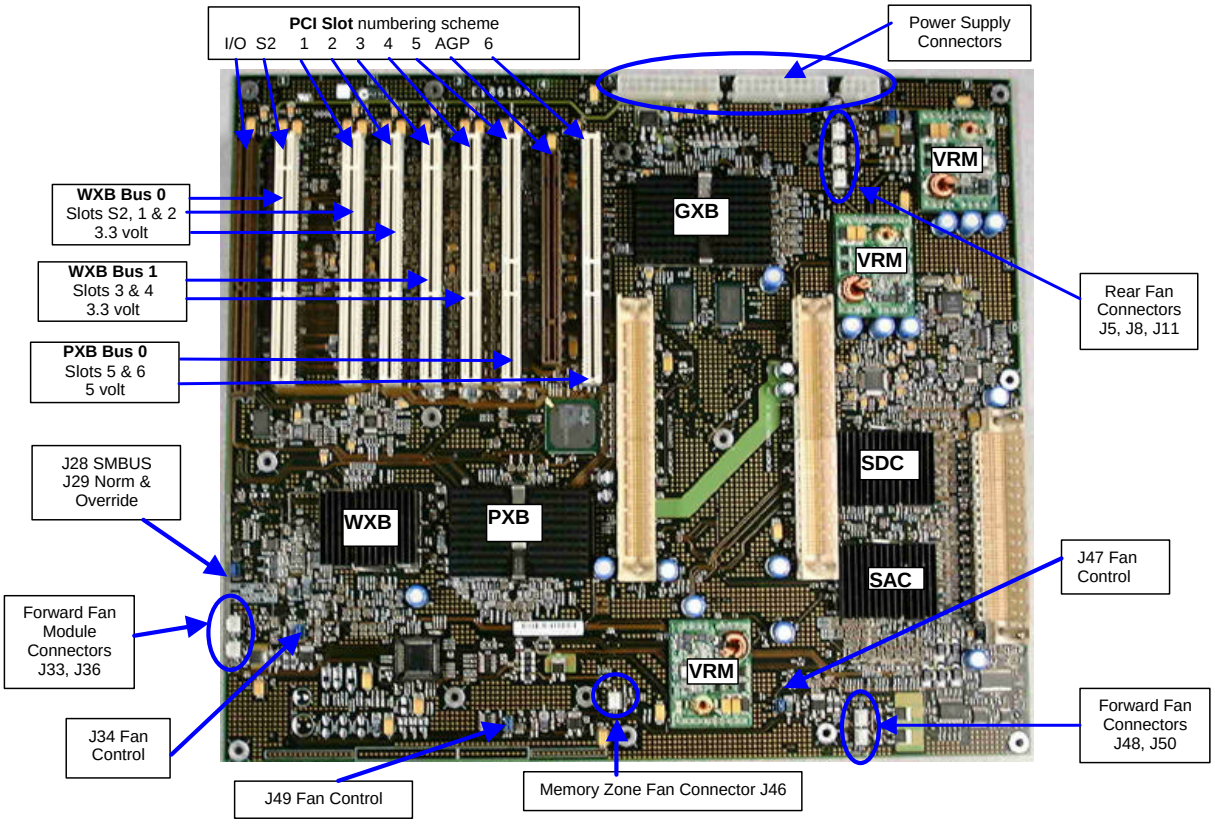


Figure 53. Baseboard Jumpers and Connectors

Table 21. Boot Jumper Header (J29)

NORM	**1-2***
OVRD/CLRCMOS	2-3
RECOVERY	No jumper
***DEFAULT**	

Table 22. FAN Thermal Control (J4, J47, J49, J34)

Variable Speed	**1-2***
Full speed	No jumper
***DEFAULT**	

8.1.3 I/O Board Connectors and Jumpers

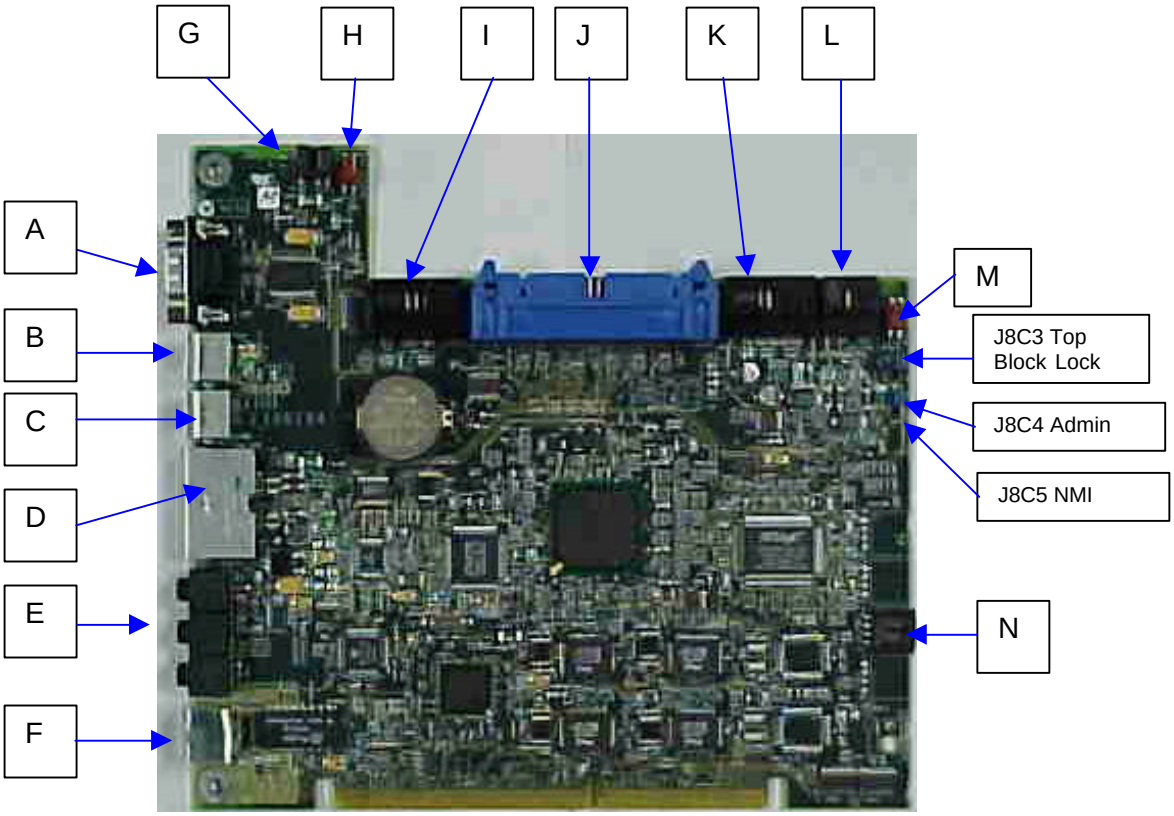


Figure 54. I/O Board Connectors and Jumper Settings

A.	Serial Port Connector
B.	PS/2 Mouse Connector
C.	PS/2 Keyboard Connector
D.	Two- (2) USB Connectors
E.	Audio Connector
F.	LAN (10/100 Mbps)
G.	Speaker Connector
H.	Chassis Intrusion Switch Connector
I.	Front Panel Power switch & LED's
J.	IDE Connector – Top = primary, Bottom = secondary
K.	Front Panel Audio
L.	Front Panel USB
M.	SCSI LED, jumper J8C2
N.	CD-ROM Audio Port

Table 23. I/O Top Block Lock

TOP BLOCK LOCK (J8C3)	
ENABLE	2-3
DISABLE	**1-2***
*** DEFAULT**	

Table 24. I/O ADMIN Jumper

ADMIN (J8C3)	
ENABLE	1-2
DISABLE	**2-3***
*** DEFAULT**	

8.2 Baseboard Installation

Once verification of the jumper settings on the baseboard, the I/O board, and the processor board are complete and correctly set, insert the baseboard into the system chassis and center the board utilizing the baseboard alignment pins 1 and 2 (as shown in Figure 49). Use the following steps:

1. Apply a small amount of downward pressure to "press fit" the baseboard onto the alignment pins. The remaining eight- (8) baseboard mounting holes must now be aligned properly. Insert the eight- (8) baseboard mounting screws and secure the baseboard to the chassis. Refer to the locations in Figure 49.
2. Reconnect the three- (3) main power supply connectors at the rear of the baseboard. Refer to Figure 48.
3. Reconnect the forward and rear processor cooling fan connectors J48, J50 and J5, J8, J11 respectively. Refer to Figure 53.

