



# Workstation Board OR840 Product Guide

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Order Number: A15479-02

# Revision History

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Revision	Revision History	Date
1.0	Release	Sept. 1999
2.0	Update BIOS data, Beep codes, etc. Revise Table 1 and convert motherboard to workstation board. Remove references to CPU and replace with processor. Exceptions being board labels and pin call outs. Added ACPI Sleep State S3 data.	Feb. 2000

If a FCC declaration of conformity marking is present on the board, the following statement applies:

## FCC Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions related to the EMC performance of this product, contact:

Intel Corporation  
5200 N.E. Elam Young Parkway  
Hillsboro, OR 97124  
1-800-628-8686

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. 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 the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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# Acronyms

Acronyms	Meaning	Acronyms	Meaning	Acronyms	Meaning	Acronyms	Meaning
ACPI	Advanced Configuration and Power Interface	ECC	Error Checking and Correcting	IRQ	Interrupt Request	POST	Power-On Self Test
ADPCM	Adaptive Differential Pulse Code Modulation	ECHS	Extended Cylinder Head Sector	LAN	Local Area Network	SCI	Special Circumstance Instructions
AGP	Accelerated Graphics Port	ECP	Extended Capabilities Port	LBA	Logical Block Addressing	S.E.C.C.2	Single Edge Contact Cartridge 2
APM	Advanced Power Management	EMC	Electro-Magnetic Compatibility	LED	Light Emitting Diode	SIR	Surface Insulation Resistance
BIOS	Basic Input / Output System	EPP	Enhanced Parallel Port	MHz	Megahertz	SMI	System Management Interrupt
CMOS	Complementary Metal Oxide Semiconductor	ESCD	Extended System Configuration Data	MIF	Management Information Format	SMM	System Management Mode
CSMA/CD	Carrier Sense Multiple Access with Collision Detection	ESD	Electrostatic Discharge	MIDI	Musical Interface Digital Interface	SMP	Symmetric Multi-Processing
DIMM	Dual Inline Memory Module	FIFO	First In, First Out	MTBF	Mean Time Between Failures	SRAM	Static Random Access Memory
DMA	Direct Memory Access	IDE	Integrated Dual Channel Enhanced	NIC	Network Interface Card	UHCI	Universal Host Controller Interface
DMI	Desktop Management Interface	I/O	Input / Output	OEM	Original Equipment Manufacturer	USB	Universal Serial Bus
DRAM	Dynamic Random Access Memory	IOAPIC	Input Output Advanced Programmable Input Controller	OS	Operating System	VID	Voltage ID
DRM	Dual Retention Mechanism	IPL	Initial Program Load	PAC	PCI AGP Controller	VPD	Vital Product Data
		ISA	Industry Standard Architecture	PCI	Peripheral Component Interconnect	WfM	Wired for Management



# 1 Workstation Board OR840 Features

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## Feature Summary

<b>Form Factor</b>	ATX (12.0 inches by 9.6 inches)
<b>Processor</b>	Support for one to two Intel® Pentium® III processors <ul style="list-style-type: none"> <li>• Two- (2), 242-pin connectors</li> <li>• 133 MHz host bus speed (FSB)</li> <li>• 512 KB discrete L2 cache support on each processor <i>OR</i></li> <li>• 256 KB advanced transfer L2 cache support on each processor</li> </ul>
<b>Chipset</b>	Intel® 82840, consisting of: <ul style="list-style-type: none"> <li>• Intel 82840 Memory Controller Hub (MCH)</li> <li>• Intel 82801AA I/O Controller Hub (ICH)</li> <li>• Intel 82802AC 8 Mbit Firmware Hub (FWH)</li> </ul>
<b>Memory</b>	Support for up to 2 GB <ul style="list-style-type: none"> <li>• Four- (4), 168-pin RDRAM* Interface Memory Module (RIMM*) sockets</li> </ul>
<b>I/O Control</b>	SMSC* LPC47B272 SIO low pin count (LPC) interface I/O controller
<b>Accelerated Graphics Port (AGP) Video</b>	AGP universal connector support 1x, 2x, 4x and AGP Pro50*
<b>Peripheral Interfaces</b>	<ul style="list-style-type: none"> <li>• One- (1), serial port (RS232)</li> <li>• Two- (2), Universal Serial Bus (USB) ports</li> <li>• One- (1), parallel port (IEEE 1284)</li> <li>• Two- (2), IDE interfaces with Ultra ATA-66 support</li> <li>• One- (1), diskette drive interface</li> <li>• SCSI HD Activity LED connector (optional)</li> </ul>
<b>Expansion capabilities</b>	Six- (6), add-in card expansion slots <ul style="list-style-type: none"> <li>• Five- (5), full-length, PCI 32/33 bus add-in card connectors</li> <li>• One- (1), AGP universal connector</li> </ul>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>• Intel proprietary BIOS for workstations</li> <li>• Intel® 8 Mbit symmetrical blocked (per EPS) flash memory</li> <li>• Compliant with Advanced Configuration and Power Interface (ACPI) and SMBIOS</li> </ul>
<b>Management Level 5</b>	<ul style="list-style-type: none"> <li>• Intel® 82559 Local Area Network (LAN) Controller</li> <li>• Alert on LAN™ 2</li> </ul>
<b>Hardware Monitor Subsystem</b>	<ul style="list-style-type: none"> <li>• Six- (6), fan sense inputs used to monitor fan activity</li> <li>• Two- (2), headers for chassis intrusion detection security feature</li> <li>• Multiple processor temperature sensors</li> <li>• Voltage sense to detect out-of-range values</li> <li>• DMI Event logging</li> </ul>
<b>Other features</b>	<ul style="list-style-type: none"> <li>• Hardware monitor (optional)</li> <li>• Audio subsystem, AD 1881 (optional)</li> </ul>

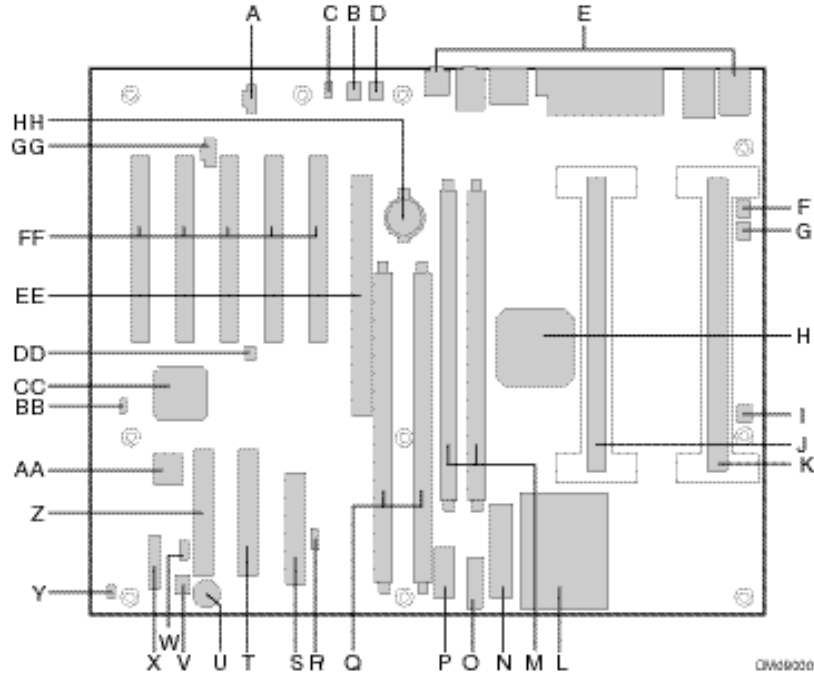
 **NOTE**

*For information regarding Intel® Workstation Board OR840, including technical product specifications, BIOS upgrades, and device drivers, go to the Intel World Wide Web site at:*

*<http://support.intel.com/support/motherboards/workstation/>*

# Components

Figure 1 shows the major components found on the Workstation Board.



**Figure 1. Workstation Board Components**

A	CD-ROM audio connector (optional)	R	SCSI LED
B	System Fan A	S	Diskette drive connector
C	Rear chassis intrusion detection	T	Secondary IDE connector
D	System Fan B	U	Internal speaker
E	Rear panel connectors	V	System Fan C
F	Processor Fan B	W	Auxiliary LED connector
G	Processor Fan A	X	Front panel connector
H	Intel® 82840 Memory Controller Hub (MCH)	Y	Front chassis intrusion connector
I	Processor Fan C	Z	Primary IDE connector
J	Processor connector P1	AA	Intel® 82802AC Firmware Hub (FWH)
K	Processor connector P0	BB	Configuration jumper
L	DC-to-DC converter	CC	Intel® 82801AA I/O Controller Hub (ICH)
M	RIMM connectors 3 and 4 (Channel B)	DD	Internal MIDI connector
N	ATX power connector	EE	AGP Pro50 connector
O	Supplementary AGP Pro50 power connector	FF	PCI slots
P	Auxiliary power connector	GG	Telephony connector (optional)
Q	RIMM connectors 1 and 2 (Channel A)	HH	Battery

**NOTE**

*Components labeled “optional” may not be installed on all OR840 Workstation Board.*

## Microprocessor

The Intel OR840 Workstation Board supports one or two Pentium® III processors as listed in Table 1. Each processor is packaged in a single-edge, contact cartridge 2 (S.E.C.C.2). The S.E.C.C.2 includes the processor core, second-level (L2) cache, thermal plate, and back cover.

**Table 1. Processors Supported by the Workstation Board**

Processor Type <sup>1</sup>	Processor Core Frequency	Host Bus Speed	Cache Size
Pentium III processor	533B MHz	133 MHz	512 KB
	600B MHz	133 MHz	512 KB
	533EB MHz	133 MHz	256 KB
	600EB MHz	133 MHz	256 KB
	667 MHz	133 MHz	256 KB
	733 MHz	133 MHz	256 KB
	800EB MHz	133 MHz	256 KB
	866 MHz	133 MHz	256 KB

1. Refer to the Specification Update, for the latest information regarding supported processors.

The letter designators for the table are:

<i>E</i>	<i>Designates Pentium III processors with advanced transfer L2 cache</i>
<i>B</i>	<i>Designates Pentium III processors with 133 MHz host bus speed</i>

For the latest information on processor support for the OR840 Workstation Board, refer to the Intel boxed workstation board web site at:

<http://support.intel.com/support/motherboards/workstation/>

For instructions on installing or upgrading processors, see Chapter 2.

## Main Memory

The Workstation Board has four- (4) sockets used for installing RIMMs. Minimum memory size is 128 MB; maximum memory size is 1 GB<sup>1</sup>. See Chapter 2 for types of memory supported and installation instructions. All supported on-board memory is cacheable.

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<sup>1</sup> 2 GB may be supported with the availability of 512 MB RIMM

### NOTE

*Some of the system memory is dedicated to video.*

## Advanced Graphics Port

The Workstation Board supports AGP and AGP Pro50\* add-in graphics cards to 1X, 2X, and 4X modes.

AGP is a high-performance, interconnect for graphic-intensive applications, such as 3D applications. AGP is independent of the PCI bus and is intended for exclusive use with graphical display devices. AGP provides these performance features:

- Pipelined-memory read and write operations that hide memory access latency
- De-multiplexing of address and data on the bus for near-100 percent bus efficiency
- AC timing for 133 MHz data transfer rates (AGP 2X), allowing data throughput of 533 MB/sec
- AC timing for 266 MHz data transfer rates (AGP 4X), allowing data throughput of 1064 MB/sec

An AGP Pro50 universal connector is provided on the Workstation Board. It accommodates both AGP and AGP Pro50 cards with a maximum power requirement of 50 Watts.

## AGP Pro50

AGP Pro50\* is an extension to the AGP interface specification and is designed to meet the needs of advanced workstation graphics. The new specification is primarily designed to deliver additional electrical power to the graphics add-in cards.

The AGP Pro Universal Connector on the OR840 Workstation Board is designed to deliver up to 50 Watts of electrical power.

**NOTE**

*The Workstation Board has been designed to support AGP Pro50 add-in cards. If you install an APG Pro add-in card with a 110W, the BIOS utility prevents the board from booting. In addition, it is recommended that the Supplementary AGP Pro50 power connector be utilized when running an AGP Pro50 card.*

*It is recommended that no other peripheral devices (i.e., hard drives) be connected to the same power supply cable that provides the supplementary AGP Pro50\* power.*

**WARNING**

*Installing an AGP add-in card, which does not meet the requirements of the Accelerated Graphics Interface Specification Revision 2.0, may result in damage to the Workstation Board or the card.*

**CAUTION**

*Care should be given when installing a non-AGP Pro50 graphics card into the AGP Pro Universal Connector. Ensure that the card is correctly positioned in the slot before power is applied.*

## Audio Subsystem (Optional)

The optional Audio Subsystem includes the AD1881 Analog Devices\* Audio Codec, and various connectors.

### Analog Devices\* AD1881 Audio Codec

The board contains a single AC '97 V 2.0-compliant audio feature, an Analog Devices\* AD1881 Audio Codec, which also meets AC '97 V 2.1 Extensions. The AD1881 offers multiple features, including:

- Multi-bit Sigma-Delta Converter Architecture\* for improved signal-to-noise ratio:  $\geq 90$  dB
- 16-bit stereo full-duplex Codec
- Audio inputs
- Audio outputs
- Power management support
- Digital audio mixer mode
- DSP 16-bit serial port format, slot 16 mode
- Full variable 7 KHz to 48 KHz sampling rate with 1 Hz resolution
- Split power supplies (3.3V Digital/5V Analog)
- Phat\* Stereo 3D Stereo Enhancement

## Audio Connectors

The audio connectors include the following:

- ATAPI-style CD-ROM
- ATAPI-style Telephony
- MIDI connector
- Back panel audio connectors
  - Line out
  - Line in
  - Mic in

### NOTE

*Some of the audio connectors are optional and are not installed on all versions of the board.*

## Audio Drivers and Utilities

Audio drivers and utilities are available from Intel's World Wide Web site:

<http://support.intel.com/support/motherboards/workstation/>

## LAN Subsystem (Optional)

The Intel 82559 10/100Mbps Fast Ethernet Wired for Management (WfM), LAN subsystem provides both 10Base-T and 100Base-TX connectivity. Features include:

- Dual mode 10Base-T and 100Base-TX capability using a single RJ45 connector and activity status LEDs
- 32-bit, 33 MHz direct bus mastering on the PCI bus
- Shared memory structure in the host memory that copies data directly to/from host memory
- IEEE 802.3u Auto-Negotiation for the fastest available connection
- Jumperless configuration; the LAN subsystem is completely software-configurable

## Intel® 82559 LAN Controller (Optional)

The Intel 82559 PCI LAN controller's features include:

- CSMA/CD Protocol Engine
- Glueless 32-bit PCI Bus interface
- DMA engine for movement of commands, status, and network data across the PCI bus
- Integrated physical layer interface, including:
  - Complete functionality necessary for the 10Base-T and 100Base-TX network interfaces; when in 10 Mbit/sec mode, the interface drives the cable directly
  - A complete set of Media Independent Interface (MII) management registers for control and status reporting
  - 802.3 $\mu$  Auto-Negotiation for automatically establishing the best operating mode when connected to other 10Base-T or 100Base-TX devices, whether half- or full-duplex capable
- Jumperless configuration; the LAN subsystem is completely software-configurable
- Integrated power management features, including:
  - System Management Bus support
  - Support for Wake on LAN\* and Alert on LAN\* 2 technology
  - Support for ACPI technology

## LAN Subsystem Software

The Intel 82559 Fast Ethernet WfM PCI LAN software and drivers are available from Intel's World Wide Web site.

<http://support.intel.com/support/motherboards/workstation/>

## RJ45 LAN Connector (Optional) LEDs

Two- (2) LEDs are built into the RJ45 LAN connector. Table 2 describes the LED states when the board is powered up and the LAN subsystem is operating.

**Table 2. RJ45 LAN Connector LEDs**

LED Color	LED State	Condition
Green	ON	LAN link is established.
Yellow	Blinking	LAN activity in progress.



## PCI Enhanced IDE Interface

The PCI enhanced IDE interface handles the exchange of information between the processor and peripheral devices like hard disks, CD-ROM drives, and Iomega Zip<sup>\*</sup> drives inside the computer. The interface supports:

- Up to four- (4) IDE devices (such as hard drives).
- ATAPI devices (such as CD-ROM drives).
- ATA devices using the single-word DMA 0, 1, and 2 and multi-word DMA 1 and 2, PIO 0-4.
- Ultra ATA/33 and Ultra ATA/66.
- Logical block addressing (LBA) of hard drives larger than 528 MB and extended cylinder head sector (ECHS) translation modes.
- Support for laser servo (LS-120) drives.

## Input / Output (I/O) Controller

The SMSC\* LPC47B272 super I/O controller handles the exchange of information between the processor and external devices, such as a mouse, keyboard, or printer that are connected to the computer. The controller features the following:

- Low pin count (LPC) interface
- One- (1) serial port
- One- (1) parallel port with Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP) support
- Serial IRQ interface compatible with serialized IRQ support for PCI systems (16C550 compatible)
- PS/2-style mouse and keyboard interfaces
- Fan Tachometer Inputs
- Interface for only one- (1) 1.44 MB 3.5-inch floppy diskette drive
- Intelligent power management, including a programmable wake up event interface
- Infrared port (IrDA 1.1 compliant)
- Supports multiple GPIOs

### NOTE

*The BIOS Configuration Manager program provides configuration options for the I/O controller.*

## Real-Time Clock

The Workstation Board has a time-of-day clock and a multi-century calendar with alarm features and century rollover. A battery on the board keeps the clock current when the computer is turned off.