8.2.1 Fan Installation

1. Attach the fan power connectors to the baseboard power connectors J33 and J36. Refer to Figure 53.
2. Reinstall the fan card guide by first aligning it with the screw hole and then snapping it into place (refer to Figure 53). Secure it to the chassis using the mounting screw.
3. Reinstall the two- (2) memory card retention posts and secure them to the baseboard using four- (4) screws (two- [2] each). Be sure to place the retention post, which contains the fan at the front of the baseboard, adjacent to the fan card guide. Refer to Figure 47.
4. Reconnect the retention post fan power cable to connector J46. Refer to Figure 53.

8.3 I/O Board Installation

8.3.1 Preparing the I/O Board

To replace or upgrade the I/O board, the mounting bracket must be removed from the original I/O board and reinstalled on the upgrade I/O board.

1. To remove the I/O mounting bracket from the I/O board, remove the two- (2) Phillips-head screws securing the board to the bracket.
2. Remove (unsnap) the plastic retaining foot from the I/O PCB.
3. Reverse the procedure by placing the bracket on the upgrade I/O board.
4. Install (snap) on the new PCB.
5. Replace and tighten the two- (2) screws securing the bracket to the board.

8.3.2 Installing the I/O Board

1. Align the I/O bracket to the chassis and the card edge connector into the system baseboard, ensuring that the I/O card is completely seated into the I/O slot.
2. Reinstall the I/O bracket retaining screw that holds the I/O bracket to the rear of the system. Refer to Figure 45.
3. Reinstall the two- (2) screws at the top of the I/O bracket, mounting it to the inside of the system.
4. Reconnect all the connectors and cables. Refer to Figure 54 for connection locations on the I/O board.

CAUTION

When you install the I/O Board, avoid damaging the EMI gaskets mounted on the rear. Replace any damaged strips, or your system may not meet EMI requirements.

8.4 Installing the SCSI Controller

Use the following steps to install the SCSI controller to the system.

NOTE

The WXB PCI buses (S2 and slots 1, 2, 3, and 4) support 3.3 V cards, while the PXB PCI bus (slots 5 and 6) support 5 V cards. Both WXB and PXB PCI buses support universal cards. Please make certain that the PCI slot used is compatible with the PCI card inserted in that slot.

NOTE

For continued EMC compliance of the system, use only those peripheral devices having an external output connector (i.e., audio, video) which are marked as FCC tested for home or office use (FCC Class B), and marked as Canada ICES-003 Class B compliant. For European installations, these devices are required to be CE marked with declaration of conformity to the EMC directives (89/336/EEC).

1. Insert the Qlogic* SCSI controller into a PCI slot (slot 3 recommended, refer to Figure 49) making sure that the controller is completely seated. Install the retaining screw.
2. Attach the 68-pin SCSI cable connector (labeled P1) to the top connector of the Qlogic* controller (labeled J3). Refer to Figure 54 and
3. Figure 55.

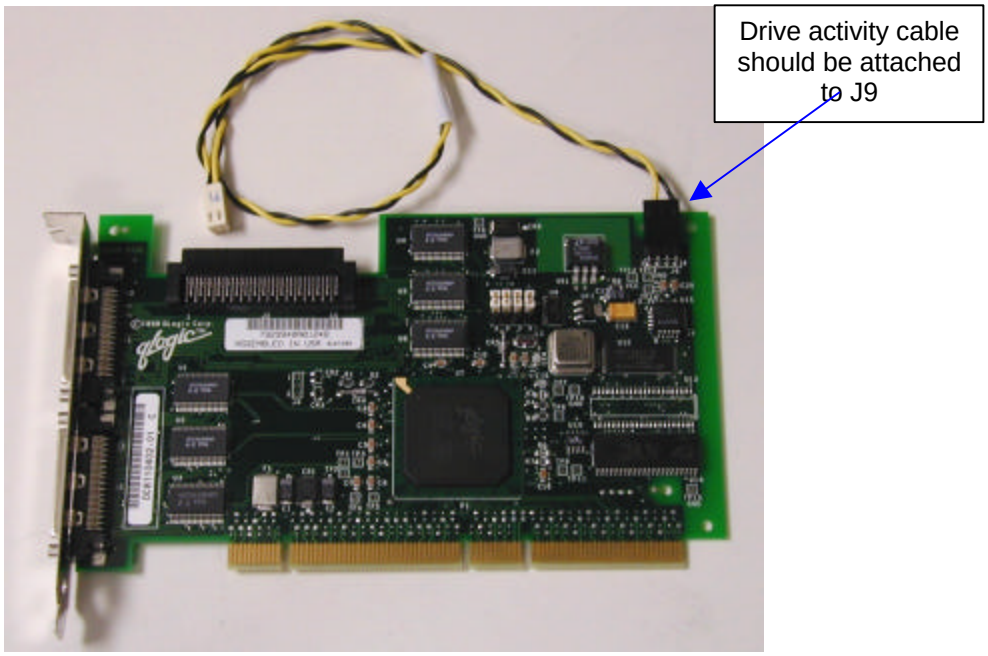


Figure 55. Qlogic 1280* SCSI Adapter

8.5 Installing the Adapter Cards

Locate and reinstall all remaining PCI or AGP based adapter cards previously removed from the system.

NOTE

The WXB PCI buses (S2 and slots 1, 2, 3, and 4) support 3.3 V cards, while the PXB PCI bus (slots 5 and 6) support 5 V cards. Both WXB and PXB PCI buses support universal cards. Please make certain that the PCI slot used is compatible with the PCI card inserted in that slot.

8.6 Installing the Upgrade RAM Accessories

8.6.1 Preparing the Memory Boards

Check that the DIMM sites are correctly populated and that the DC-DC converters are installed on the memory boards. Refer to Figure 56.

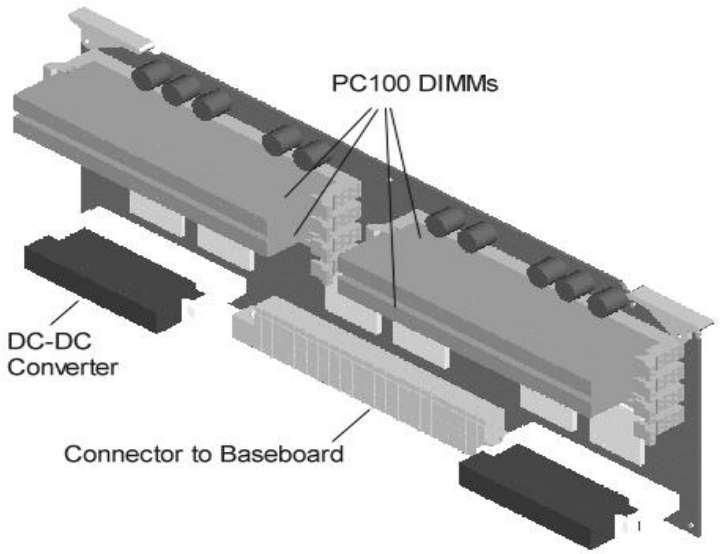


Figure 56. DIMMS and DC-DC Converters

NOTE

DIMMs must be installed in groups of four- (4) with all DIMMs within a stack being of the same size, type, and manufacturer.