**⇒ NOTE**

*The recommended method of accessing the date in systems with Intel® Workstation Boards is from the Real-Time Clock (RTC) via the BIOS. The BIOS on Intel motherboards contains a century checking and maintenance feature. This feature checks the two least significant digits of the year stored in the RTC during each BIOS request (INT 1Ah) to read the date and, if less than 80 (i.e., 1980 is the first year supported by the PC), updates the century byte to 20. This feature enables operating systems and applications using the BIOS date/time services to reliably manipulate the year as a four-digit value.*

*For more information on proper date access in systems with Intel Workstation Boards please see:*

*<http://support.intel.com/support/year2000/paper.htm>*

## USB Support

The Workstation Board has two- (2) USB ports, only one- (1) USB peripheral can be connected per port. To attach more than two- (2) devices, connect an external hub to either of the built-in ports. The board fully supports the standard, Universal Host Controller interface (UHCI) and takes advantage of standard software drivers written to be compatible with UHCI.

**⇒ NOTE**

*Computer systems that have an unshielded cable attached to a USB port might not meet FCC Class B requirements, even if no device or a low-speed USB device is attached to the cable. Use a shielded cable that meets the requirements for full-speed USB devices.*

## BIOS

The Intel® proprietary BIOS provides the “Power-on Self-test” (POST), the BIOS Configuration Manager (Setup) program, ACPI, PCI and IDE auto-configuration utilities. The BIOS can be upgraded by following the instructions in Section 3.

## Intel® 82802AC Firmware Hub (FWH)

The BIOS is stored in the Intel 82802AC Firmware Hub. The firmware hub contains a nonvolatile memory core based on Intel® Flash technology. In addition to storing the system BIOS, the firmware hub incorporates logic features such as the hardware Random Number Generator (RNG). These logic features enable protection for storing and updating platform information relating to security and manageability.

## PCI Auto Configuration

If you install a PCI add-in board in your computer, the PCI auto-configuration utility in the BIOS automatically detects and configures the resources (IRQs, DMA channels, and I/O space) for that add-in board. You do not need to run the BIOS Setup program after you install a PCI add-in board.

## IDE Auto Configuration

If you install an IDE device (such as a hard drive) in your computer, the IDE auto-configuration utility in the BIOS automatically detects and configures the device for your computer. You do not need to run the BIOS Setup program after installing an IDE device.

## Security Passwords

The BIOS includes security features that restrict whether the BIOS Setup program can be accessed and who can boot the computer. An administrator password and a user password can be set for Setup and for booting the computer, with the following restrictions:

- The administrator password gives unrestricted access to view and change all Setup options. This is administrator mode.
- Setting a user password restricts who can boot the computer. The password prompt is displayed before the computer is booted. If the administrator password is the only setting, the computer boots without asking for a password. If both passwords are set, you can enter either password to boot the computer.

## Expansion Slots

The Workstation Board contains five- (5), PCI expansion slots and one- (1) AGP slot.

## Power Management Features

Power management is implemented at several levels, including:

- Software support:
  - Advanced Configuration and Power Interface (ACPI)
- Hardware support:
  - Alert-on-LAN\* 2 Technology
  - Wake-on-LAN\* Technology
  - Wake-on-Ring Technology
  - Wake on USB or PS2 Keyboard/mouse
  - Wake on Real-time clock

**⇒ NOTE**

*Advanced Power Management is not supported.*

## Wake on LAN\* Technology

Wake on LAN Technology enables remote wakeup of the computer through a network. The Workstation Board supports Wake on LAN through the PCI bus PME# signal and the Intel® 82559 LAN controller. This signal can wake up the computer only when the power cord is still plugged into the socket and the computer is in a supported sleep state. Wake on LAN can be enabled or disabled through the BIOS Configuration Manager program. A “Wake on LAN” connector is not required.

**CAUTION**

*For Wake on LAN technology, the 5V standby line for the power supply must be capable of providing adequate +5V standby current (1.0A). Failure to provide adequate standby current when implementing Wake on LAN Technology can damage the power supply.*

## Alert on LAN\* 2 Technology

The Workstation Board supports Alert on LAN\* 2 Technology. Alert on LAN 2 Technology enables PCs to send immediate alerts over the network when there are hardware or operating system failures or evidence of tampering. Alert on LAN 2 improves on this technology by providing a way to remotely reboot hung systems. If the system still hangs, it can be booted to a “known good state” in order to run diagnostics.

The 82559 LAN device supports Alert on LAN 2 technology in combination with the Alert on LAN device through a dedicated 8-bit interface and through the Intel® 82801AA ICH.

## Battery

A battery on the Workstation Board keeps the clock and the values in CMOS RAM current when your computer is turned off. See Chapter 2 for instructions on how to replace the battery.

## 2 Installing and Replacing Workstation Board Components

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This chapter explains how to remove and install the OR840 Workstation Board and its various component parts. The chapter covers the following topics:

Topic or Procedure	Page
Safety Considerations Before You Begin	21
Installing the Grounded Retention Mechanism (GRM)	22
Installing the Processor(s)	24
Removing the Processor(s)	25
How to Remove and Install the Workstation Board	26
Procedure To Remove the Workstation Board	26
How to Upgrade a Processor	27
Procedure to Install the Termination Card	28
How to Install Memory	28
Memory Configuration	28
Procedure to Install RIMMs	30
Procedure to Remove RIMMs	30
How to Replace the CR2032 Lithium Battery (M)	30
Procedure to Replace the Battery	32
How to Set Jumpers and Clear Passwords	33
Procedure to Clear Passwords	33
How to Connect IDE Drives	34

### Safety Considerations: Before You Begin



#### CAUTION

*Before you install this Workstation Board in a chassis, see Appendix B for regulatory requirements and precautions.*

- Always follow the steps in each procedure in their correct order.
- Set up a log to record information about your computer, such as model, serial number installed options, and configuration information.
- Use an anti-static wrist strap and a conductive foam pad when working on the Workstation Board.



## WARNINGS

*The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.*

*Always disconnect the computer from its power source and from any telecommunications links, networks, or modems before performing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks, or modems before you open the computer or perform any procedures can result in personal injury or equipment damage. Some circuitry on the workstation board can continue to operate even though the front panel power button is off.*



## CAUTION

*Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an anti-static wrist strap and attaching it to a metal part of the computer chassis.*

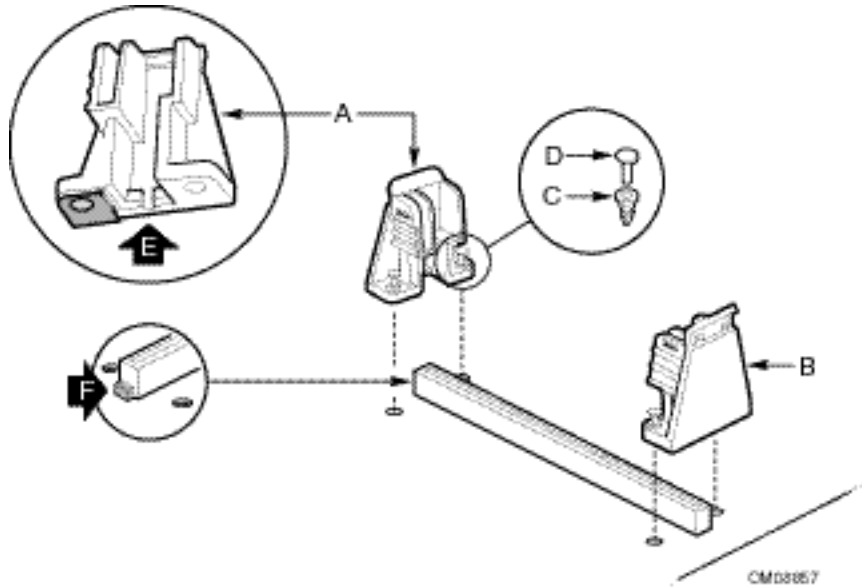
## Installing the Grounded Retention Mechanism

Grounded Retention Mechanisms (GRM) are recommended for use on the OR840 Workstation Board when installing Pentium® III processors. The GRM is shipped as two- (2) assemblies that are ready for installation on the workstation board. Figure 2 illustrates the installation process for the GRM on the board.



## NOTE

*Use of the Grounded Retention Mechanism is recommended with the OR840 Workstation Board and Pentium® III 600EB MHz processors and higher.*



**Figure 2. Installing the Grounded Retention Mechanism**

A	Notched retention bracket	D	Fastener retainer pin
B	Un-notched retention bracket	E	Retention bracket's notch
C	Press-fit fastener	F	Key on 242-pin connector

Follow these steps to install the assemblies on the Workstation Board:

1. Support the Workstation Board so it does not deform when a fastener is pressed into its mounting hole.  
Note: Allow at least ½” of free space under each mounting hole.
2. Retention bracket A (in Figure 3) has a notch (E); retention bracket B does not. The notch in the retention bracket (A), fits over the key (F) on the end of the 242-pin connector. As shown in Figure 3, position the retention bracket (A) over the mounting holes on the workstation board.
3. Push each of the fasteners (C), through the retention bracket and the workstation board mounting hole until you feel the fastener snap into place.
4. Push a fastener retainer pin (D) into the through hole of the fastener (C) until it is fully seated against the top of the fastener. Repeat this step for each of the fasteners.
5. If any fastener (C) gets pushed out of the retention bracket during assembly, remove the fastener retainer pin (D). Then press the fastener (C) through the bracket and workstation board's hole until the fastener snaps into place.
6. Repeat steps 2 through 5 for the other retention bracket assembly.

## Installing the Processor(s)

### NOTE

If you are installing a single processor, you must:

- Install the processor in the slot marked 'P0'
- Install a termination card in the slot marked 'P1'

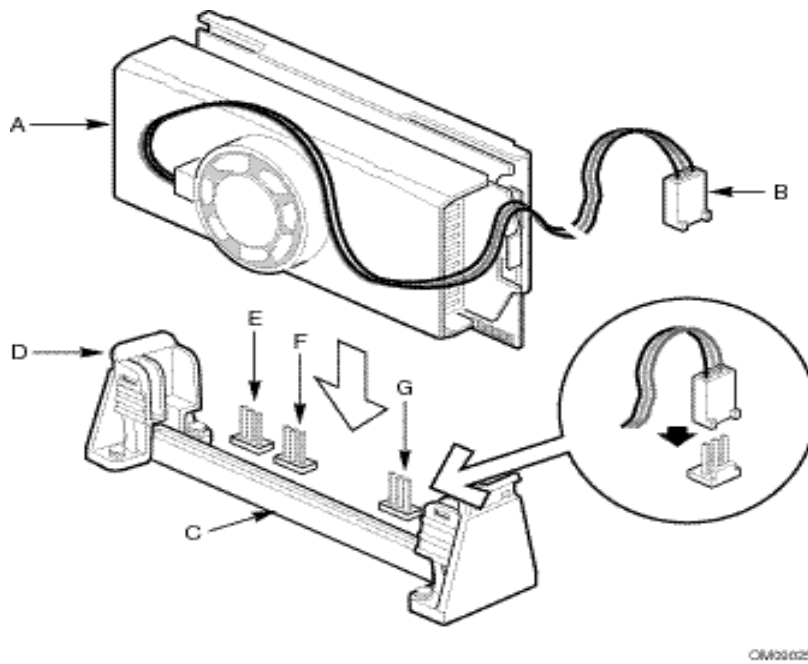
If you are installing two- (2) processors, the following values must be identical for both processors:

- Host bus speed
- Processor core frequency
- Cache size
- Cache type (either discrete or advanced transfer)
- Operating voltages

Refer to Figure 3 that follows, as you review these steps:

1. After the GRM has been attached to the Workstation Board, line up the processor, ensuring that the substrate key is aligned with the connector.
2. Insert the processor into the guide rails along the GRM.
3. Place one hand on the top edge of the processor/heat sink combination and press down, pushing it into the connector.
4. You will hear a click as the retention mechanism pops back thereby locking the processor in place.
5. If an active heat sink is employed, connect fan connector to one of the fan header.





**Figure 3. Processor Insertion**

A	Processor/Heat Sink Assy.	E	Processor Fan B Connector
B	Processor/Heat Sink Fan Connector	F	Processor Fan A Connector
C	S.E.C.C.2 Connector	G	Processor Fan C Connector
D	GRM		

## Removing the Processor(s)

The following are the steps required for removing a processor:

1. Ensure that the system is powered OFF.
2. If an active (fan) heat sink is used, ensure that the cable is unplugged from the Workstation Board.
3. Grasp the heat sink of the processor with one hand.
4. With the other hand, pull on the top lip or tab of the GRM, to disengage the heat sink attach notches from the GRM.
5. Holding the heat sink assembly, rotate the processor out of the connector and GRM.

## How to Remove and Install the Workstation Board

Refer to your chassis manual for detailed instructions on removal and installation. The OR840 Workstation Board fits into a standard ATX chassis but can also be installed into a standard WTX chassis when supplied with the appropriate adapter plate.

### NOTE

*You will need a Phillips-head (#2 bit) screwdriver. Refer to Appendix B for regulatory requirements and installation instructions and precautions.*



### WARNING

*Only qualified technical personnel should do Workstation Board removal or installation. Disconnect the computer from its power source before performing the removal or installation procedures noted here and before opening the computer. Failure to observe these precautions may result in personal injury or equipment damage.*

## Procedure to Remove the Workstation Board:

The following are the steps required for removing a Workstation Board:

1. Remove processor/heat sink/GRM assembly/Termination Card (if applicable) using procedures “How to Remove a Processor” and “How to Remove a Termination Card.”
2. Disconnect fan cables from fan headers.
3. Locate the workstation board mounting screw holes in Figure 4 that follows.
4. Remove the 10- Workstation Board mounting screws.
5. Carefully extract the board by its edges.
6. Place board component-side up on a grounded, static-free surface.

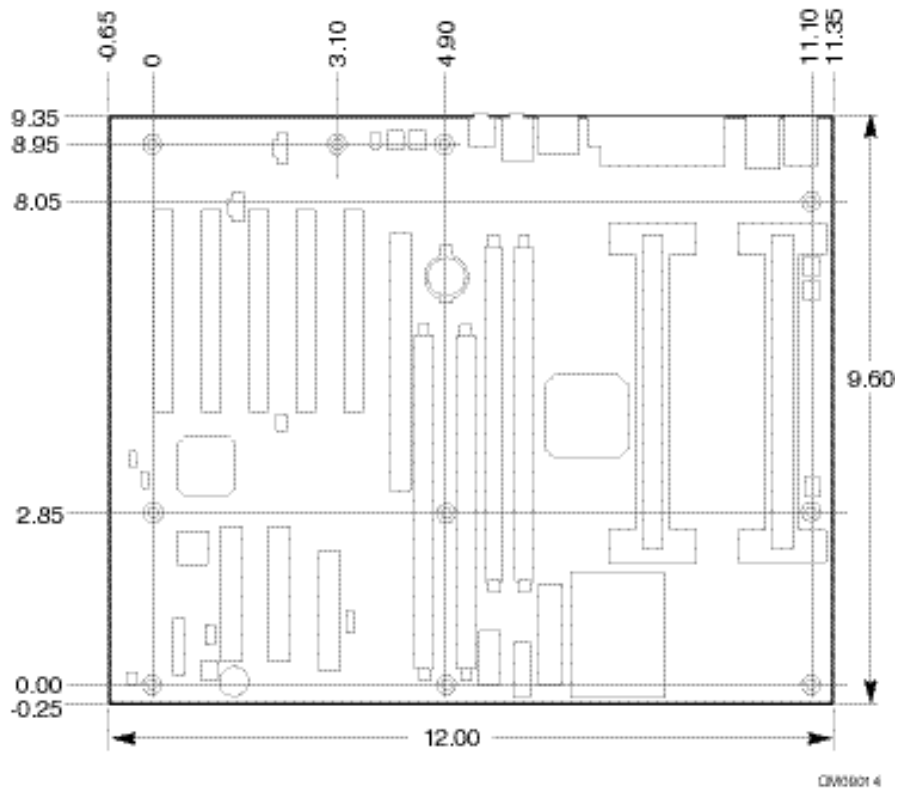


Figure 4. Workstation Board Mounting Screw Holes

## How to Upgrade a Processor

If your Workstation Board contains one- (1) microprocessor, then you can upgrade the computer by replacing this processor with one faster or by installing an application processor.

If your Workstation Board has two- (2) microprocessors, then you can upgrade by replacing these processors with two- (2) faster processors.

If you install only one processor on a Workstation Board, then it must go in the boot (P0) processor connector. In a single processor configuration, you must install a Termination Card in the empty, application processor connector (P1), to ensure proper operation of the computer.

## Procedure to Install the Termination Card

The following is the procedure for installing a Termination card:

1. Observe the safety precautions in *Safety Considerations* section at the beginning of this chapter.
2. Turn OFF the computer.
3. Disconnect the computer's power cord and all external peripheral equipment.
4. Remove any peripherals that block access to the processor connector.
5. Slide the Termination Card into the GRM.
6. Ensure that the alignment notches in the Termination Card fits over the key in the processor connector.

## How to Install Memory

You can install from 128 MB to 1 GB of PC600 or PC800 RDRAM into the four- (4), Workstation Board RIMM sockets.

### NOTE

*2 GB may be supported with the availability of 512 MB RIMM.*

## Memory Configuration

Figure 5 illustrates the correct method for installing RIMMs\*. The Workstation Board has two- (2) RDRAM\* channels, in which a total of four- (4) RIMMs may be installed.

When using only two- (2) RIMMs, you must install a Continuity Rambus Inline Memory Module (CRIMM) in those slots that do not contain RIMMs.