For optimum performance, the stacks must also be populated in the proper order with the same size of DIMMs. The memory subsystem can operate in two- (2) different modes, interleaved or single-port.

8.6.2 Installation of the Memory Boards

1. Install the memory boards in the system. The boards are keyed for correct installation. The components of both boards face each other when correctly installed. Refer to Figure 44 and Figure 53.
2. Ensure that the boards are seated firmly into their connectors.

Installing i2000 RAM Accessory DIMMs

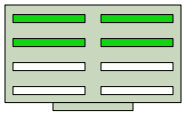
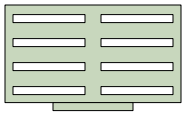
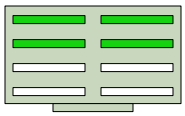
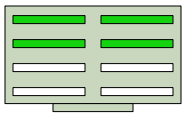
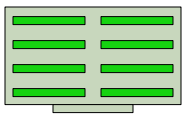
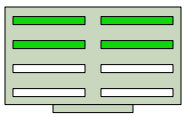
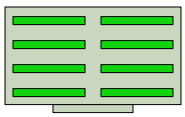
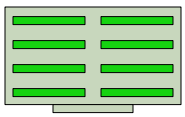
Number of DIMMs Installed	Memory Expansion Card A	Memory Expansion Card B
(4) DIMMs		
(8) DIMMs		
(12) DIMMs		
(16) DIMMs		

Figure 58. Installing i2000 RAM Accessory DIMMs

8.7 Installing Accessory Hard Disk Drives

To install additional hard drives in the hp workstation i2000:

1. Carefully place the system on its side. The side containing the lock in the center should be facing upwards.
2. Pull the system out from the work area and grasp the bottom inside of the bezel. Locate the two- (2) bezel clips (as show in Figure 39) near the bottom of the system and press in to disengage the bezel from the chassis sheet metal. Once disengaged, gently pull the front bezel away from the system. There are four- (4) interlock clips that disengage from the slots within the system chassis. Press the two tabs on the bottom of the bezel,
3. With the system in an upright (normal) position, and resting on an antistatic surface, loosen the four- (4) Phillips-head screws from the rear (as shown in Figure 38).
4. Remove the side cover by firmly pressing on the center of th panel and pushing, forcing the panel to slide backwards toward the rear of the unit.
5. Remove the two- (2) Phillips-head screws from the power supply door and set aside for later reinstallation. (as shown in Figure 40).
6. Remove the baseboard E-PAC (black Styrofoam protective material as shown in Figure 41).
7. Disconnect power and data cables from SCSI hard drive.
8. Disconnect SCSI cable from SCSI card.
9. Remove two- (2) Phillips-head screws from the hard drive cage.
10. Set unique SCSI ID's for each hard drive.

To set the SCSI ID:
Assign an unused SCSI ID. See below:

SCSI ID #

SCSI ID #	Used By:
0	First SCSI hard drive
1	Optional second SCSI hard drive
2 - 6	Unused
7	Reserved for SCSI controller
8 - 15	Unused

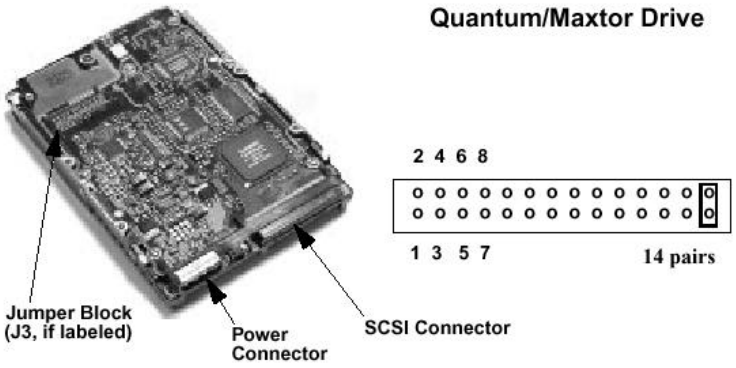
- If you are *adding* a SCSI hard drive to your system, consider setting the new hard drive SCSI ID to 1. However, if you have other SCSI devices connected externally, or have changed the SCSI ID of the currently installed hard drive, remember this SCSI ID must be unique.
- If you are *replacing* a SCSI hard drive, you can use the SCSI ID number of the current hard drive for the replacement hard drive.
- SCSI IDs are set by jumpering pins on the disk drive.

Which Pins To Jumper.
First, determine which drive is installed in your system. Your drive will be type A, B or C. Then use the table for the proper pins to jumper on your drive.

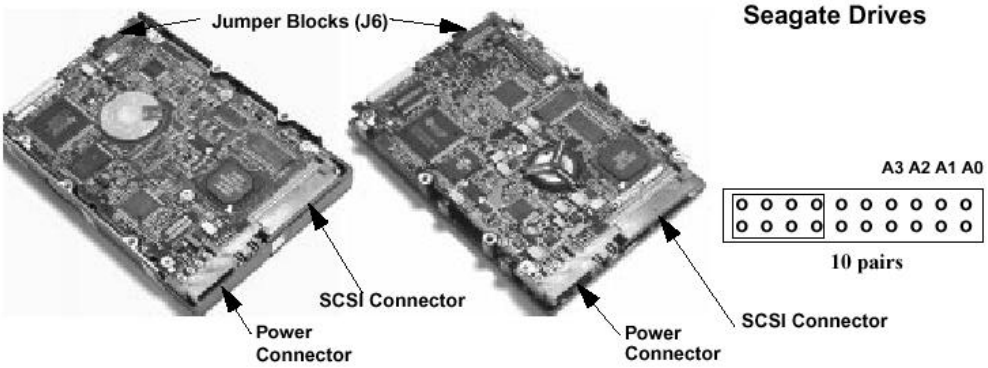
Using the jumpers provided, set the SCSI ID on the jumper block located on the bottom of the hard disk drive. Do *not* use the 12-pin jumper block next to the power connector.

NOTE
Jumpers must be installed vertically. If jumpers are installed horizontally across adjacent pins, there is no effect. However, this is a good way to store unused jumpers.

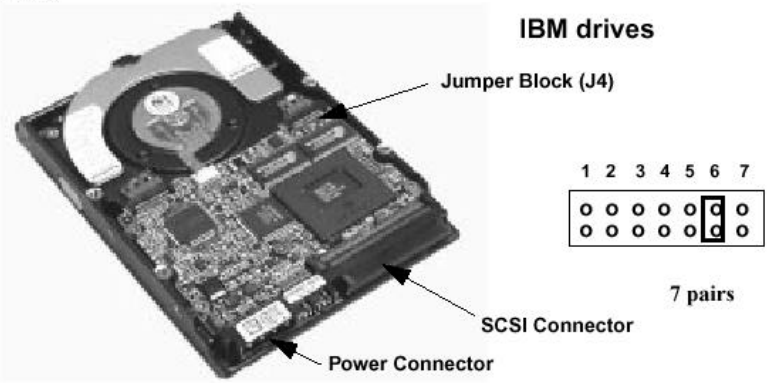
Drive Style A:



Drive Style B:



Drive Style C:



Drive Style/SCSI ID	Pins to Jumper (■)			
(Quantum/Maxtor) **A**	1/2	3/4	5/6	7/8
(Seagate) **B**	A3	A2	A1	A0
(IBM) **C**	1	2	3	4
SCSI ID = 0	❒ ❒	❒ ❒	❒ ❒	❒ ❒
SCSI ID = 1	❒ ❒	❒ ❒	❒ ❒	■ ■
SCSI ID = 2	❒ ❒	❒ ❒	■ ■	❒ ❒
SCSI ID = 3	❒ ❒	❒ ❒	■ ■	■ ■
SCSI ID = 4	❒ ❒	■ ■	❒ ❒	❒ ❒
SCSI ID = 5	❒ ❒	■ ■	❒ ❒	■ ■
SCSI ID = 6	❒ ❒	■ ■	■ ■	❒ ❒
SCSI ID = 7	❒ ❒	■ ■	■ ■	■ ■
SCSI ID = 8	■ ■	❒ ❒	❒ ❒	❒ ❒
SCSI ID = 9	■ ■	❒ ❒	❒ ❒	■ ■
SCSI ID = 10	■ ■	❒ ❒	■ ■	❒ ❒
SCSI ID = 11	■ ■	❒ ❒	■ ■	■ ■
SCSI ID = 12	■ ■	■ ■	❒ ❒	❒ ❒
SCSI ID = 13	■ ■	■ ■	❒ ❒	■ ■
SCSI ID = 14	■ ■	■ ■	■ ■	❒ ❒
SCSI ID = 15	■ ■	■ ■	■ ■	■ ■

11. Install hard drives in drive cage. You must locate the two- (2) #1 Phillips screws to properly secure drives to the drive cage.
12. Connect the data cable to back of hard drives.

13. Connect power to all hard drives.
14. Secure the card cage to the chassis with two- (2) Phillips-head screws from the hard drive cage.
15. To complete the hard drive installation procedure follow the steps in section 9. Reassembling the System.

9. Reassembling the System

After installing components, the system must be properly reassembled. The operator must again adhere to proper grounding techniques. Refer back to the "*Safety Steps*" in the *Warnings* section found at the beginning of this guide.

1. Ensure that the processor assembly is properly seated into the baseboard assembly and that the E-PAC is reinstalled over the processors. Refer to Figure 57.

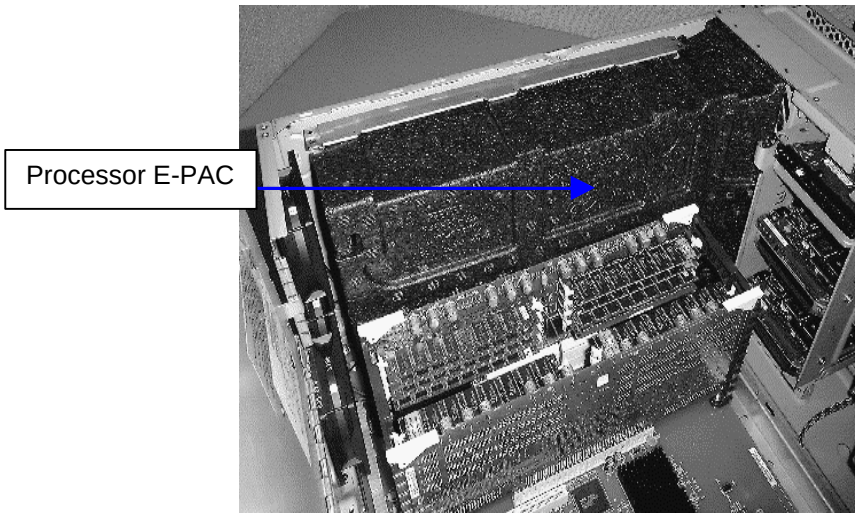


Figure 57. Correct Reinstallation of E-PAC

2. Verify that the memory cards are properly seated into the baseboard assembly.
3. Locate and reconnect the peripheral power supply harness from the main power supply (as show in Figure 41).
4. Check that all cables are properly plugged in and not blocking fans or interfering with fan movement.
5. Ensure that all drives are fastened to the drive bays and the drive bays to the chassis.
6. Place the baseboard E-PAC over the memory cards (as shown in Figure 68). The center tab should align with the E-PAC of the processor assembly.
7. Position your fingers over the E-PAC (as shown in Figure 59) and push down. The E-PAC should "pop" into place.
8. Once the E-PAC is in place close the power supply door by disengaging the power supply door "locking tab", located near the I/O board. The supply closes in a downward motion into the system. While closing, keep the cables of the power supply in the channel of the E-PAC as much as possible. Ensure that no power cables are being cut or pinched and *DO NOT FORCE* the door closed.
9. If the power supply door will not close easily, check the routing of the power supply cables in relation to the E-PAC channel.
10. Reattach the two- (2) power supply door screws.

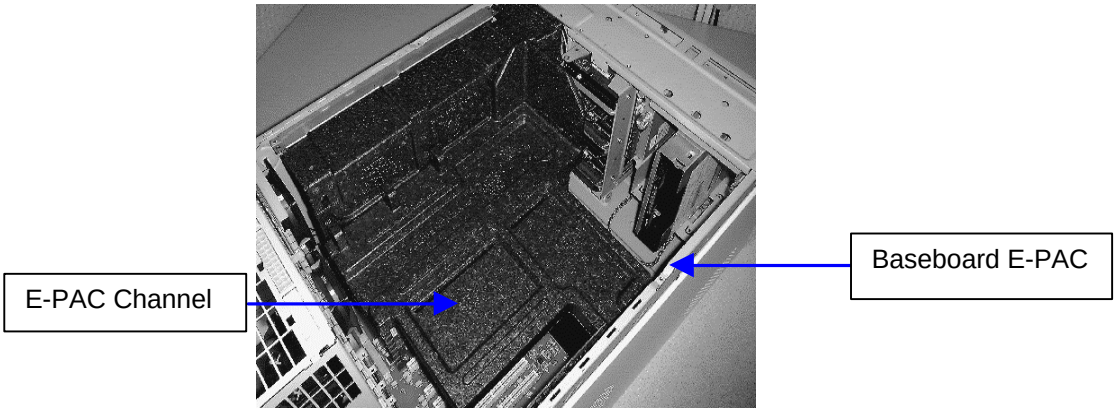


Figure 58. E-PAC Inserted over Memory Cards

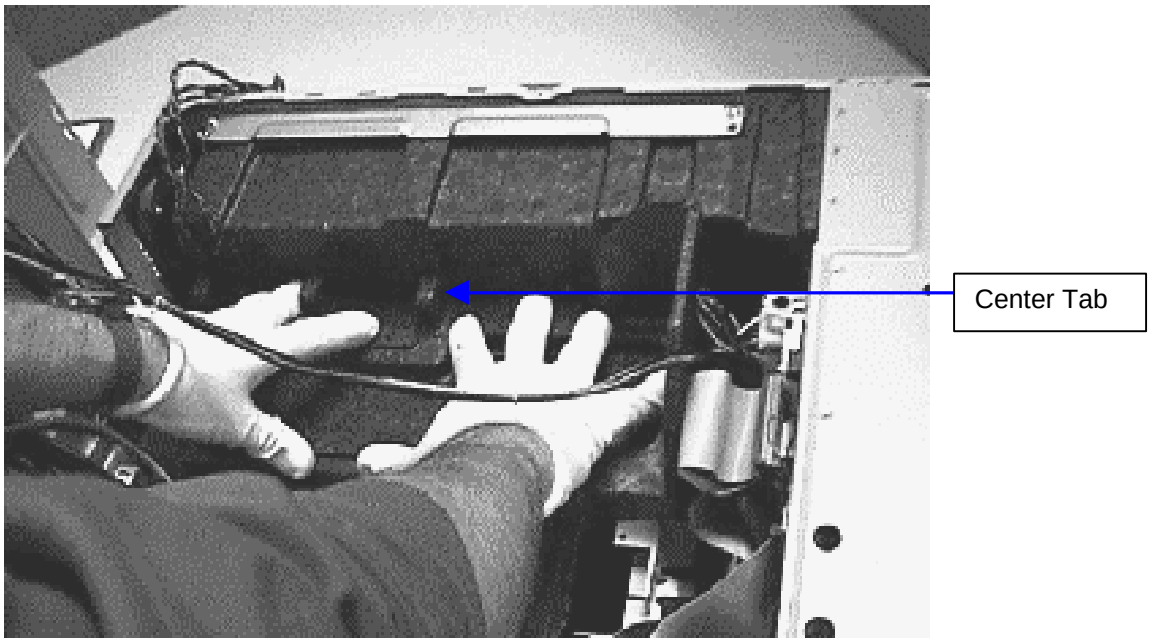


Figure 59. E-PAC Installation

11. Reattach the side panel by placing the tabs of the sheet metal into the slots of the system at the top. Then slide the side panel towards the front of the system. When properly in place, the lock can be depressed into the system and secured.
12. Reattach the bezel by aligning the top of the bezel to the top of the system. Then by aligning the interlock clips with their respective slots push the clips into the slots starting with the top two down to the bottom clips.
13. Reattach all external devices such as the keyboard, mouse, video monitor and AC power into their respective ports.
14. The system is now ready to power on.