### NOTE

*In order to optimize memory performance, you must first populate RIMM-1 and RIMM-3.*

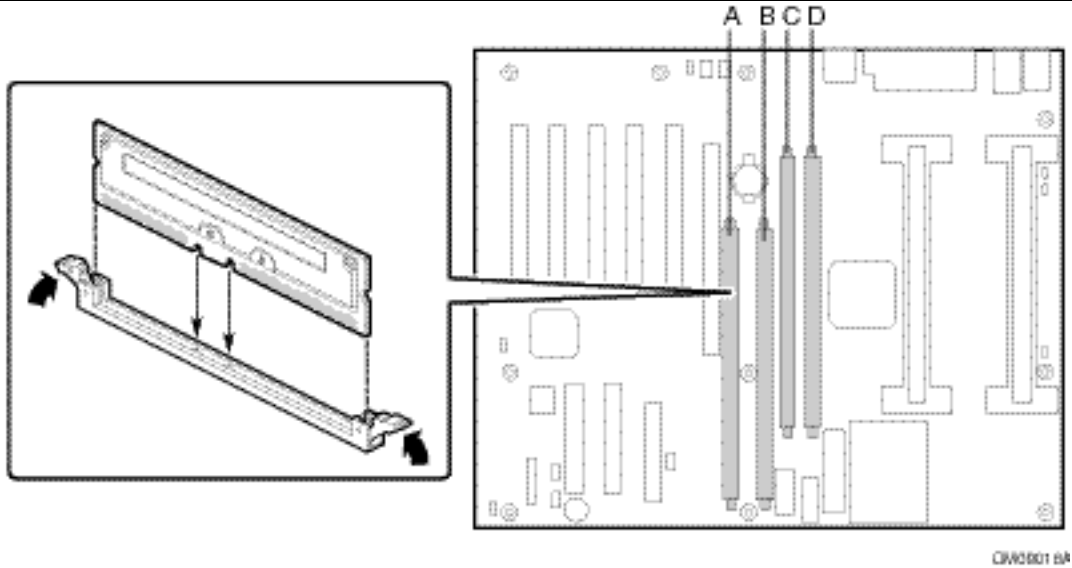


Figure 5. Installing RIMMs

A	RIMM-2 (Channel A)	C	RIMM-4 (Channel B)
B	RIMM-1 (Channel A)	D	RIMM-3 (Channel B)

Table 3 shows the optimum combinations for installing RIMMs and CRIMMs.

Table 3. Optimum RIMM Installation Combinations

	RIMM 1	RIMM 2	RIMM 3	RIMM 4
Combination 1	RDRAM	CRIMM	RDRAM	CRIMM
Combination 2	RDRAM	RDRAM	RDRAM	RDRAM

**NOTE**

*CRIMMs must be installed in unpopulated RIMM connectors for the Workstation Board to boot. RIMMs must be installed as described previously in Table 3, or the Workstation Board will not boot.*

*The memory in RIMM-1 and RIMM-3 must be the same size, density, type, and speed. The memory in RIMM-2 and RIMM-4 must be the same size, density, type and speed. Using the encoded part numbers on the RIMMs is the best way to determine if the parts are the same.*

## Procedure to Install RIMMs

The following are the steps required for installing RIMMs:

1. Observe the safety precautions in *Safety Considerations* at the beginning of this chapter.
2. Disconnect the computer's power cord and all external peripheral equipment.
3. Remove the computer cover and locate the RIMM sockets.
4. Holding the RIMM by its edges, remove it from its anti-static package.
5. Ensure that the clips at either end of the socket are pushed away from the socket.
6. Position the RIMM above the socket and align the two- (2) small notches in the bottom edge of the RIMM with the keys in the socket.
7. Press down firmly on the RIMM until it clicks into position making sure that the clips are securely engaged.

## Procedure to Remove RIMMs

The following are the steps required used to remove RIMMs:

1. Observe the safety precautions in *Safety Considerations* at the beginning of this chapter.
2. Turn OFF the computer.
3. Disconnect the computer's power cord and all external peripheral equipment.
4. Remove the computers' cover, and locate the RIMM sockets (See Figure 1/ Callout I).
5. Gently spread the retaining clips at each end of the socket.
6. The RIMM pops out of the socket.
7. Holding the RIMM by its edges, lift it away from the socket and store it in an anti-static package.

## How to Replace the Lithium Battery (M)

When turned off, a computer's lithium battery maintains the current time-of-day clock and the current values in CMOS RAM.

The battery should last approximately three- (3) years. When the battery begins to fail, it loses voltage; when the voltage drops below a certain level, the Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Always replace the battery with an equivalent one in size and value.

**WARNING**

*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.*

**ATTENTION**

*Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.*

**ADVARSEL!**

*Lithiumbatteri - Eksplosjonsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.*

**ADVARSEL**

*Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.*

**WARNING**

*Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.*

**VAROITUS**

*Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.*

## Procedure to Replace the Battery

The following is the procedure for replacing the battery:

1. Observe the safety precautions in *Safety Considerations* at the beginning of this chapter.
2. Record CMOS settings.
3. Turn OFF the computer.
4. Disconnect the computer's power cord and all external peripheral equipment.
5. Remove the computer cover.
6. Locate the battery on the motherboard (See Figure 1/ Callout M).
7. Gently pry the battery free from its socket using a small flat bladed screwdriver. Note the orientation of the "+" on the battery.
8. Install the new battery in the socket, orienting the "+" as shown in the illustration.
9. Replace the computer cover.
10. Update CMOS records with any changes.

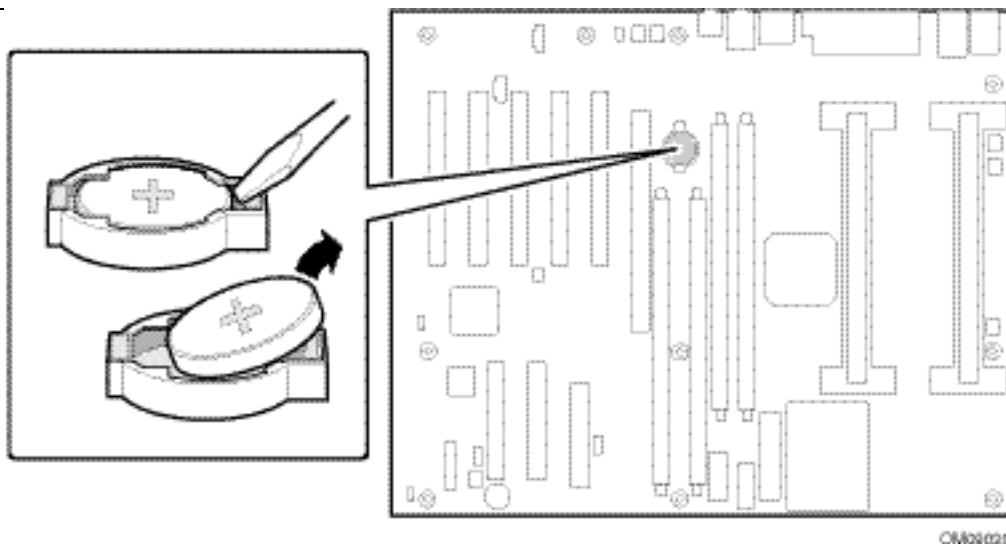


Figure 6. Installing/Changing the Battery



## How to Set Jumpers and Clear Passwords



### CAUTION

*Do not move any jumper with the power on. Always turn off the power and unplug the power cord from the computer before changing a jumper setting. Otherwise, damage to the Workstation Board could occur.*

- The Workstation Board has one- (1) jumper block.
- Figure 7 shows the location of the board's jumper block.
- This 3-pin jumper block determines the BIOS Configuration Manager's mode.
- Figure 7 describes the jumper settings for the three modes: normal, configure, and recovery.



### NOTE

*This procedure assumes that the Workstation Board is installed in the computer and the configuration jumper block (J1F2) has the jumper set on pins 1-2 for normal mode.*

## Procedure to Clear Passwords

The following is the required procedure used to clear passwords:

1. Observe the safety precautions in *Safety Considerations* at the beginning of this chapter.
2. Turn OFF the computer.
3. Disconnect the computer's power cord and all external peripheral equipment.
4. Remove the computer cover. Locate the configuration jumper block (See Figure 7).
5. Move the jumper to pins 2-3.
6. Replace the cover and turn ON the computer.
7. Allow the computer to boot up.
8. Enter the configuration manager
9. Choose the security tab
10. Select Clear User Password or Clear Administrator Password.
11. Go to the Save/Exit Tab.
12. Select Save New Settings then select Exit.
13. Shut down the system and unplug the power and peripheral cables.
14. Reset the Configuration Mode Jumper to the normal operation setting (connect jumper to pins 1–2).

15. Reassemble the system and turn the power on. Now reboot.

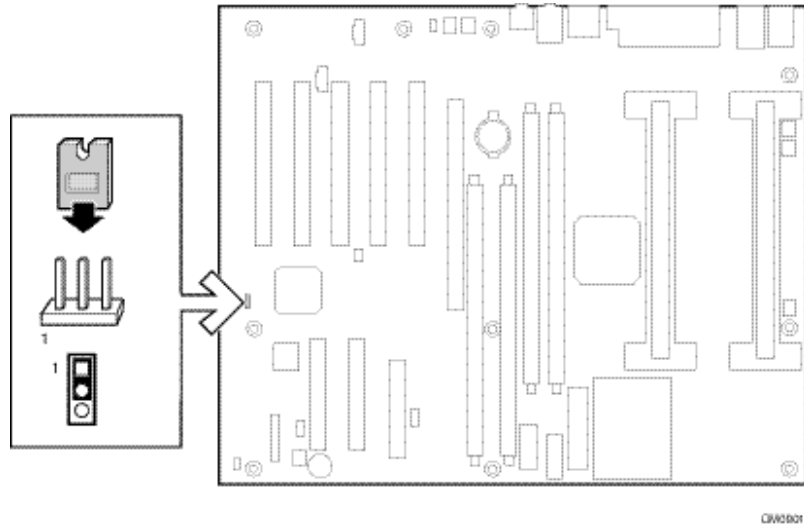


Figure 7. Location of Configuration Mode Jumper

Table 4. BIOS Configuration Jumper (J1F2)

Function/Mode	Jumper Setting	Description
Normal	1-2	The BIOS uses current configuration information and passwords for booting.
Configure	2-3	Displays the Configuration Manager program, and clears the CMOS on the next power-up as well.
Recovery	None	The BIOS attempts to recover the BIOS configuration. A BIOS update diskette is required.

**CAUTION**

*Always turn off the power and unplug the power cord from the computer before changing the jumper. Moving the jumper with the power on may result in unreliable computer operation.*

## How to Connect IDE Drives

The Intel boxed Workstation Board package includes an 80-conductor IDE cable. It is capable of connecting two- (2) drives to the board.

The cable supports the Ultra ATA/66 transfer protocol and is backward compatible with drives using slower IDE transfer protocols.

## 3 Using the Configuration Manager

---

This chapter provides an overview of the Configuration Manager. This program enables you to change the BIOS configuration information and boot sequence for your computers' settings. This chapter covers the following topics:

Topic or Procedure	Page
Configuration Manager Tabs	35
Using the Mouse and Keyboard in Configuration Manager	37
Help Tab	39
System Processors Tab	40
System Memory Tab	41
Boot Options Tab	42
System Event Log Tab	43
Integrated IDE Tab	45
Integrated Floppy Tab	46
System BIOS Tab	47
Peripheral Ports Tab	48
Power Events Tab	49
Time/Date Tab	50
General Tab	51
Security Tab	52
Save/Exit Tab	53

### Configuration Manager Tabs

The Configuration Manager is organized into a set of tabbed panels. The Configuration Manager can be used to change the BIOS configuration information and boot sequence for the computer through the use of tabs. Figure 5 summarizes the uses for each Tab.

#### NOTE

*For reference purposes, you should write down the current settings. When you make changes to the settings, update this record. Use the form provided in Appendix C, "Configuration Manager Settings," to record your settings. The Configuration Manager settings are reset to the factory default settings when you update the BIOS.*

**Table 5. Summary of Configuration Manager Screens**

<b>Tab Legend</b>	<b>Uses</b>
Help	Help on using the Configuration Manager
System Processors	Displays processor information and Front Side Bus (FSB) speed
System Memory	Displays the memory speed Displays the amount of memory Displays the type of memory module in each slot
Boot Options	Select the order for the boot devices
System Event Log	Configure System Event Log Mark System Event Log entries as read View System Event Log
Integrated IDE	Configure the Primary and Secondary IDE channels
Integrated Floppy	Configure the floppy
System BIOS	Displays the BIOS version
Peripheral Ports	Configure the serial ports, parallel port, and USB
Power Events	Enable or disable the S5 wake-up events S1 and S3 Standby
Time/Date	Set the time or date
General	Set the amount of time the introductory screen remains visible Disable the on-board Network Interface Card (NIC) Disable the on-board audio device Set resume after AC power failure or remain off Enable Num Lock at power-up Enable the processor serial number Force fans to run at full speed.
Security	Set or clear the User and Administrator passwords
Save/Exit	Save, discard, or reset the changes Exit Configuration manager

## Using the Mouse and Keyboard in Configuration Manager

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

**Table 6. Mouse and Keyboard Usage in Configuration Manager**

Mouse	Use the left mouse button to select tabs or buttons. 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	Jump to the Save/Exit Tab.
F1 key/Right Mouse Button	Displays help text for the selected tab.
Right Arrow	Move to the next Tab panel to the right.
Left Arrow	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 move the highlight in the drop down list up or down. If the focus is on a spin box, the Up and Down Arrows will select the previous or next value.

### NOTE

*Figure 8, which follows shows the General Tab in the Configuration Manager.*

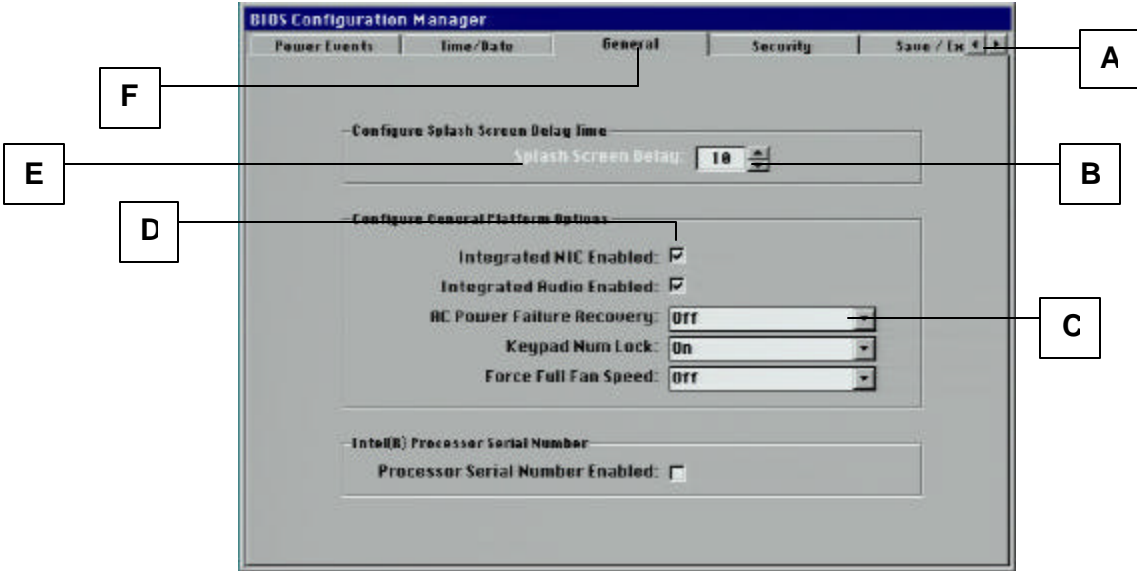
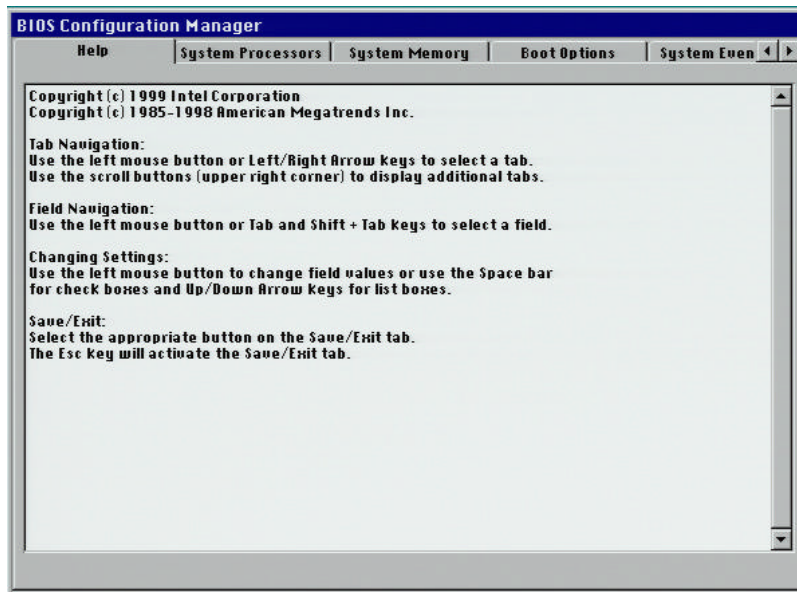


Figure 8. Configuration Manager Controls

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

## Help Tab

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**Figure 9. Help Tab**

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

## System Processors Tab

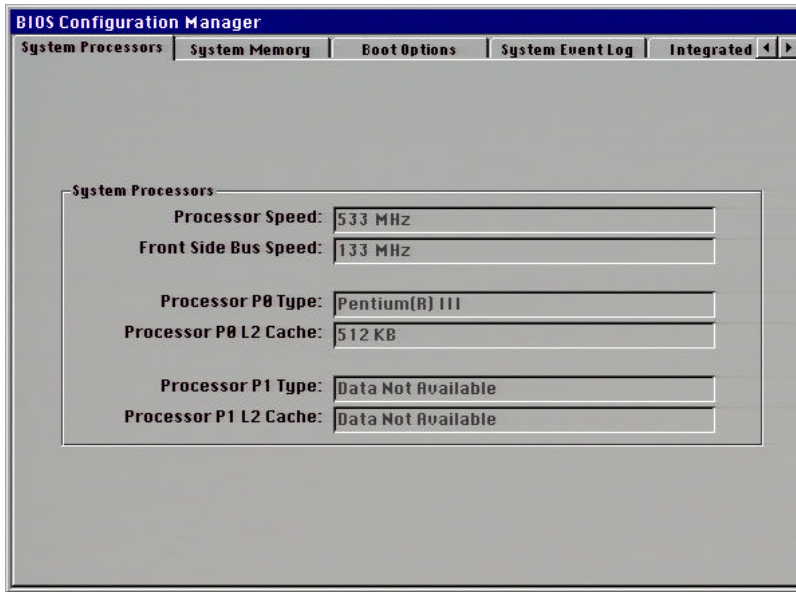


Figure 10. System Processors Tab

Table 7. Description of the System Processors Tab

Feature	Options	Description
Processor Speed	No options	Displays the processor speed detected by the BIOS. If two 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. Only Pentium® III processors with 133 MHz front side bus speeds are supported.
Processor P0 Type	No options	Displays the processor type. P0 is the “boot processor.”
Processor P0 L2 Cache	No options	Displays the amount of L2 cache RAM for the processor.
Processor P1 Type	No options	Displays the processor type. P1 is the “application processor.”
Processor P1 L2 Cache	No options	Displays the amount of L2 cache RAM for the processor.