10. Solving Problems

This chapter helps you identify and solve problems that may occur while you are using the hp workstation i2000.

10.1 Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	<Ctrl+Alt+Del>
Cold boot reset, which clears system memory, restarts POST, and initializes all peripherals. Hold the power button for 4 seconds to Power off.	Power off/on
Hard reset, which also clears system memory, restarts POST, and initializes all peripherals.	Press the reset switch located on a card slot filler panel at the rear of the system

10.2 Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause.

10.2.1 Startup Checklist

- ☐ Are the processors fully seated in their connectors on the processor board?
- ☐ Is at least one- (1) memory board installed and fully seated?
- ☐ Are all add-in PCI boards fully seated in their slots on the baseboard?
- ☐ Are all switch and jumper settings on boards and drives correct?
- ☐ Are all switch and jumper settings on add-in cards and peripheral devices correct? To check these settings refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts - for example, two- (2) add-in cards sharing the same interrupt.
- ☐ Are all DIMMs installed correctly?
- ☐ Are all memory board voltage modules installed correctly?
- ☐ Are all peripheral devices installed correctly?
- ☐ Is the hard disk drive properly formatted or configured?
- ☐ Are all device drivers properly installed?
- ☐ Did you press the system power on/off switch on the front panel to turn the system on (power-on light should be lit)?
- ☐ Are the system power cords properly connected to the system and plugged into an outlet for 110-240 VAC?
- ☐ Is AC power available at the wall outlet?

10.2.2 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 LS-120 Drive Activity Light Does Not Activate or Drive Is Not Detected" on page 115.
- ☐ Does the hard disk drive activity light on the control panel turn on briefly? If not, refer to "Hard Disk Drive Activity Light Does Not " on page 116.

10.2.3 PCI Installation Tips

Some common PCI installation tips:

- Certain devices may require resources that are not shared. It may be necessary to alter settings where applicable to minimize resource contention or conflicts.
- Check PCI resource interdependencies among slots and onboard devices, relocating adapters to other slots (i.e., PXB bus 0 to WXB bus 1).

NOTE

***PCI peripherals will not operate if used with 32-bit drivers**. At this time, there are a limited number of Itanium Ô -based drivers available for PCI peripherals. Do not install any additional PCI peripherals that do not have current Itanium Ô -based drivers.*

NOTE

The WXB PCI buses (S2 and slots 1, 2, 3, and 4) support 3.3 V cards, while the PXB PCI bus (slots 5 and 6) support 5 V cards. Both WXB and PXB PCI buses support universal cards. Please make certain that the PCI slot used is compatible with the PCI card inserted in that slot.

NOTE

For continued EMC compliance of the system, use only those peripheral devices having an external output connector (i.e., audio, video), which are marked as FCC tested for home or office use (FCC Class B), and marked as Canada ICES-003 Class B compliant. For European installations, these devices are required to be CE marked with declaration of conformity to the EMC directives (89/336/EEC).

10.3 Monitoring Post

A POST card can display status codes that provide information about the system. A POST card must be installed in a connector on PCI Bus 0 (PCI connectors 5 and 6).

NOTE

A POST card is required to view POST codes.

10.4 POST Codes

During the POST, the BIOS utility generates diagnostic progress codes (POST codes) to I/O ports 80h and 81h. If the POST fails, execution stops and the last POST code generated is left at ports 80h and 81h. These codes are useful for determining the point where an error occurred.

Displaying the POST codes requires an add-in card (often called a POST card). The POST card can decode the port and display the contents on a medium such as a seven-segment display.

The firmware contains POST codes for both SAL and BIOS firmware. The SAL POST codes are provided for convenience in determining boot issues prior to launching quick boot (BIOS).

Refer to Table 25 and Table 26 that follow for descriptions of the POST codes generated by the BIOS.

NOTE

1. *Port 0x81 of the POST code is currently only used for debug purposes.*
2. *POST codes 30, 31 are used twice. POST codes C2 to C6 are temporary POST codes that may be removed in the future.*

Table 25. SAL POST Codes

Port 80	Port 81	Description
31	n/a	RECOVERY: SAL A – Begin Recovery
3E	n/a	RECOVERY: SAL A – Failed minimal memory test (cannot launch recovery)
F0	n/a	Entering early system initialization (EarlySystemInit)
F1	n/a	Memory is initialized, preparing to shadow SAL B components
F2	n/a	IA32 BIOS has been shadowed, preparing to perform full processor initialization
F3	n/a	Shadowing SAL B component
F4	n/a	SAL is shadowed, verifying PAL version
F5	n/a	Shadowing PAL B component
F6	n/a	PAL B is shadowed
F7	n/a	SAL and PAL are shadowed to RAM and ready for execution
F8	n/a	Entering shadowed SAL code. Initializing data areas
F9	n/a	Setting up execution environment: entry points, cache info, version #'s, processor self test and virtual to physical mapping.
FA	n/a	Setting up IA-32 emulation environment
FB	n/a	Initialize auxiliary processors and execute IA-32 BIOS

Table 26. BIOS POST Codes

Port 80	Port 81	Description
04	n/a	Memory failure (all four rows have mismatched SPD data). Specification requires all four DIMMs of any row must have the same SPD data. This also produces 1-1-5 beeps.
0B	00	PIM: Start of PIM Launch (loading Plug-in)
0B	01	PIM: Module List Completion
0B	02	PIM: Initializing services completed
0B	03	PIM: Initializing of core services completed
0B	04	PIM: Begin loading of the Plug-in, record status…
0B	05	PIM: If this post code persists, it indicates that the module did not load…
0B	06	PIM: Module loaded successfully, prepare import and export tables…
0B	10	PIM: Module ready for fix-ups…
0B	20	PIM: Fix-ups complete, module is ready for execution
21	10	RECOVERY: Cannot recognize file system on media, must be FAT12 or FAT16
21	20	RECOVERY: File not present on the disk
21	30	RECOVERY: Recovery device not found
21	40	RECOVERY: Recovery device initialization failure
30	00	RECOVERY: Beginning of EMRECOVERY.EXE execution.
30	00	IBV: Enter Phase 0 of the Interposer for Manufacturing Mode
30	01	IBV: Enter Phase 0 of the Interposer for Non-mfg Mode
30	11	IBV Phase 1: Fix-up the Fixed Disk Parameter Table
30	12	IBV Phase 1: Fix-up SCSI Device Info
30	23	IBV Phase 1: Fix-up INT 13 Power On Self Test
30	24	IBV Phase 1: Fix-up Floppy Parameter Table
30	21	IBV Phase 2: Fix-up E820 Interface
30	22	IBV Phase 2: Fix-up various AMI data structures (boot sequence, version ,etc)
30	23	IBV Phase 2: Fix-up INT13 Power On Self Test
31	00	RECOVERY: Setting up default chipset initialization (IDE)
31	10	RECOVERY: Flash device initialization failure.
31	20	RECOVERY: Flash Update Operation Failed
31	30	RECOVERY: Recovery device failed during a read operation
31	40	RECOVERY: Flash device erase failure
31	50	RECOVERY: Flash device programming failure
31	60	RECOVERY: File Verify Operation (Checksum) Failed
31	70	RECOVERY: Processor Patch Installation Failed
32	00	RECOVERY: Locating and initializing LS-120 and the file system
32	10	RECOVERY: File Verify Operation (Invalid BIOS) Failed
32	20	RECOVERY: File Verify Operation (Mismatched Platform BIOS) Failed
32	30	RECOVERY: Boot Block Incompatible with BIOS