# System Memory Tab

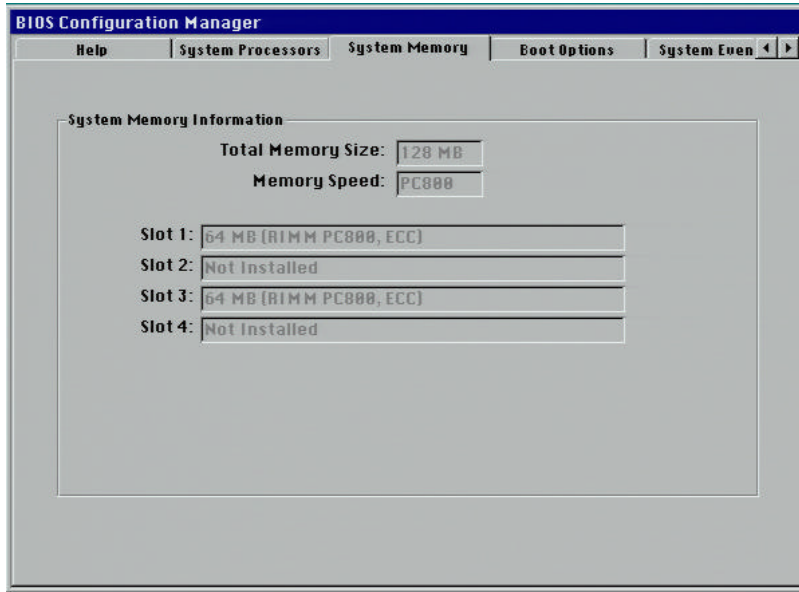


Figure 11. System Memory Tab

Table 8. Description of the System Memory Tab

Feature	Options	Description
Total Memory Size	No options	Displays the total amount of RAM on the Workstation Board.
Memory Speed	No Options	Displays the speed of the memory (PC600 or PC800)
Memory Slot 1	No options	Displays the size and type of memory installed in this slot.
Memory Slot 2**	No options	Displays the size and type of memory installed in this slot.
Memory Slot 3	No options	Displays the size and type of memory installed in this slot.
Memory Slot 4**	No options	Displays the size and type of memory installed in this slot.

\*\* For best performance, install the first two RIMM modules in slots 1 (RIMM 1, Channel A, connector J5D1) and 3 (RIMM 3, Channel B, connector J6C1). For additional memory, install two more RIMM modules in slots 2 (RIMM 2, Channel A, connector J4D1) and 4 (RIMM 4, Channel B, connector J5C1). Always install RIMM modules in pairs.

# Boot Options Tab

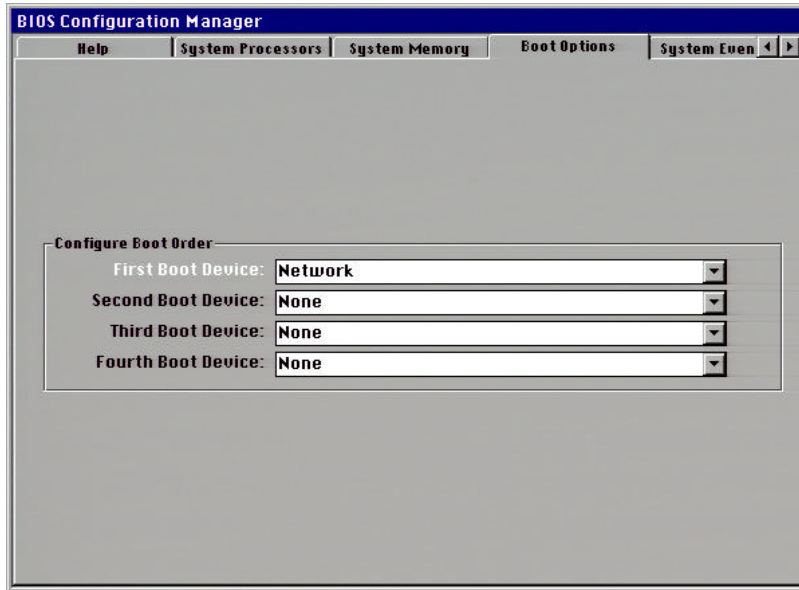


Figure 12. Boot Options Tab

Table 9. Description of the Boot Options tab

Feature	Options	Description
First Boot Device	<b>Auto</b> (default) None Available boot devices	Specifies the boot sequence from the available devices. The Auto setting selects the 3.5-inch floppy disk drive, if available. The Network boot is only available as the first boot device.
Second Boot Device	<b>Auto</b> (default) None Available boot devices	Specifies the boot sequence from the available devices. The Auto setting selects the IDE hard disk drive, if available.
Third Boot Device	<b>None</b> (default) Available boot devices	Specifies the boot sequence from the available devices.
Fourth Boot Device	<b>None</b> (default) Available boot devices	Specifies the boot sequence from the available devices.

## System Event Log Tab

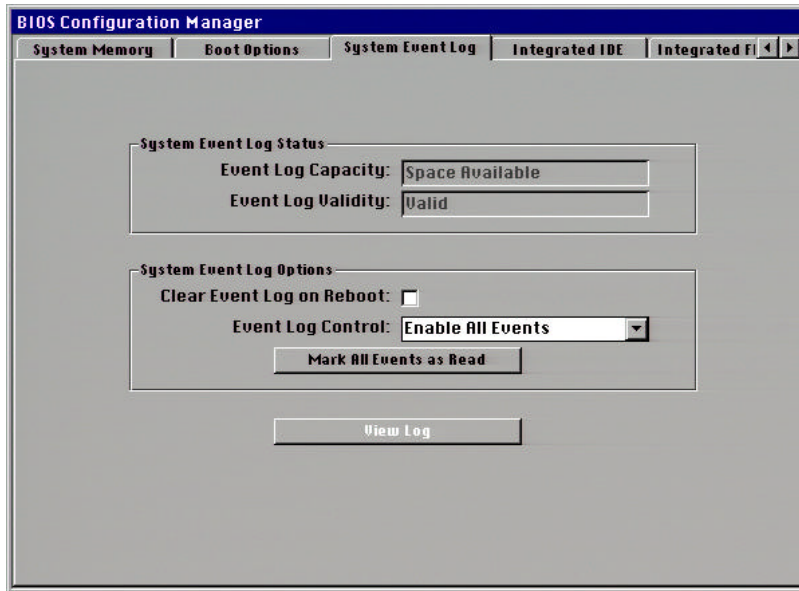


Figure 13. System Event Log Tab

Table 10. Description of the System Event Log Tab

Feature	Options	Description
Event Log Capacity	Display only	Shows whether or not space is available for the event log.
Event Log Validity	Display only	Shows whether or not the information in the event log is marked 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 <b>Disabled</b> (default)	Enable this option to clear the event log each time the system is rebooted.
Event Log Control	<b>Enable All Events</b> (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 Event Log (see Figure 14). Read events are marked with an asterisk.

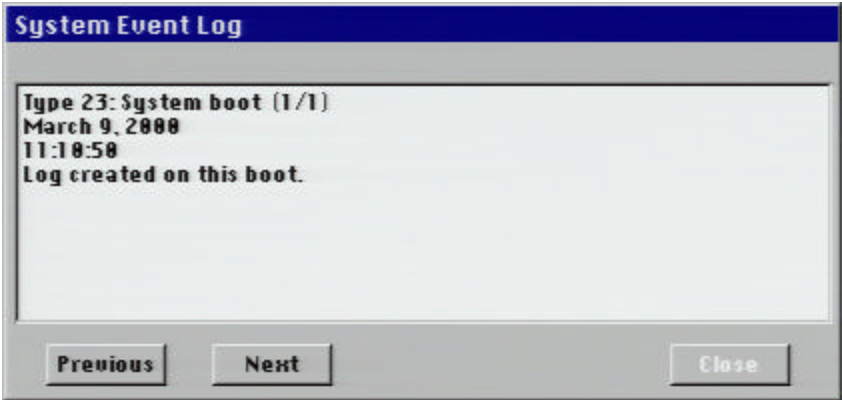


Figure 14. Sample View of System Event Log

---

## Integrated IDE Tab

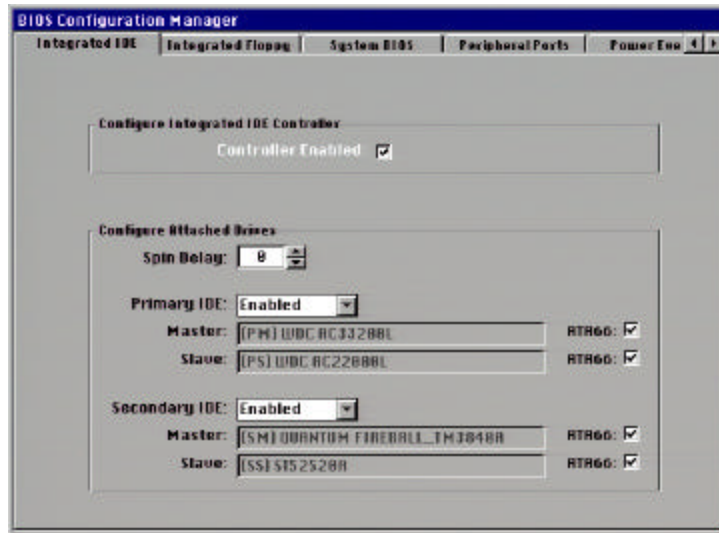


Figure 15. Integrated IDE Tab

Table 11. Description of the Integrated IDE Tab

Feature	Options	Description
Controller Enabled	<b>Enabled (default)</b> Disabled	<i>Enabled</i> will enable the dual-channel IDE controller. <i>Disabled</i> will disable the dual-channel IDE controller. This option will prevent the IDE controller from using system resources.
Spin Delay	0–60 seconds ( <b>0</b> sec. 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	<b>Enabled (default)</b> Disabled	<i>Enabled</i> automatically sets the values for the LBA mode, transfer mode, and Ultra DMA settings. <i>Disable</i> 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	<b>Enabled (default)</b> Disabled	<i>Enabled</i> automatically sets the values for the LBA mode, transfer mode, and Ultra DMA settings. <i>Disable</i> 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.
ATA-66	<b>Enabled (default)</b> Disabled	Enables high-speed ATA66 modes if an ATA-66 drive is used with the special 80-conductor IDE cable. If the drive doesn't support ATA-66 mode, or if the cable is not detected by the BIOS, the IDE device operates in an ATA-33 mode. Choosing Disabled forces the IDE device to operate in one of the ATA-33 modes.

## Integrated Floppy Tab

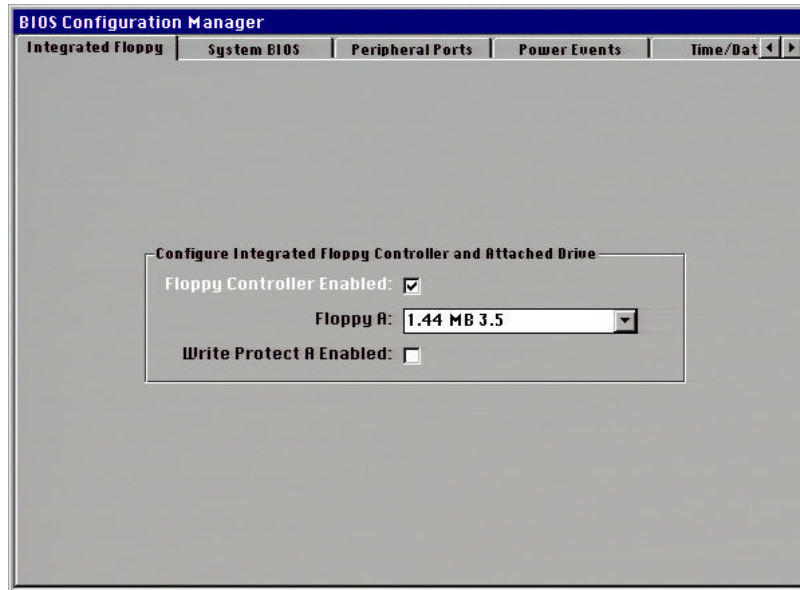


Figure 16. Integrated Floppy Tab

Table 12. Description of the Integrated Floppy Tab

Feature	Options	Description
Floppy Controller Enabled	<b>Enabled</b> (default) Disabled	Enables or Disables the integrated diskette controller.
Floppy A	<b>1.44 MB, 3½"</b> (default) 2.88 MB, 3½"	Specifies the capacity and physical size of diskette drive A.
Write Protect A Enabled	<b>Disable</b> (default) Enable	Disables or enables the "write protect" features for the diskette drive.

# System BIOS Tab



Figure 17. System BIOS Tab

Table 13. 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.
Boot Block Revision	No options	Displays the Boot Block Revision

## Peripheral Ports Tab

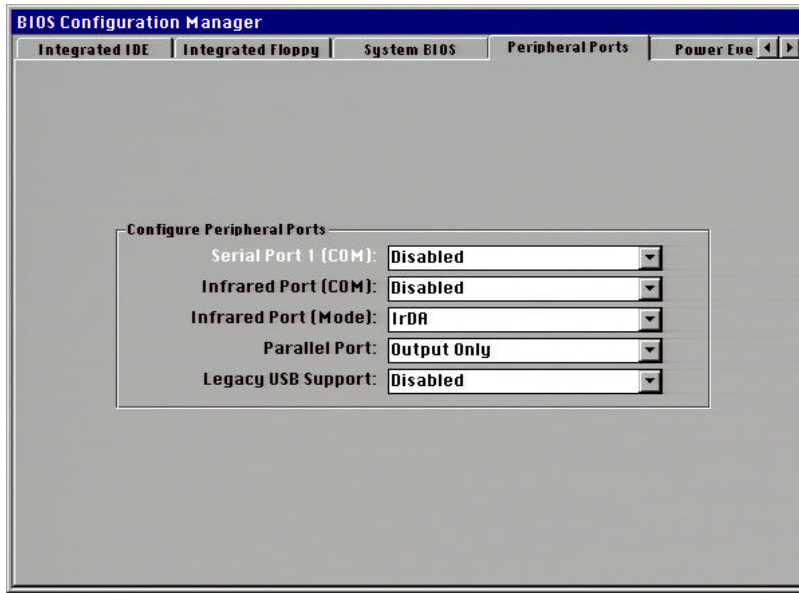


Figure 18. Peripheral Ports Tab

Table 14. Description of the Peripheral Ports Tab

Feature	Options	Description
Serial Port 1 (COM)	<b>Auto (default)</b> COM1 COM2 Disabled	Configures the serial port. <i>Auto</i> assigns the first available COM port. <i>COM1</i> assigns COM1, address 3F8h, and interrupt IRQ4. <i>COM2</i> assigns COM2, address 2F8h, and interrupt IRQ3. <i>Disabled</i> disables Serial Port 1.
Infrared Port (COM)	Auto COM1 COM2 <b>Disabled (default)</b>	Configures the infrared port. <i>Auto</i> assigns the first available COM port. <i>COM1</i> assigns COM1, address 3F8h, and interrupt IRQ4. <i>COM2</i> assigns COM2, address 2F8h, and interrupt IRQ3. <i>Disabled</i> disables the Infrared Port.
Infrared Port (Mode)	<b>IrDA (default)</b>	Specifies the mode for serial port 2 for infrared applications.
Parallel Port	<b>ECP (default)</b> EPP Bi-directional Output only Disabled	Configures the parallel port. <i>Output Only</i> operates in AT-compatible mode. <i>Bi-directional</i> operates in bi-directional PS/2-compatible mode. <i>EPP</i> is Extended Parallel Port mode, a high-speed bi-directional mode. <i>ECP</i> is Enhanced Capabilities Port mode, a high-speed bi-directional mode.
Legacy USB Support	<b>Disabled (default)</b> Enabled	Enables or disables USB legacy support. Enable this option to use a USB keyboard or mouse with non-USB aware operating systems.