Port 80	Port 81	Description
32	40	RECOVERY: Flash Verify after Write Failed
33	00	RECOVERY: Loading the file (wpgbios.bin) from disk
33	30	RECOVERY: Recovery completed successfully.
33	10	RECOVERY: Recovery started
34	00	RECOVERY: Initializing flash hardware interface
35	00	RECOVERY: Erasing flash memory…
36	00	RECOVERY: Programming new BIOS…
37	00	RECOVERY: Recovery completed successfully
3F	01	DCC: Indicates entry into DCC test code
3F	7F	DCC: Indicates exit from DCC test code
40	00	PCI: Initialize the PCI Enumeration Resource Manager
41	n/a	PCI: Initialize host bridge
42	n/a	PCI: Configure host bridge
44	n/a	PCI: Execute Option ROM's
4F	n/a	PCI: PCI Enumeration Complete
50	n/a	DCC: Checksum validated
50	n/a	QUICKBOOT: Enter RunIBVphase0, retrieve AMIRTTBL size
51	n/a	QUICKBOOT: Load AMI Runtime Table and INT13 Table
70	00	Enumerating Primary Channel
71	00	Enumerating Secondary Channel
71	04	IDE Discovery: collecting ATAPI signatures. Tag = IDE_ATAPI_SIGNATURE_81 | (x << 7), where x = channel 0, 1 for Master or Slave respectively
71	05	Special check when a master device does not drive the bus for accesses to a slave device
71	06	Special handler when a master device does not drive the bus for accesses to a slave device
72	n/a	Configuring Chipset (PIIX)
73	n/a	Configuring IDE devices – setting I/O speeds, DMA, bus-master, etc.
74	n/a	IDE Runtime Setup – saves data into CDB for interposer
75	n/a	IDE Spin Up Delay – wait for HD to spin up before accessing it
90	n/a	QUICKBOOT: End of QuickBoot – should NEVER get here.
91	n/a	QUICKBOOT: BootOS_now
92	n/a	QUICKBOOT: PCI Enumeration (execute Option ROMs), processor speed testing, CM Entry, SMBIOS initialization
93	n/a	QUICKBOOT: ACPI Table Initialization
94	n/a	QUICKBOOT: IDE Enumeration, IBV Phase1, KBD Init, IRQ Enable
95	n/a	QUICKBOOT: Enable RTC, Timer 0 and Timer 1, Run IBV Phase 0
96	n/a	QUICKBOOT: Configuration Database (CDB) Initialization
97	n/a	QUICKBOOT: Plug-in Manager (PIM) Launch
98	n/a	QUICKBOOT: Flash Memory Manager (FMM) Initialization
99	n/a	QUICKBOOT: beginning of Quickboot – clibHeapMapInit
A2	n/a	ACPI: ACPI_LOAD_FACS
A3	n/a	ACPI: ACPI_LOAD_FACP
A4	n/a	ACPI: ACPI_LOAD_RSDT
A5	n/a	ACPI: ACPI_LOAD_DSDT
A6	n/a	ACPI: ACPI_LOAD_SSDT
A7	n/a	ACPI: ACPI_LOAD_APIC
AC	n/a	ACPI_NO_CATALOG – no catalog object
AE	n/a	ACPI_E820 – OBSOLETE – fix-up E820 data – done by Interposer
AF	n/a	ACPI_FIX-UPS – calculate table checksums and Fix-ups
BD	n/a	Testing message checksum
C1	01	IBV Phase 0: UpdateE801Data (INT15 Data)
C1	02	IBV Phase 0: CMOS Fix-up Start
C1	03	IBV Phase 0: Fix-up Compatibility Table
C1	04	IBV Phase 0: Fix-up PS2 Mouse
C2–C6	n/a	QUICKBOOT
C9	n/a	IBV Phase 0: CreateDnodes
CA	n/a	IBV Phase 0: EnterBDAtoCDB
CB	n/a	IBV Phase 0: BuildBDA
CC	n/a	IBV Phase 0: EnterEBDAtoCDB
CD	n/a	IBV Phase 0: BuildEBDA
CE	n/a	IBV Phase 0: EnterCMOStoCDB
CF	n/a	IBV Phase 0: BuildCMOS

10.5 Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not activate.
- No characters appear on screen (after 90 seconds).
- Characters on the screen appear distorted or incorrect.
- System cooling fans do not rotate.
- LS-120 drive activity light does not activate, or drive is not detected.
- Hard disk drive activity light does not activate.
- CD-ROM drive activity light does not activate.
- CD-ROM drive is not detected.

10.5.1 Power Light Does Activate

Check the following:

☐ Is the power supply plugged in? Is the power turned on to the outlet? Is there a blown fuse or breaker?
☐ Is the system connected to a 110-240 VAC source?
☐ Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the I/O board is loose.
☐ Are there other problems with the system? If so, refer to the items listed under the section titled, "System Cooling Fans Do Not Rotate Properly."

10.5.2 No Characters Appear on the Screen

Check the following:

☐ Is the keyboard working? Check to see that the "Num Lock" light is functioning by pressing the "Num Lock" key.
☐ Is the video monitor plugged in and turned on? Many modern video monitors shut down when inactive and may require a moment to warm up when activated.
☐ 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?

10.5.3 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.
- ☐ Is the video monitor signal and power cable properly installed?

If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact the manufacturer's service representative for further monitor assistance.

10.5.4 System Cooling Fans Do Not Rotate Properly

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

Check the following:

- ☐ Is AC power available at the wall outlet?
- ☐ Are the system power cords properly connected to the system and the wall outlet?
- ☐ Did you press the power on/off push-button switch?
- ☐ Is the power-on light activated?
- ☐ Are the fan power connectors properly connected to the baseboard?
- ☐ Are there any shorted/open wires caused by pinched cables or power connector plugs forced incorrectly into sockets?

10.5.5 LS-120 Drive Activity Light Does Not Activate or Drive Is Not Detected

Check the following:

- ☐ Is the LS-120 drive power and signal cables properly installed?
- ☐ Was an LS-120 disk in the drive on boot? (Disk media is required to be in the drive on boot-up or the LS-120 drive will not be recognized by the system.)
- ☐ Are all relevant switches and jumpers on the LS-120 drive set correctly?
- ☐ Is the LS-120 drive properly configured as the master device, with the CD-ROM as the slave on the primary IDE channel?
- ☐ Is the LS-120 drive activity light always on? If so, the signal cable may be plugged in incorrectly.

10.5.6 Hard Disk Drive Activity Light Does Not Activate

If hard disk drive activity light does not function, check the following:

- ☐ Is the power and signal cables to the drive properly installed?
- ☐ Are all relevant switches and jumpers on the hard drive and I/O board set correctly?
- ☐ Is the onboard IDE controller enabled? (IDE hard drives only)?
- ☐ Is the PCI SCSI controller enabled and configured correctly? (SCSI only)?
- ☐ Is the hard disk drive properly configured?

 **NOTE**

Front panel hard disk LED indicates IDE and SCSI devices*. The hard disk drive activity light on the front panel lights when either an IDE hard disk drive, or a SCSI device controlled by the PCI SCSI host controller, is in use. This LED does not display CD-ROM activity.*

10.5.7 DVD ROM Drive Activity Light Does Not Activate

Check the following:

- ☐ Are all relevant switches and jumpers on the drive set correctly?
- ☐ Is the drive properly configured as the master?
- ☐ Is the onboard IDE controller enabled?