## Power Events Tab

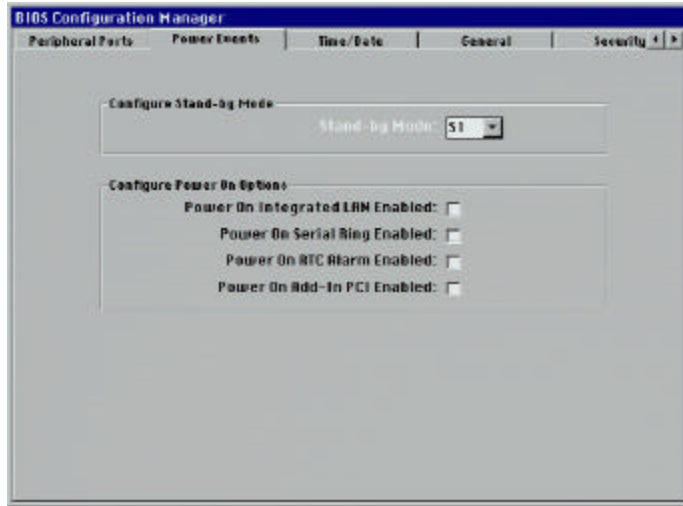


Figure 19. Power Events Tab

Table 15. Description of the Power Events Tab

Feature	Options	Description
Power On Integrated LAN Enabled	Enabled <b>Disabled (default)</b>	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 states 1 and 4.
Power On Serial Ring Enabled	Enabled <b>Disabled (default)</b>	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 states 1 and 4.
Power On RTC Alarm Enabled	Enabled <b>Disabled (default)</b>	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 states 1 and 4.
Power On Add-In PCI (PME) Enabled	Enabled <b>Disabled (default)</b>	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 states 1 and 4.
Stand-by Mode	S3 <b>S1 (default)</b>	Choose the ACPI Sleep State to use for stand-by mode. Choose either S3 (Suspend to RAM) or S1 (Processor Sleep). While S3 is supported by Microsoft Windows 2000*, not all drivers will allow the system to go into S3. Choose S1 for drivers or operating systems that do not support S3.

## Time/Date Tab

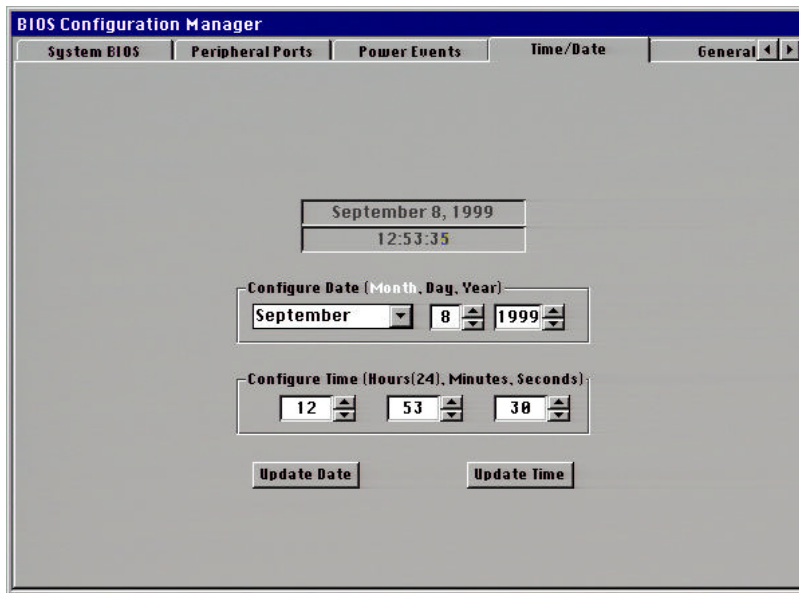


Figure 20. Time/Date Tab

Table 16. 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.

# General Tab

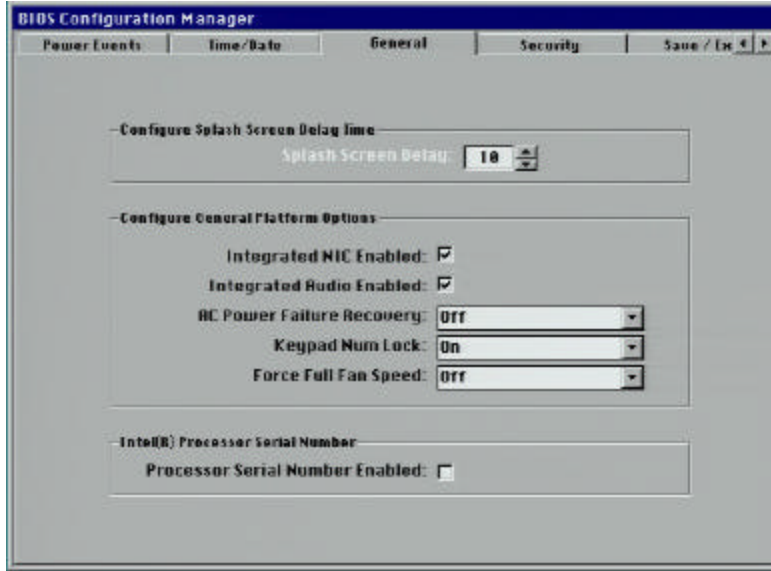


Figure 21. General Tab

Table 17. Description of the General Tab

Feature	Options	Description
Splash Screen Delay	2–30 seconds (10 sec. is default)	Specifies the number of seconds to display the start-up screen before automatically booting the operating system.
Integrated NIC Enabled	<b>Enabled</b> (default) Disabled	Enables or disables the on-board LAN Network Interface Card (NIC).
Integrated Audio Enabled <sup>†</sup>	<b>Enabled</b> (default) Disabled	Enables or disables the on-board audio.
AC Power Failure Recovery	<b>Off</b> (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	<b>On</b> (default) Off	Specifies the power-on state of the Num Lock feature on the numeric keypad of the keyboard.
Force Full Fan Speed	On <b>Off</b> (default)	Select On to force the three system fans to run at full speed. Select Off to enable normal fan speed control using the on-board temperature sensors. The default is Off. This option has no effect on the two- (2) processor fans.
Processor Serial Number Enabled	<b>Disabled</b> (default) Enabled	Enables or disables the Intel processor serial number in the Intel Pentium® III processors. This option applies to all processors in the system.

<sup>†</sup> Integrated audio is a manufacturing option that may not be present on all workstation boards. Please refer to spec update for latest information.

## Security Tab

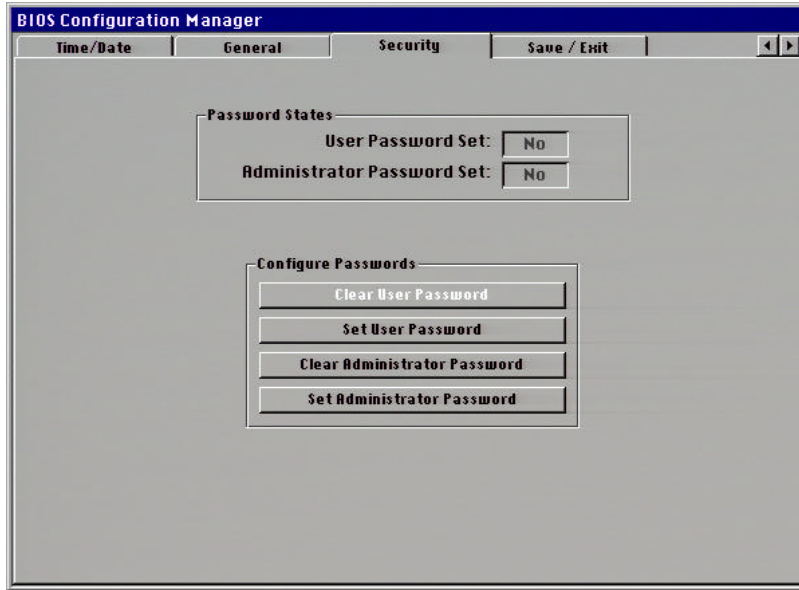


Figure 22. Security Tab

Table 18. Description of the Security Tab

Feature	Options	Description
User Password Set	No options	Reports if a user password is set.
Administrator Password Set	No options	Reports if an 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.

## Save/Exit Tab

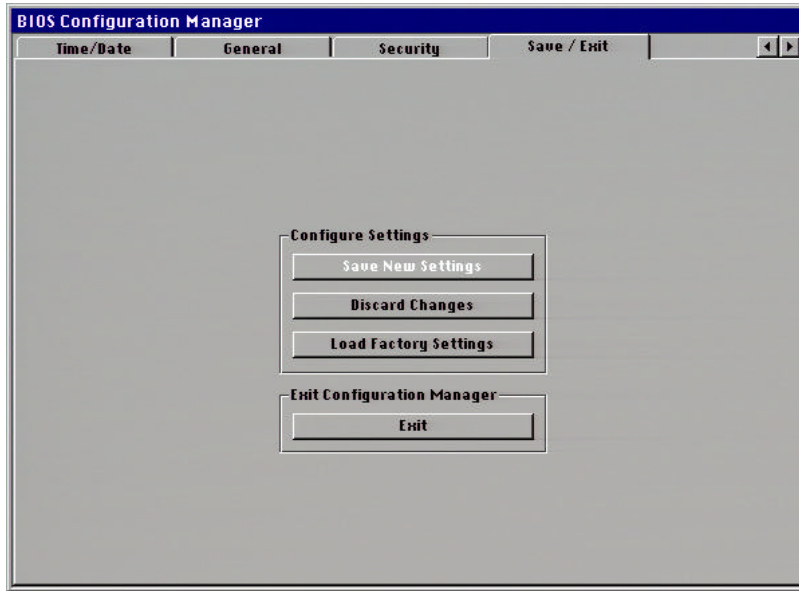


Figure 23. Save/Exit Tab

Table 19. 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.

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## 4 Using the BIOS Features

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The OR840 Workstation Board uses Intel® proprietary BIOS, which is stored in flash memory and can be upgraded using a disk-based program.

The flash memory also contains the BIOS Configuration Manager (described in Chapter 3), Power-On Self-Test (POST), the PCI auto-configuration utility, and Windows 98\*-ready Plug and Play\* code. This board supports system BIOS shadowing. This chapter covers the following topics:

<b>Topic</b>	<b>Page</b>
Entering and Exiting the Configuration Manager	56
Booting the Operating System	57
Getting Online Help	58
Using the Memory Error Correcting Code	58
Setting the Time and Date	59
Keyboard Num Lock	59
Force Full Fan Speed	59
Enabling/Disabling On-board LAN NIC (Optional)	59
Enabling/Disabling On-board Audio (Optional)	60
Power Management ACPI Sleep States	60
IDE Configuration	61
Floppy Drive Configuration	61
Selecting Boot Options	62
How to Display the Network Bootstrap Selection Menu	63
Canceling a Network Boot	63
Identifying the BIOS	63
Setting the Splash Screen Delay	63
Using the BIOS Security Features	64
Clearing BIOS Passwords	66
Using USB	67
Serial Port Configuration	67
Parallel Port Configuration	68
Processor Speed Detection	68
Loading the Factory Default Settings	69

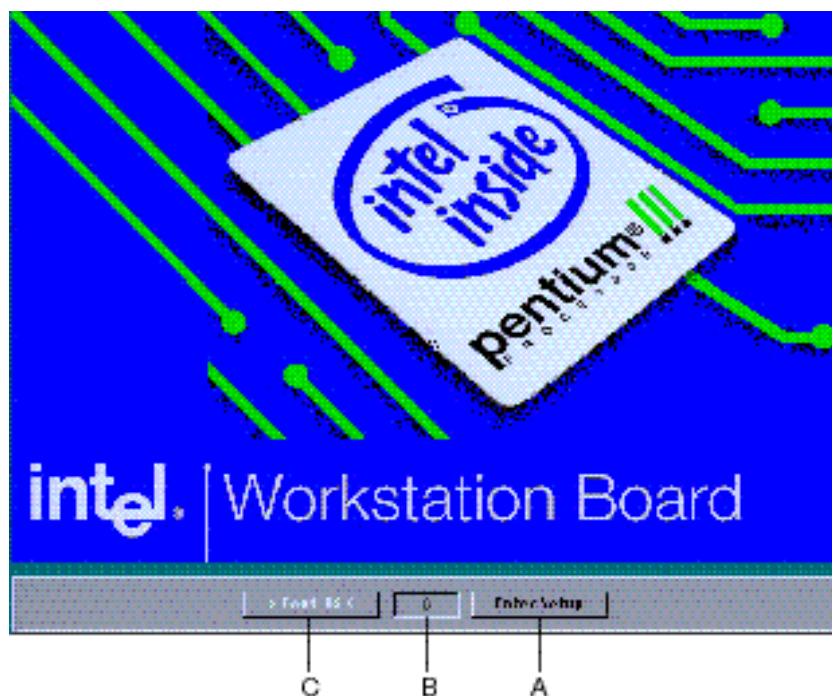
## Entering and Exiting the Configuration Manager

The BIOS displays a screen with the manufacturer's logo (Figure 24) shortly after the start of the boot sequence. You have two choices:

- Choose Enter Setup to view the Configuration Manager
- 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, or press the Tab key. (The Right and Left keyboard arrow may be used as well.)

The text box between the two buttons (Figure 24, B) shows the number of seconds remaining before the BIOS automatically continues and performs the action associated with the currently highlighted button (Boot OS or Enter Setup).



**Figure 24. Example of a Full-screen Logo with Buttons to Enter Setup or Boot OS**

A	Enter Setup (Configuration Manager)
B	Time remaining before booting operating system entering Configuration Manager (determined by whichever button is highlighted)
C	Boot OS (Operating System)



To exit Configuration Manager, do the following:

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

## Booting the Operating System

To boot the operating system, do the following:

1. Turn the power on or restart the system.
2. Choose Boot OS from the full-screen logo screen, or simply wait without making a choice (the BIOS will boot the operating system 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 BIOS will search for a valid boot image on the boot devices selected in the Boot Options Tab in Configuration Manager.

If the system does not boot, check the following possible causes:

- The boot devices listed on the Boot Options Tab of the Configuration Manager do not have boot images.
- The system has a 110W AGP Pro graphics adapter.
- The boot image is on an unsupported device (for example, USB mass storage device or Iomega ZIP\* drive).



### CAUTION

*To prevent damage to the Workstation Board, do not attempt to use >110W AGP Pro graphics adapters. If the BIOS utility detects a 110W AGP Pro graphics adapter, the system will emit four- (4) beeps and then stop without booting the operating system.*

## Getting Online Help

To get online help, do the following:

1. Go to the Tab where you need help.
2. Press the F1 key, or click the right mouse button anywhere in the Tab Window.

A pop-up window will appear with the on-line help for the Tab you selected. Figure 27 shows an example of the pop-up Help window.

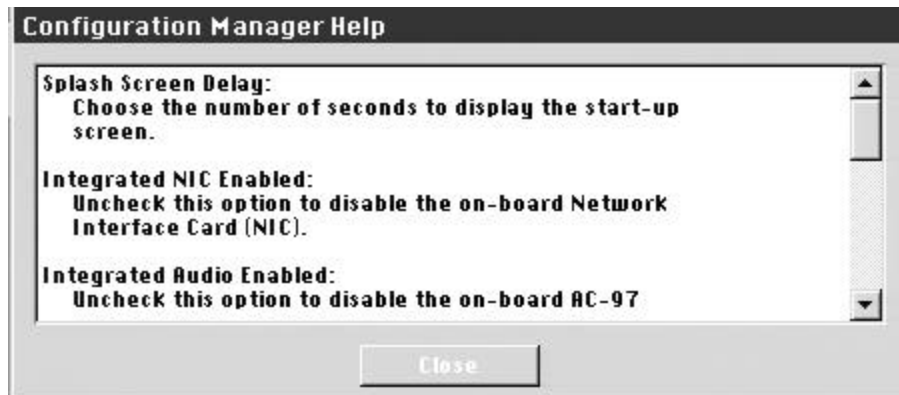


Figure 25. Example of Configuration Manager Help (General Tab)

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## Using ECC (Error Correcting Code) Memory

The BIOS automatically enables an ECC operation if your system has ECC memory modules. If enabled, single-bit memory errors are detected and automatically corrected by the hardware. To log ECC errors in the System Events Log, see the System Events Tab. To view the System Events Log, go to the System Event Log Tab.

## Setting the Time and Date

- Configure Date (Time/Date Tab)
- Configure Time (Time/Date Tab)

You can set the time and date in the operating system or in the Configuration Manager. To set the time or date, do the following:

1. Go to the Time/Date Tab
2. Enter the new time or date
3. Press the Update Time or Update Date button.

Go to <http://developer.intel.com> on the World Wide Web to view the available Year 2000 Readiness Disclosures for Intel® Products.

## Keyboard Num Lock

- Keypad Num Lock (General Tab)

Use the Keypad Num Lock setting to control the on/off state of the Num Lock key on the keyboard when the system is powered-on. The Num Lock State may be ignored by the Operating System.

## Force Full Fan Speed

- Force Full Fan Speed (General Tab)

Use this option to automatically force the system fans to always run at full speed. For maximum cooling, set this option to “On.” For quieter operation, set this option to the default “Off.” Consult your system manufacturer for recommended settings based on your system configuration.

## Enabling/Disabling On-board LAN NIC

- Integrated NIC Enabled (General Tab)

Use the Integrated NIC Enabled setting to enable or disable an on-board LAN Network Interface Card controller. The on-board LAN controller is manufacturers’ option and may not be present on all Workstation Boards.

## Enabling/Disabling On-board Audio

- Integrated Audio Enabled (General Tab)

Use the Integrated Audio Enabled setting to enable or disable an on-board AC '97 audio controller. The on-board audio controller is a manufacturer's option, and may not be present on all Workstation Boards.

## Power Management ACPI Sleep States

The BIOS supports ACPI-aware operating systems. Table 20 shows the wake events supported by the BIOS.

**Table 20. Wake Events Supported for Each Sleep State**

<b>S0 Normal Operation</b>	<b>S1 Processor Sleep</b>	<b>S2</b>	<b>S3 Suspend to RAM</b>	<b>S4 Suspend to Disk</b>	<b>S5 Normal Off</b>
Not applicable	LAN Modem ring <sup>†</sup> RTC alarm PCI PME USB (keyboard or mouse) PS/2 keyboard or mouse Power switch	Not supported	Power switch PCI PME USB (keyboard or mouse) PS/2 keyboard or mouse	LAN Modem ring <sup>†</sup> RTC alarm PCI PME Power switch	LAN Modem ring <sup>†</sup> RTC alarm PCI PME Power switch

<sup>†</sup> External serial modems using Ring Indicator (RI). PCI modems use the PCI PME signal. No wake on modem ring support is provided for USB modems.

The S5 wake-up events can be enabled or disabled on the Power Events Tab. Momentary closure of the power switch will wake-up the system from all sleep states. Refer to the *OR840 Workstation Board Specification Update* for the latest information

## IDE Configuration

- Spin Delay (Integrated IDE Tab)
- Primary IDE (Integrated IDE Tab)
- Secondary IDE (Integrated IDE Tab)
- Controller Enabled (Integrated IDE Tab)

If the IDE hard drive is not ready when the BIOS searches for a boot drive, the BIOS utility proceeds to the next boot device. The spin delay setting is used to add a time delay to allow IDE hard disk drives to spin-up before the BIOS checks for a bootable image.

Use the Primary IDE/Secondary IDE settings to enable the Primary/Secondary IDE channels.

Use the Controller Enabled option to enable or disable both IDE channels and free the system resources.

## Floppy Drive Configuration

- Floppy Controller Enabled (Integrated Floppy Tab)
- Floppy A: type (Integrated Floppy Tab)
- Write Protect A Enabled (Integrated Floppy Tab)



### NOTE

1. Use the *Floppy Controller Enabled* setting to enable or disable the floppy drive.
2. Use the *Floppy A: setting* to select the floppy drive density.
3. Use the “*Write Protect A Enabled*” setting to enable or disable the write capability of the floppy disk drive.

## Selecting Boot Options

- Select Boot Device (Boot Options Tab)
- Splash Screen Delay (General Tab)
- Spin Delay (Integrated IDE Tab)

In the Configuration Manager, the user can choose to boot from a diskette drive, IDE or SCSI hard drive, CD-ROM, or the network. The default setting, Auto, selects the diskette drive to be the first is for the diskette drive to be the primary boot device and the hard drive to the second boot device. By default the third and fourth devices are disabled.

Booting from CD-ROM is supported in compliance to the *El Torito* bootable CD-ROM format specification. You can boot a CD-ROM from either a CD-ROM drive or a DVD drive. If you have multiple CD-ROM drives in your system, only the first CD-ROM drive found in the system can be used as a boot device.

A PXE-compliant network server may be selected as a boot device by choosing “Network” on the Boot Options Tab. The on-board network adapter does not require the user to install a remote boot ROM. Booting from an add-in network adapter may require the user to install a remote boot ROM. To access the PXE bootstrap selection menu, press both left and right shift keys immediately after the video BIOS sign-on message.

## How to Display the Network Bootstrap Selection Menu

- First Boot Device (Boot Options Tab)

The BIOS includes a PXE boot ROM (included in the firmware hub) for the built-in network interface that is compatible with the *Preboot Execution Environment (PXE) Specification*.

When the Network is selected as the first boot device on the Boot Options Tab, the user will be presented with the following prompt when the system boots:

```
Press F8 to view menu (9)
```

The number (9) represents the number of seconds before the BIOS continues and uses the default boot menu choice. The local network system administrator on using configuration files on the network boot server configures the network boot menu, (including the default choice).

## Canceling a Network Boot

To cancel a PXE network boot, press the Escape key or <Ctrl> + <C>.

## Identifying the BIOS

- BIOS version (System BIOS Tab)
- SMBIOS Version (System BIOS Tab)
- Boot Block Revision (System BIOS Tab)

The System BIOS Tab displays the BIOS identifier string, the version number for SMBIOS, and the Boot Block Revision

## Setting the Splash Screen Delay

- Splash Screen Delay (General Tab)

The Splash Screen Delay setting controls how long the OEM logo screen remains visible.

## Using the BIOS Security Features

- User password (Security Tab)
- Administrator password (Security Tab)

The BIOS has support for two password levels: Administrator and User. The User password is used to prevent unauthorized users from booting the Operating System. The Administrator password is used to prevent unauthorized users from entering the Configuration Manager.

### NOTE

*If both passwords are set, you may enter either password to boot the system. If you forget your passwords, use the Configuration Mode Jumper to enter Configuration Manager without the Administrative Password. See “Clearing BIOS Passwords.”*

*A password must have between 1 and 15 characters. Valid characters have character codes in the range from 20h to 7Eh (32 to 126 in decimal notation.)*

*Passwords are stored in flash memory with the BIOS. Updating the system BIOS clears both passwords.*



**Table 21. Administrative and User Passwords in Configuration Manager**

Configuration Mode Jumper:	pins 1-2				pins 2-3
	Neither Password Set	User Password Set	Administrator Password Set	Both Passwords Set	
Condition → Action ↓					Jumper Set to Configure
Boot OS	No password required	User Password Required	No password required	Password Required (User or Administrator)	Not allowed
Remote Boot across Network using LAN-based Management Software	No password required	User Password must be entered on local machine	No passwords required	User Password must be entered on local machine	Not allowed
Enter Configuration Manager	No password required	No password required	Administrator Password Required	Administrator Password Required	No password required (Limited to setting the password)
Set or Reset User Password	No password required	User password required	Administrator Password Required**	Both Passwords Required**	No password required
Set or Reset Administrator Password	No password required	No password required	Administrator Password Required	Administrative Password Required	No password required
Upgrade BIOS	No password required	User password required	No password required	Password required (User or Administrator)	Not Allowed

\*\*Administrative password required allowing entry into the Configuration Manager.

## NOTE

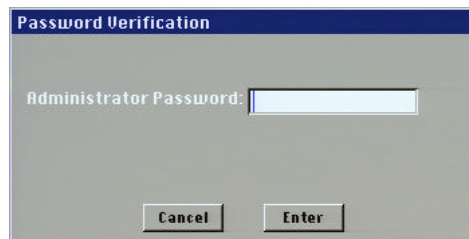
*BIOS recovery – configuration jumper removed – no password is required. This operation resets any passwords previously set.*

## Clearing BIOS Passwords

- Clear User Password (Security Tab)
- Clear Administrator Password (Security Tab)

To clear the User or Administrative Password, do the following:

1. Enter Configuration Manager.
2. If the Administrator password is set, enter the password in the Password Verification dialog, then choose Enter.



**Figure 26. Administrator Password Verification Dialog**

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3. Choose the Security Tab.
4. Select Clear User Password or Clear Administrator Password.
5. Enter the password in the Password Verification dialog, then choose Enter.
6. Go to Save/Exit Tab.
7. Choose Save New Settings, then choose Exit.

If you forgot one of the passwords, you can clear either password by using the Configuration Mode Jumper. If you use the Configuration Mode Jumper, you will not be prompted to enter or verify passwords. To clear the password using the Configuration Mode Jumper, refer to Table 4.

**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 your system user's guide for important safety information.*

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

## Using USB

- Legacy USB Support (General Tab)

The Workstation Board includes an on-board USB hub that supports two device ports. USB-aware Operating Systems support the USB interface. For non USB-aware Operating Systems (Windows\* NT 4.0), the BIOS will provide support for USB “Legacy” keyboard and mouse.

To enable USB keyboard/mouse in non USB-aware Operating Systems, check “Legacy USB Support” on the General Tab. Boot the device drivers to the Operating System, and not the USB.

**NOTE**

- *You should not have more than two USB hubs between your device and the USB ports on your computer.*
- *Do not use two keyboards or two mice (one- [1] on the PS/2 or serial port and the other on the USB port).*
- *Do not connect or disconnect the keyboard or mouse during power-on.*
- *The BIOS does not support booting from USB storage devices.*
- *The BIOS does not support wake on ring from USB modems.*

## Serial Port Configuration

- Serial Port 1 (Peripheral Ports Tab)
- Infrared Port (Peripheral Ports Tab)

The Workstation Board has one RS-232 serial port connector, and one connector header for an IrDA v1.0 compatible infrared transceiver.

An infrared interface (not included with the workstation board) provides two-way wireless communications to infrared devices. The infrared transceiver must be connected to the infrared header on the workstation board (see your workstation board documentation for details).

The BIOS does not support booting with an infrared keyboard or mouse. Also, the BIOS does not support wake on infrared keyboard or mouse.

## Parallel Port Configuration

- Parallel Port mode (Peripheral Ports Tab)

The parallel port mode can be set to ECP, EPP, Bi-directional, or Output only mode.

**Table 22. Parallel Port Modes**

Mode	Description
ECP	IEEE-1284 compatible Enhanced Capabilities Port mode. A bi-directional parallel port mode with hardware support for RLE compression. This mode is software and hardware compatible with all other parallel port modes and therefore can be used as the default mode.
EPP	IEEE-1284 compatible Enhanced Parallel Port (ECP 1.9) mode. A bi-directional parallel port mode.
Bi-directional	PS/2 type bi-directional parallel port (SPP) mode.
Output only	Output only mode used to support basic printers.

## Processor Speed Detection

- Front Side Bus Speed (System Processor Tab)
- Processor Speed (System Processor Tab)

The processor speed and front side bus (FSB) settings are displayed on the System Processor Tab. Only Pentium® III processors with 133 MHz front side bus speeds are supported.



### CAUTION

*The Workstation Board only supports Intel® Pentium® III processors with a front-side bus speed of 133 MHz. Installing Pentium® II or Celeron™ processors may result in damage to the workstation board and processors.*

*If two- (2) processors are installed, both processors must have the same processor speed, cache size, and cache type (either discrete cache or advanced transfer cache).*

The Intel nomenclature for Pentium III processors with speeds between 500 and 600 MHz includes two- (2) letter designators that customers can use to determine the front-side bus speed and cache type of the processor. The letter designators are:

E	Designates Pentium III processors with advanced transfer L2 cache
B	Designates Pentium III processors with 133 MHz Front Side Bus speed

 **NOTE**

*For further details refer to the following support web site.*

<http://support.intel.com/support/motherboards/workstation/OR840/procsupp.htm>

## Loading the Factory Default Settings

- Load Factory Settings (Save/Exit Tab)

The Load Factory Settings button restores the factory defaults.

## 5 Upgrading the System BIOS

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This chapter describes how to upgrade the System BIOS. This chapter covers the following topics:

Topic	Page
Procedure To Create A Bootable Floppy Disk	70
Preparing for the Upgrade	71
Obtaining the BIOS upgrade File	71
Recording the Current BIOS settings	71
Creating the BIOS Upgrade Diskette	72
Upgrading the System BIOS	72
Recovering the BIOS	73

### Procedure to Create a Bootable Floppy Disk

#### NOTE

*For BIOS upgrades you must use 1.44 MB floppy or LS-120 drive.*

Use the following BIOS Upgrade Instructions for generating a floppy disk:

1. Insert an IBM\* formatted 3.5-inch disk into the floppy drive
2. Unzip the BIOS files to the disk by typing "SW A:"
3. Run instboot.exe to create a bootable disk
4. Reboot the system
5. The upgrade process will start automatically
6. The upgrade process takes 1-2 minutes to complete, a 3-3-3 beep code indicates a successful BIOS upgrade
7. Remove the BIOS upgrade disk
8. Press the reset button on your computer

## Preparing for the Upgrade

Before you upgrade the BIOS, prepare by:

- Obtaining the BIOS upgrade file
- Recording the current BIOS settings
- Creating the BIOS upgrade diskette

## Obtaining the BIOS Upgrade File

You can upgrade to a new version of the BIOS by using the BIOS upgrade file. The BIOS upgrade file is a compressed self-extracting archive that contains all the files you need to upgrade the BIOS. The BIOS upgrade file also functions as the BIOS recovery file.

The BIOS upgrade file contains:

- New BIOS files
- BIOS recovery files

You can obtain the BIOS upgrade file through your computer supplier or from the Intel World Wide Web site:

<http://support.intel.com/support/motherboards/workstation/OR840/>

### NOTE

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

## 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 C to record the current settings in the Configuration Manager.

## Creating the BIOS Upgrade Diskette

To create a BIOS upgrade or recovery diskette, do the following:

1. Obtain the BIOS upgrade file through your computer supplier or from the Intel World Wide Web site:  
<http://support.intel.com/support/motherboards/workstation/or840/software.htm>
2. Follow the instructions provided with the upgrade files to create the upgrade diskette:

## Upgrading the System BIOS

1. Create a BIOS upgrade diskette.
2. Follow the instructions provided with the upgrade files.

### NOTE

All Configuration Manager settings are reset to the factory default values and the passwords are cleared after a BIOS update or recovery.



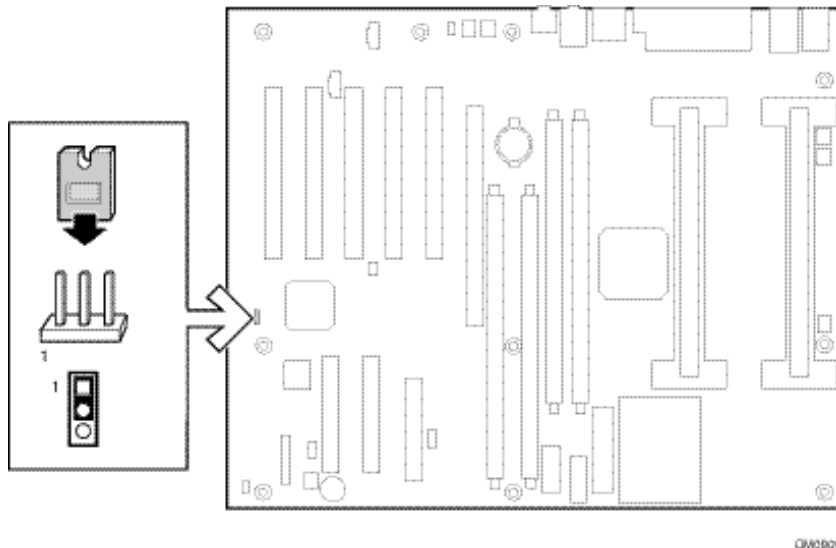
## Recovering the BIOS

### WARNING

*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. The inside of the chassis presents potential for multiple risks of personal injury, including risk of electrical shock, burns due to hot components, and lacerations due to sharp edges! Refer to your system user's guide for important safety information.*

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:

1. Turn the computer off and unplug the power cord from the wall outlet, disconnect any telephone lines or LAN connections, and unplug all peripheral devices.
2. Remove the chassis cover to gain access to the jumper.
3. Remove the Configuration Mode jumper (J1F2). Save the jumper.



**Figure 27. Location of Configuration Mode Jumper**

4. Reassemble your system and turn the power on.
5. Insert the BIOS upgrade diskette in drive A: then boot the computer. The BIOS will automatically update the System BIOS in flash memory. This process takes less than two minutes. The video display will be disabled during the upgrade process.
6. Listen for the beeps coming from the small speaker on the motherboard (not the external audio port) that indicates the BIOS update is complete. Remove the BIOS upgrade diskette when you hear the following beep code: three beeps—pause—three beeps—pause—three beeps.
7. Shut down the system and unplug the system.
8. Reset the Configuration Mode jumper to the normal operation setting (connect jumper to pins 1–2).
9. Reassemble the system and reboot.
10. Choose Enter Setup.
11. Change the Configuration Manager settings to match your previous settings.
12. Save the changes and exit Configuration Manager.

## 6 Technical References

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### Workstation Board Connectors

This chapter contains the following topics:

Topic	Page
Back Panel Connectors	75
Midboard Connectors	77
Audio Connectors	77
Fan Connectors	78
Power Connectors	79
Peripheral Connectors	80
Security Connectors	81
Add-in Board Connectors	81
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Workstation Board Resources	84
Memory Map	84
System Management Bus Map	84
I/O Map	84
Fixed I/O Address Ranges	85
Variable I/O Decode Ranges	86



#### CAUTION

*Only the back panel connectors of this Workstation Board have over-current protection. The powered-interval motherboard connectors are not over-current protected, and should connect only to devices inside the computer chassis, such as fans and internal peripherals. Do not use these connectors for powering up devices, which are external to the computer chassis. A fault in the load presented by the external devices could cause damage to the computer, the interconnecting cable, and the external devices themselves.*

This section describes the Workstation Board's connectors. The connectors can be divided into three- (3) groups as shown in Figure 28.