 **NOTE**

Front panel hard disk LED indicates IDE and SCSI devices*. The hard disk drive activity light on the front panel lights when either an IDE hard disk drive, or a SCSI device controlled by the onboard SCSI host controller, is in use. This LED does not display DVD ROM activity.*

 **NOTE**

PCI peripherals will not operate if used with 32-bit drivers*. At this time, there are a limited number of Itanium Ô -based drivers available for PCI peripherals, do not install any additional PCI peripherals that do not have current Itanium Ô -based drivers.*

10.5.8 DVD ROM Is Not Detected

Check the following:

- ☐ Was a DVD Disk in the DVD ROM drive on boot? (Disk media is required to be in the drive on boot-up or the DVD ROM drive will not be recognized by the system).
- ☐ Is the peripheral bay fully seated against the chassis?

11. Regulatory Specifications and Declaration of Conformity

CAUTION

For continued maintenance of the computer system's regulatory compliance and certifications, it is imperative you adhere to the assembly instructions in this guide. Use only those components where specifically described in this guide. Use of other components may void the UL listing of the product and possibly other product certifications, resulting in possible noncompliance with local product regulatory requirements.

11.1 Regulatory Compliance

The chassis, when correctly integrated per this guide, complies with the following safety and electromagnetic compatibility (EMC) regulations.

11.1.1 Declaration of Conformity

Declaration of Conformity
According to ISO/IEC Guide 22 and EN 45014

Manufacturer: Hewlett-Packard Company
3404 East Harmony Road
Fort Collins, CO 80528
USA

Declares that the

Product Name: HP Workstation
Product Numbers: A7202A (733MHz 1 way) and A7203A (800MHz 2 way)
Model Numbers: i2000
Base Product Numbers: A6037A
Product Options: all

conforms to the following specifications:

Safety	IEC 950:1991+A1+A2+A3 +A4 / EN 60950:1992+A1+A2+A3+A4
	IEC 60825-1:1993/EN60825-1:1994 Class 1 for LEDs
	USA 21CFR Subpart J - for FC Laser module
	China GB4943-1995
	Russia GOST R 50377-92
EMC	CISPR 22:1997 / EN 55022:1998 Class B
	CISPR 24:1997 / EN 55024:1998
	IEC 61000-3-2:2000 / EN 61000-3-2:1995
	IEC 61000-3-3:1994 / EN 61000-3-3:1995
	US FCC Part 15, Class B
	Japan VCCI Class B
	Australia/New Zealand AS/NZS 2064:1997, AS/NZS 3548:1995
	China GB9254-1999
	Russia GOST R 29216-94
	Taiwan CNS 13438:1997 Class A

and is certified by:

cULus Listed to UL1950, 3nd edition, File E146385
CB report provided by NEMKO to EN60950 2nd edition with A1+A2+A3+A4

supplementary information:
The product herewith complies with the requirements of the following Directives and carries the CE marking accordingly:
- the EMC directive 89/336/EEC and 92/31/EEC and 93/68/EEC
- the Low Voltage Directive 73/23/EEC and 93/68/EEC

This product was tested in a typical Hewlett Packard workstation configuration.

For Compliance Information ONLY, contact:

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQTRE Standards Europe, Herrenberger Straße 130, D-71034 Böblingen (FAX: +49-7031-14-3143)
Americas Contact: Hewlett-Packard, Fort Collins Site Quality Manager, mail stop 64, 3404 E. Harmony Rd., Ft. Collins,CO 80528, USA

11.1.2 Regulatory Compliance Markings

This product is provided with the following Product Certification Markings.

- U.S. and Canada UL and ULc listing mark
- European Union CE mark
- U.S. FCC declaration of compliance mark for Class B computer systems
- Industry Canada ICES-003 Class B compliance statement
- Japanese VCCI Class B mark
- Australian C-Tick mark

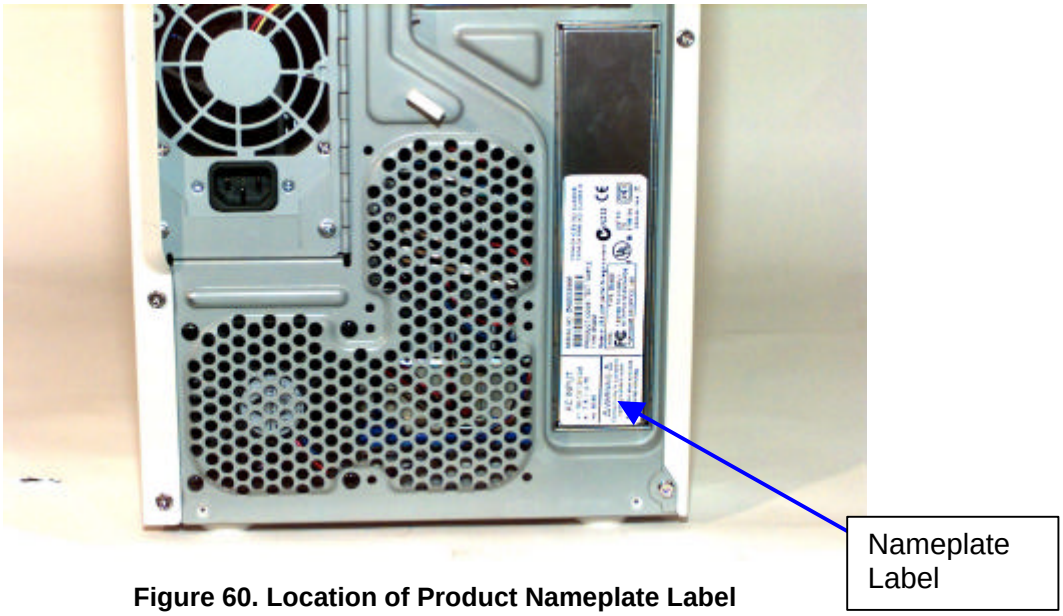


Figure 60. Location of Product Nameplate Label

NOTE

FIGURE 60 shows the location of the product nameplate label. The nameplate label comes complete with product identification, ratings, agency markings and other regulatory compliance information.

Do not remove this nameplate label or the cover it is located upon. To do so is a violation of national and international product regulations and IntelÒ marking requirements.

11.1.3 Product Specifications

The following table includes other product specifications pertinent to the i2000 system.

Processor	
Type	Intel Itanium
Clock Frequency	733 MHz with 2MB Cache or 800 MHz with 2MB Cache
Number of Processors	1 or 2
Chip set	Intel 82460GX
Front Side Bus	133 MB/s; 2GB/sec
Main Memory	
Bus bandwidth	4.2 GB/s peak
RAM type	SDRAM
Capacity	4 GB (16 GB is physically possible but not supported by HP.)
Memory slots	16
Operating Systems	HP-UX11i V1.5 Microsoft(r) Windows(r) XP 64-bit Edition Red Hat Linux Rel. 7.1 64-Bit
Expansion Slots	8 total slots
AGP	1 Supporting AGP-1X, 2X, 4X or AGPpro-110
PCI-4X	5 PCI-4X Full Length
PCI-2X	2 PCI-2X Full Length
Internal Storage	
Supported Storage Device	1 18 GB, 10K RPM Disk
Interface	Ultra 3 SCSI LVD, 160 MB/s, Qlogic 12160
Storage Device Bays	5 each 1" HD 1 each 3.5" device 2 each 5.25" Removeable Media Bays
External Storage	Note: No external storage devices are supported by HP.
Interface	Ultra 3 SCSI LVD, Qlogic 12160
External Connectors	2 68-pin LVD/SE external connectors
Removable Media	1 DVD ROM 1 SuperDisk LS-120/240 Drive (for floppy and 120/240 MB SuperDisk media)
Networking	
Connector	1 each RJ45
LAN Data Rate	10/100BT
Other I/O	
Serial interface 9-pin DIN	1
USB (Universal Serial Bus) Series A	4
PS2 ports	2
Audio	
Type	Stereo
Graphics	nVidia Quadro2-Pro
Environmental Specifications	
Temperature	
Operating	+10 C to +40 C, tested at 5C to 40C
Non-operating	-40C to +70C Not to exceed 50 freeze/thaw cycles.
Humidity	
Operating	20% - 85%, non condensing