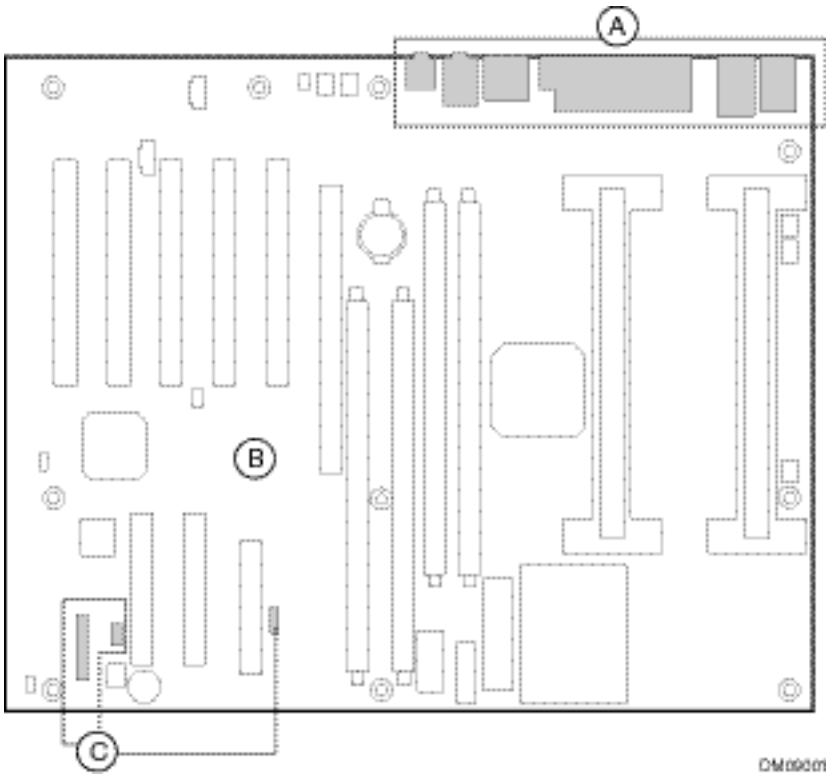


Figure 28. Connector Groups

Group A	Back panel connectors
Group B	Midboard connectors
Group C	Front panel connectors

### Back Panel Connectors

The following Figure 29 shows the location of the back panel connectors.

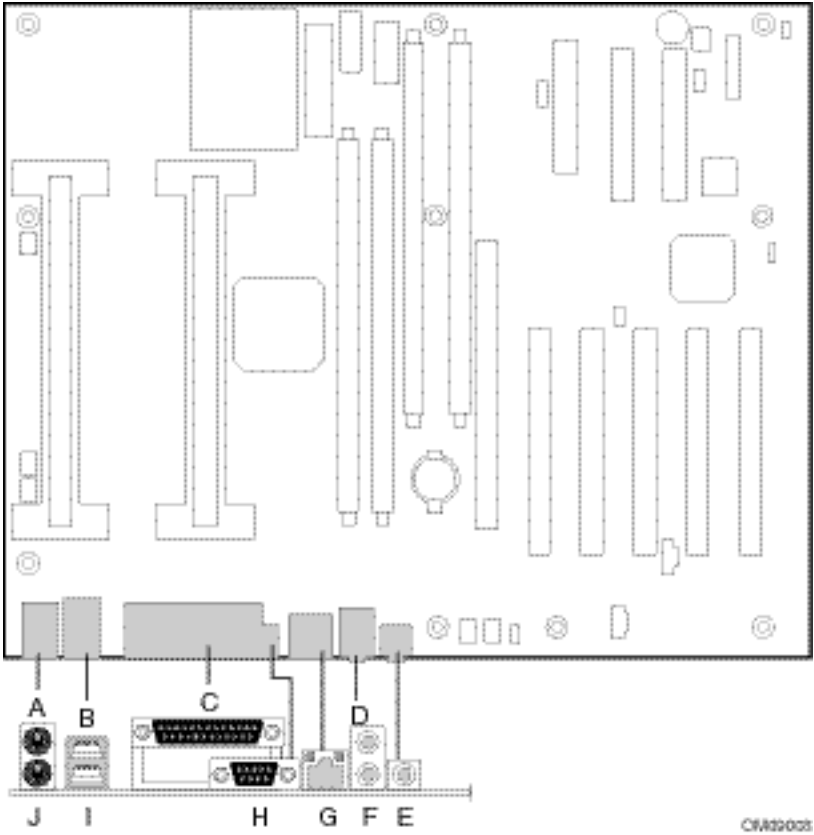


Figure 29. Back Panel Connectors

A	PS/2 Keyboard or Mouse	F	Line Out
B	USB Port 1	G	LAN
C	Parallel Port	H	Serial Port A
D	Line In	I	USB Port 0
E	Mic In	J	PS/2 Keyboard or Mouse

**NOTE**

*The back panel audio line out connector is only designed to power headphones or amplified speakers. Poor audio quality may occur if passive (non-amplified) speakers are connected to this output.*

# Midboard Connectors

The midboard connectors are divided into the following functional groups:

- Add-in board connectors
  - PCI
  - AGP

# Audio Connectors

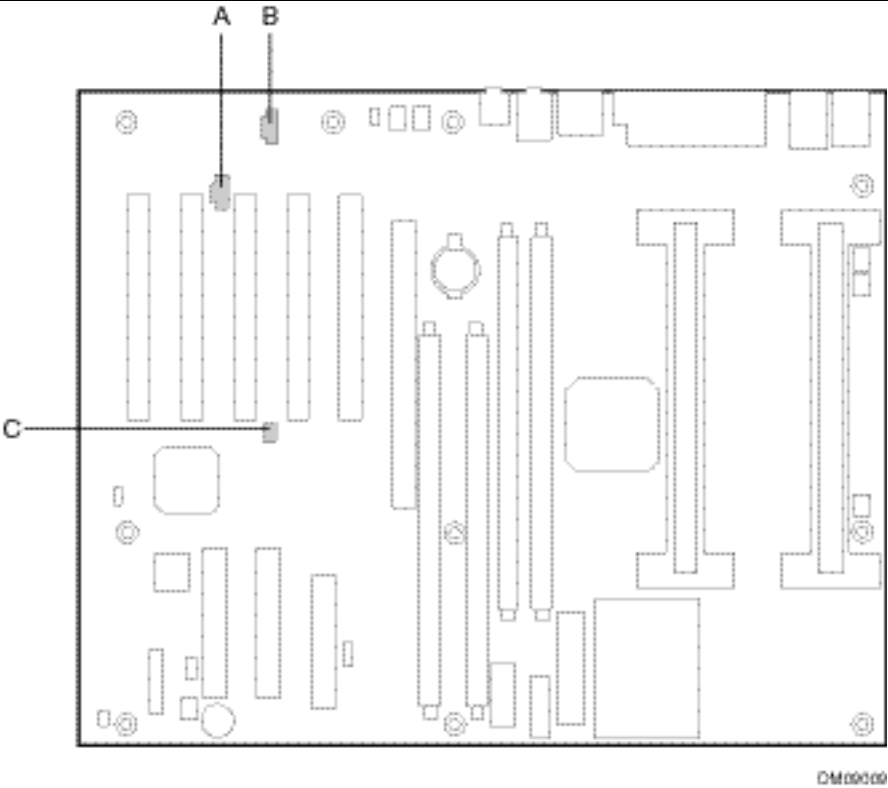


Figure 30. Audio Connectors

A	ATAPI-style telephony	1x4-pin
B	ATAPI-style CD-ROM	1x4-pin
C	MIDI	2x3-pin

# Fan Connectors

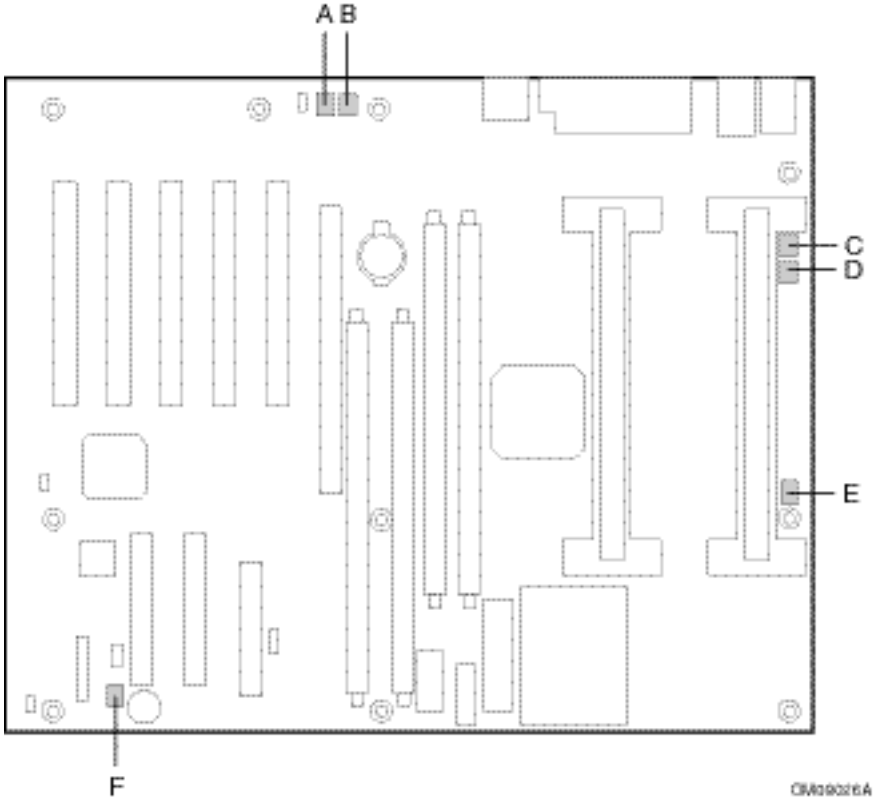


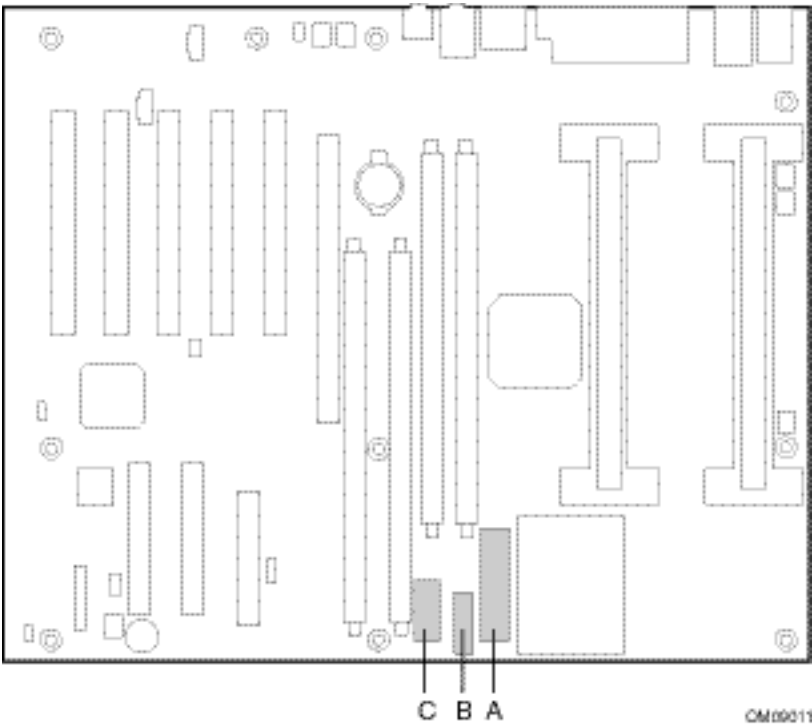
Figure 31. Fan Connectors

A	System Fan A
B	System Fan B
C	Processor Fan B
D	Processor Fan A
E	Processor Fan C
F	System Fan C

# Power Connectors

**CAUTION**

*It is important to utilize the Supplementary AGP Pro50 power connector when the Workstation Board is configured with an AGP-Pro50 graphics card. This connector accepts a standard hard drive connector from the power supply cable harness. Failure to do this can result in damage to the Board and the 20-pin ATX connector through excessive 12V current.*



**Figure 32. Power Connectors**

A	ATX power connector
B	Supplementary AGP Pro50 power connector
C	Auxiliary power connector

# Peripheral Connectors

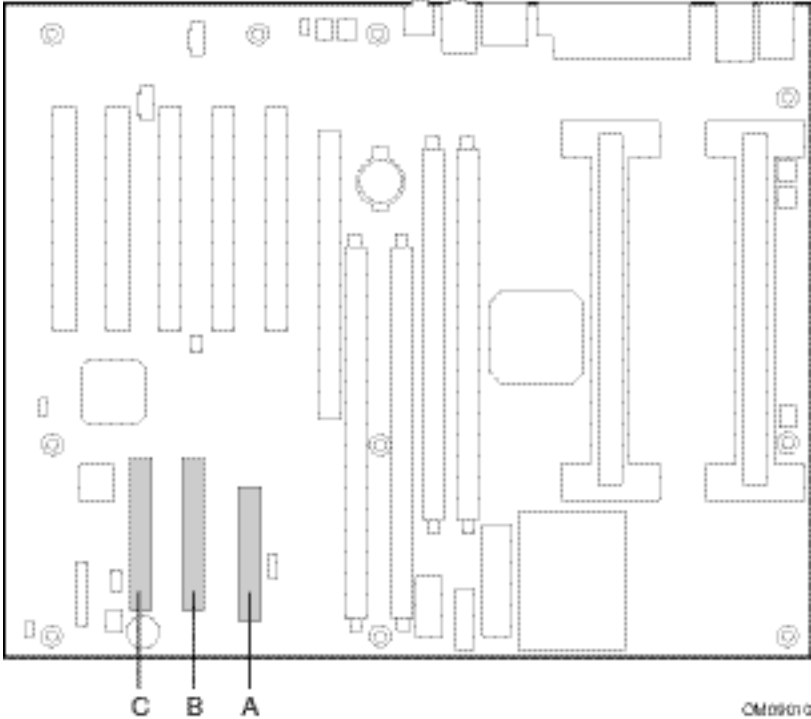
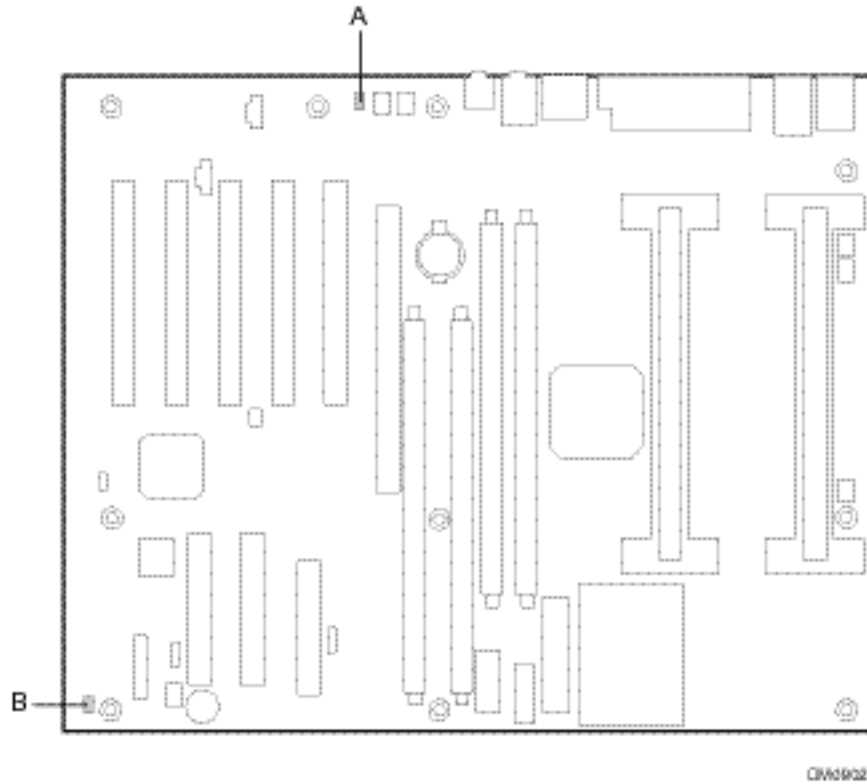


Figure 33. Peripheral Connectors

A	Diskette drive
B	Secondary IDE
C	Primary IDE



## Security Connectors



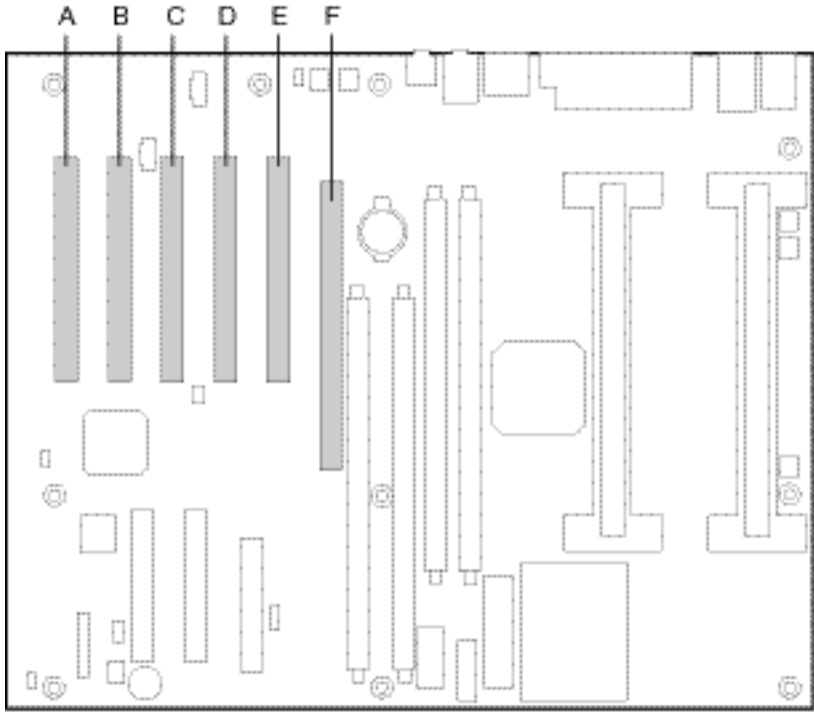
**Figure 34. Security Connectors**

A	Front chassis intrusion detection
B	Rear chassis intrusion detection

## Add-in Board Connectors

When the Workstation Board is installed in a chassis, a maximum of six- (6) slots is available for installing add-in boards as follows:

- Five- (5) dedicated PCI slots
- One- (1) AGP, AGP Pro50 modes and add-in cards at 1X, 2X, and 4X modes. The following Figure 35 shows the add-in board connectors.