Physical Dimensions	
Height	17.3"
Width	9.9"
Depth	23.5"
Net Weight	
Minimum configuration	84 lbs.
Fully loaded	89 lbs
Power Requirements	
Input current	7.5 Amps @ 100-120V & 3.75A @ 200-240V
Line frequency	50 / 60 Hz
Maximum power input	750 Watts not rated but is 800W at 90V

11.1.4 Electromagnetic Compatibility Notices (International)

NOTE

If a Class A device is installed within this system, then the system is to be considered a Class A system. In this configuration, operation of this equipment in a residential area is likely to cause harmful interference.

a) FCC Statement for Class B Devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

b) VCCI (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

(English translation of the notice above)

This is a Class B product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment.

If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

When used near a radio or TV receiver, it may become the cause of radio interference.
Read the instructions for correct handling.

This equipment has been tested for radio frequency emissions and has been verified to meet CISPR 22.2 Class B.

c) EMC STATEMENT (KOREA) - Class A

사용시 안내문 (A급 기기)

이 기기는 업무용으로 전자파장해검정을 받은 기기이오니,만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

(English translation of the notice above)

Please note that this equipment has been approved for business purposes with regards to electromagnetic interference, if purchased in error for use in a residential area, you may wish to exchange the equipment where you purchased it.

d) EMI Warning Message (Taiwan) - Class A

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

11.2 Lithium Battery Replacement

CAUTION

Refer to technically qualified persons only for replacement of battery.

CAUTION

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

PRÉCAUTION

Risque d'explosion si la pile usagée est remplacée par une pile de type incorrect. Les piles usagées doivent être recyclées dans la mesure du possible. La mise au rebut des piles usagées doit respecter les réglementations locales en vigueur en matière de protection de l'environnement.

FORHOLDSREGEL

Eksplosionsfare, hvis batteriet erstattes med et batteri af en forkert type. Batterier bør om muligt genbruges. Bortskaffelse af brugte batterier bør foregå i overensstemmelse med gældende miljølovgivning.

OBS!

Det kan oppstå eksplosjonsfare hvis batteriet skiftes ut med feil type. Batterier bør sendes til gjenvinning hvis det er mulig. Brukte batterier bør kastes i henhold til gjeldende miljølovgivning.

VIKTIGT!

Risk för explosion om batteriet ersätts med felaktig batterityp. Batterier bör om möjligt återvinnas . Batterier ska kasseras enligt de lokala miljövårdsbestämmelserna.

VARO

Räjähdysvaara, jos pariston tyyppi on väärä. Paristot on kierrätettävä, jos se on mahdollista. Käytetyt paristot on hävitettävä paikallisten ympäristömääräysten mukaisesti.

VORSICHT

Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.

AVVERTIMENTO

Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.

PRECAUCIÓN

Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante..

12. Appendix A: Power System - Description / Power Usage

The processor power envelope is currently rated as 130 Watts. This figure encompasses future growth in processor power due to higher operating frequency and possible larger caches. The i2000 uses this envelope figure.

The SDRAM sub-system power envelope is currently 260 W for 32 and 8 device DIMMs installed.

All thermal envelopes assume a Memory sub-system clock rate of 66 MHz.

CAUTION

Do not exceed a combined power output of 220 W for the +5 V and +3.3 V outputs. Exceeding a combined 220 W will overload the power subsystem and may cause the power supply to overheat and malfunction.

- *Maximum continuous total DC output power should not exceed 800 Watts.*
- *Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 220 Watts.*
- *Maximum continuous combined load on +3.3VDC, +5VDC and +12V_{IO} outputs shall not exceed 320 Watts.*
- *Maximum peak total DC output power should not exceed 820 Watts.*

12.1 Power Supply Input Voltages

The power supply is capable of supplying full rated output power over two input voltage ranges that are switch selectable and rated 100-127 VAC and 200-240 VAC RMS nominal. The power supply automatically recovers from AC power loss. The input voltage, current, and frequency requirements for continuous operation are stated below. The power supply must be able to start up under peak loading at 90V AC.

NOTE

Nominal voltages for test purposes are considered to be within ±1.0 V of nominal.

Table 27. AC Input Line Requirements

Parameter	Min	Nom	Max	Unit
V_{in} (115 VAC)	90	115	135	VAC_{rms}
V_{in} (230 VAC)	180	230	265	VAC_{rms}
V_{in} Frequency	47	--	63	Hz
I_{in} (115 VAC)			11.5	A_{rms}
I_{in} (230 VAC)			5.8	A_{rms}

12.2 Power Supply Output Voltages

The DC output voltages shall remain within the regulation ranges shown in Table 28 when measured at the load end of the reference cable harness assemblies' connectors under all line, load, and environmental conditions.

Table 28. DC Output Voltage Regulation

Parameter	Range[1]	Min.	Nom.	Max.	Unit
$+12_{IO}$ VDC[2]	± 5 %	+11.40	+12.00	+12.60	Volts
+ 5 VDC	± 4 %	+4.80	+5.00	+5.20	Volts
+3.3VDC	± 4 %	+3.17	+3.30	+3.43	Volts
-12 VDC	± 10 %	-10.80	-12.00	-13.20	Volts
$+12_{DIG}$ VDC[3]	± 5 %	+11.40	+12.00	+12.60	Volts
$+12_{CPU}$ VDC[3]	± 5 %	+11.40	+12.00	+12.60	Volts
$+12_{CPU2}$ VDC[3]	± 5 %	+11.40	+12.00	+12.60	Volts
+ 3.3 V_{AUX}	± 5 %	+3.14	+3.30	+3.47	Volts
+ 5 V_{SB}	± 5 %	+4.75	+5.00	+5.25	Volts

1. Regulation at load end of reference cable harnesses
2. At +12V surge, regulation can go to ±10%.
3. This output provides power to DCDC converters

13. Appendix B: Configuration Manager Settings

Element	Default	Your Setting
BIOS Build and PAL	Build 77 PAL 214	
Itanium™ Processor(s) Build	B-1	
Case Lock & Key Number	Varies	
Selectable Options		
Boot Options		
Boot Files Programmed	EFI shell	
BootNext Set	None	
Auto Boot Timeout	Disabled	
Active Console Output	ACPI (pnp0A03,3)/pci(1:0) {Screen}	
Active Console Input	ACPI (PNP0303,0) {Keyboard)	
Active Standard Error	ACPI (PNP0500.3F8) {Serial Port}	
BIOS Configuration Manager		
System Event Log Tab		
Clear Event Log on Reboot	Disabled	
Event Log Control	Enable All Events	
IDE Tab		
Controller Enabled	Enabled	
Spin Delay	0	
Primary IDE	Enabled	
Secondary IDE	Enabled	
Power Events Tab		
Power On Integrated LAN Enabled	Disabled	
Power On Serial Ring Enabled	Disabled	
Power On RTC Alarm Enabled	Disabled	
Power On Add-In PCI Enabled	Disabled	
General Tab		
Splash Screen Delay	10	
Integrated NIC Enabled	Enabled	
Integrated Audio Enabled	Enabled	
AC Power Failure Recovery	Disabled	
Keypad Num Lock	Enabled	
Time/Date Tab	Needs to be set to your local time zone	

14. Index