CM09012

Figure 35. Add-in Board Connectors

A	PCI Bus connector 5
B	PCI Bus connector 4
C	PCI Bus connector 3
D	PCI Bus connector 2
E	PCI Bus connector 1
F	AGP Pro universal connector

# Front Panel Connectors

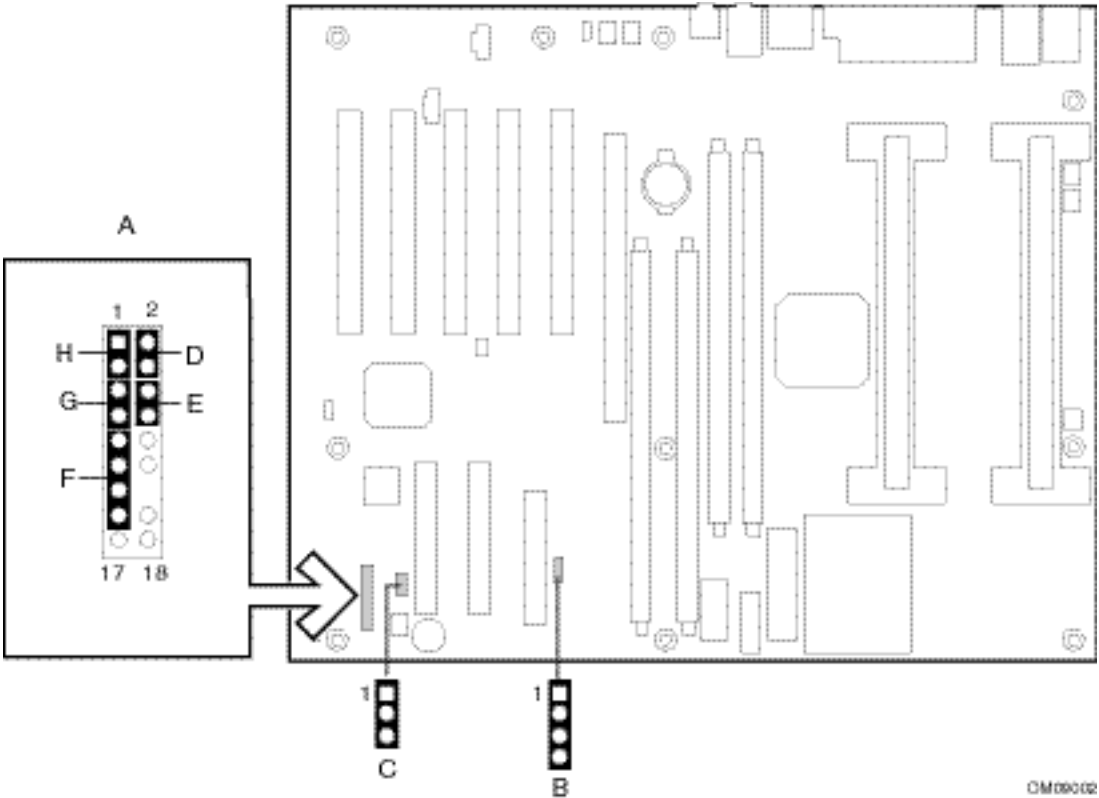


Figure 36. Front Panel Connectors

A	Front panel connector
B	SCSI activity LED
C	Auxiliary front panel LED
D	Power/sleep LED
E	Power switch
F	Infrared port
G	Reset
H	Hard drive activity LED

## Workstation Board Resources

### Memory Map

**Table 23. System Memory Map**

Address Range (hex)	Size	Description
0FFF0000-0FFFFFFF	1 MB	Flash Memory (FWH)
	32 KB	Reserved for ACPI tables (other tables as required)
00100000-(top of memory-32 KB)	varies	Extended System Memory
000E0000-000FFFFF	128 KB	Reserved for System BIOS shadow area
000C0000-000DFFFF	128 KB	Reserved for Option ROM shadow area
000A0000-000BFFFF	128 KB	Video Buffer
00000000-0009FFFF	640 KB	Conventional memory

### System Management Bus Map

**Table 24. System Management Bus Map**

Address (hex)	Description	Partition
A0, A2, A4, A6	Baseboard IDROM	2
5A	First Heceta 4	2
5C	Second Heceta 4	2
A0	RIMM 1 SPD EEPROM	0
A4	RIMM 2 SPD EEPROM	0
A2	RIMM 3 SPD EEPROM	0
A6	RIMM 4 SPD EEPROM	0
CE	Alert on LAN 2 companion device	1

### I/O Map

The I/O map is divided into Fixed and Variable address ranges. Fixed ranges cannot be moved, but in some cases can be disabled. Variable ranges can not only be moved, but also disabled.

## Fixed I/O Address Ranges

**Table 25. Fixed I/O Ranges Decoded by ICH**

Address	Read Target	Write Target	Internal Unit
00h-08h	DMA Controller	DMA Controller	DMA
09h-0Eh	Reserved	DMA Controller	DMA
0Fh	DMA Controller	DMA Controller	DMA
10h-18h	DMA Controller	DMA Controller	DMA
19h-1Eh	Reserved	DMA Controller	DMA
1Fh	DMA Controller	DMA Controller	DMA
20h-21h	Interrupt Controller	Interrupt Controller	Interrupt
24h-25h	Interrupt Controller	Interrupt Controller	Interrupt
28h-29h	Interrupt Controller	Interrupt Controller	Interrupt
2Ch-2Dh	Interrupt Controller	Interrupt Controller	Interrupt
30h-31h	Interrupt Controller	Interrupt Controller	Interrupt
34h-35h	Interrupt Controller	Interrupt Controller	Interrupt
38h-39h	Interrupt Controller	Interrupt Controller	Interrupt
3Ch-3Dh	Interrupt Controller	Interrupt Controller	Interrupt
40h-42h	Time/Counter	Time/Counter	PIT (8254)
43h	Reserved	Time/Counter	PIT
50h-52h	Time/Counter	Time/Counter	PIT
53h	Reserved	Time/Counter	PIT
61h	NMI Controller	NMI Controller	Processor Interface
70h	Reserved	NMI and RTC Controller	RTC
71h	RTC Controller	RTC Controller	RTC
72h	RTC Controller	NMI and RTC Controller	RTC
73h	RTC Controller	RTC Controller	RTC
74h	RTC Controller	NMI and RTC Controller	RTC
75h	RTC Controller	RTC Controller	RTC
76h	RTC Controller	NMI and RTC Controller	RTC
77h	RTC Controller	RTC Controller	RTC
80h	DMA Controller	DMA Controller and LPC or PCI	DMA
81h-83h	DMA Controller	DMA Controller	DMA
84h-86h	DMA Controller	DMA Controller and LPC or PCI	DMA
87h	DMA Controller	DMA Controller	DMA
88h	DMA Controller	DMA Controller and LPC or PCI	DMA
89h-8Bh	DMA Controller	DMA Controller	DMA
8Ch-8Eh	DMA Controller	DMA Controller and LPC or PCI	DMA
08Fh	DMA Controller	DMA Controller	DMA
92h	Reset Generator	Reset Generator	Processor Interface
A0h-A1h	Interrupt Controller	Interrupt Controller	Interrupt
A4h-A5h	Interrupt Controller	Interrupt Controller	Interrupt
A8h-A9h	Interrupt Controller	Interrupt Controller	Interrupt
ACh-ADh	Interrupt Controller	Interrupt Controller	Interrupt
B0h-B1h	Interrupt Controller	Interrupt Controller	Interrupt

Address	Read Target	Write Target	Internal Unit
B2h-B3h	Power Management	Power Management	TBD
B4h-B5h	Interrupt Controller	Interrupt Controller	Interrupt
B8h-B9h	Interrupt Controller	Interrupt Controller	Interrupt
BCh-BDh	Interrupt Controller	Interrupt Controller	Interrupt
C0h-D1h	DMA Controller	DMA Controller	DMA
D2h-DDh	Reserved	DMA Controller	DMA
DEh-DFh	DMA Controller	DMA Controller	DMA
F0h	See Note 3	FERR#/IGNNE#/Interrupt	Processor Interface
170h-177h	IDE Controller <sup>1</sup>	IDE Controller <sup>1</sup>	IDE
1F0h-1F7h	IDE Controller <sup>2</sup>	IDE Controller <sup>2</sup>	IDE
376h	IDE Controller <sup>1</sup>	IDE Controller <sup>1</sup>	IDE
3F6h	IDE Controller <sup>2</sup>	IDE Controller <sup>2</sup>	IDE
4D0h-4D1h	Interrupt Controller	Interrupt Controller	IDE
CF9h	Reset Generator	Reset Generator	Processor Interface

1. Only if IDE Standard I/O space is enabled for Primary Drive. Otherwise the target is PCI
2. Only if IDE Standard I/O space is enabled for Secondary Drive. Otherwise, the target is PCI.
3. IF POS\_DEC\_EN bit is enabled, reads from F0h will not be decoded by the ICH. If POS\_DEC\_EN is not enabled, reads from F0H will forward to LPC.

## Variable I/O Decode Ranges

Table 26 shows the variable I/O decoded ranges for the ICH.

**Table 26. Variable I/O Decode Ranges**

Range Name	Mappable	Size (Bytes)	Target
ACPI	Anywhere in 64 K I/O Space	64	Power Management
IDE	Anywhere in 64 K I/O Space	16	IDE Unit
USB	Anywhere in 64 K I/O Space	32	USB Unit
SMBus	Anywhere in 64 K I/O Space	16	SMB Unit
AD'97 Audio Mixer	Anywhere in 64 K I/O Space	256	AC'97 Unit
AC'97 Bus Master	Anywhere in 64 K I/O Space	64	AC'97 Unit
AC'97 Modem Mixer	Anywhere in 64 K I/O Space	256	AC'97 Unit
TCO	96 Bytes above ACPI Base	32	TCO Unit
GPIO	Anywhere in 64 K I/O Space	64	GPIO Unit
Parallel Port	3 ranges in 64 K I/O Space	8	LPC Peripheral
Serial Port 1	8 ranges in 64 K I/O Space	8	LPC Peripheral
Serial Port 2	8 ranges in 64 K I/O Space	8	LPC Peripheral
Floppy Disk Controller	2 ranges in 64 K I/O Space	8	LPC Peripheral
MIDI	4 ranges in 64 K I/O Space	2	LPC Peripheral
MSS	4 ranges in 64 K I/O Space	8	LPC Peripheral
SoundBlaster	2 ranges in 64 K I/O Space	32	LPC Peripheral
AdLib	2 ranges in 64 K I/O Space	2	LPC Peripheral
LPC Generic 1	Anywhere in 64 K I/O Space	128 bytes (with mask)	LPC Peripheral
LPC Generic 2	Anywhere in 64 K I/O Space	16 bytes (with mask)	LPC Peripheral

# Appendix A: Error Messages

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## Beep Codes and BIOS Messages

### 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 27. BIOS Beep Codes**

Beep Code	Description
1-1-1	Memory not supported (Not RDRAM)
1-1-2	Memory not supported (SPD contains invalid width – not 16 or 18)
1-1-3	No memory devices were found on one or both channels.
1-1-4	More than 32 devices on the channel.
1-1-5	Memory failure (number of devices detected does not match SPD data)
1-1-6	Memory not supported (FRAS data in SPD is invalid)
1-2-3	Memory not supported (Populated memory requires too many time domains)
1-2-4	Memory not supported (No valid channel frequency)
1-2-5	Memory failure (Levelization failure – ran out of time domains)
1-2-6	Memory not supported (unsupported memory technology)
1-2-7	Memory failure (Continuity module missing or chipset failure)
1-2-8	Memory not supported (could not find valid refresh rate)
1-3-1	Memory not supported (invalid refresh information in SPD)
1-3-2	Memory not supported (tCAC invalid)
1-3-3	Memory not supported (does not support enough time domains)
1-3-4	Memory not supported (tRCD invalid)
1-3-5	Memory not supported (invalid SPD tCLS or tCAS)
1-3-6	Memory not supported (SPD mismatch between channel A and B)
1-3-8	Memory not supported (SPD mismatch between channel A and B)
1-4-1	Memory not supported (SPD mismatch between channel A and B)
1-4-2	Memory not supported (SPD mismatch between channel A and B)
1-4-3	Memory not supported (SPD mismatch between channel A and B)
1-4-4	Memory not supported (SPD mismatch between channel A and B)
1-4-5	Memory not supported (SPD mismatch between channel A and B)
1-4-8	Memory not supported (SPD mismatch between channel A and B)
1-5-1	Memory not supported (invalid number of devices on RIMM)
1-5-3	Memory not supported (SPD mismatch between channel A and B)
1-5-5	Memory failure (Detected bad chipset configuration)
1-6-1	Memory not supported (unsupported memory technology)

<b>Beep Code</b>	<b>Description</b>
1-6-2	Memory not supported (unsupported memory technology)
1-6-3	Memory not supported (could not find valid CAS Latency)
1-6-5	Memory not supported (can not mix registered and non-registered memory)
1-6-6	Memory not supported (could not find valid CAS Latency)
1-6-7	Memory failure (Levelization phase 1)
1-6-8	Memory failure (Levelization phase 2)
2-1-1	APG Pro (>50W) detected. Only AGP or AGP Pro50 (50W) graphics adapters are supported. The BIOS will prevent the system from booting.
2-1-2	FMM Initialization failed – Flash Corruption – BIOS Recovery required
3-1-1	BIOS Recovery – Flash Initialization Failure
3-1-2	BIOS Recovery – Flash Update Operation Failed
3-1-3	BIOS Recovery – Read file from Floppy Operation Failed
3-1-4	BIOS Recovery – Flash Erase Operation Failed
3-1-5	BIOS Recovery – Flash Write Operation Failed
3-1-6	BIOS Recovery – File Verify Operation (Checksum) Failed
3-1-7	BIOS Recovery/Flash Update – Processor Patch Installation Failed
3-2-1	BIOS Recovery – File Verify Operation (Invalid BIOS) Failed
3-2-2	BIOS Recovery – File Verify Operation (Mismatched Platform BIOS) Failed
3-2-3	BIOS Recovery Boot Block Incompatible with BIOS
3-2-4	BIOS Recovery – Flash Verify After Write Failed
3-3-3	BIOS update completed normally
4-8-8	A double-bit ECC error has been detected
5-1-3	Severe parity error reading flash
8-1-1	The BIOS did not detect a PS/2 or USB keyboard
8-1-2	The BIOS did not detect a PS/2 or USB mouse



## BIOS Messages

### 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 floppy, IDE-0, IDE-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 A:"  
The floppy drive is not physically connected, or the drive does not have a diskette in the drive.
- "Invalid Boot Diskette"  
The diskette in the floppy drive contains an unformatted diskette.
- "Non-System disk or disk error. Replace and strike any key when ready."  
The diskette in the floppy drive contains a formatted diskette, but not a valid boot diskette.

### Configuration Manager Messages

- Password is incorrect!  
The password you entered does not match the required password. Enter the password again.
- 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 can not 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.

## PXE Client Status and Error Messages

- PXE-M00: Intel UNDI, PXE-2.0 (build nnn) - Initializing: PnP/BEV  
Status message indicating the software is initializing.
- PXE-M00: Intel UNDI, PXE-2.0 (build nnn) - Initializing: Int 18h  
Status message indicating the software is initializing.
- PXE-M00: Intel UNDI, PXE-2.0 (build nnn) - Initializing: Int 19h  
Status message indicating the software is initializing.
- PXE-M00: Intel UNDI, PXE-2.0 (build nnn) - Network Boot Disabled  
Network boot has been disabled using the Bootstrap Selection menu.
- PXE-M04: Hold down both shift keys to change bootstrap selection...  
Hold down the left and right shift keys after the video BIOS identifier appears on the screen to invoke the Bootstrap Selection menu.
- PXE-M70: Network boot canceled by keystroke  
The network boot has been canceled by the user.
- PXE-M71: No services selected.
- PXE-E00: Could not find enough free base memory  
PXE base-code and UNDI runtime modules are copied from FLASH or upper memory into the top of free base memory between 480K (78000h) and 640K (A0000h). This memory must be zero filled by the system BIOS. If this memory is not zero filled, the relocation code in the PXE ROMs will assume that this memory is being used by the system BIOS or other boot ROMs.
  - PXE-E04: Error reading PCI configuration space  
This message is displayed if any of the PCI BIOS calls made to read the PCI configuration space return an error code. This should not happen with a production BIOS and properly operating hardware.
- PXE-E05: EEPROM checksum error  
This message is displayed if the NIC EEPROM contents have been corrupted. This can happen if the system is reset or powered down when the NIC EEPROM is being reprogrammed. If this message is displayed, the configured bootstrap type (Int 18h, 19h, PnP/BEV) has been lost and a default bootstrap type is selected. The default bootstrap type will be set to PnP/BEV if the system supports the PnP/BBS runtime functions. If the PnP/BBS runtime functions are not supported, Int 18h is the default bootstrap.
- PXE-E11: ARP timeout  
Displayed when the PXE ROM does not get an ARP reply.
- PXE-E20: BIOS extended memory copy error AH==nn  
This message is displayed if the BIOS extended memory copy service returns an error.
- PXE-E21: BIS integrity check failed  
BIS image has been corrupted.
- PXE-E22: BIS image/credential validation failed  
Downloaded image and credential do not match client key.
- PXE-E23: BIS initialization failed  
BIS could not be initialized. No more data is available.
- PXE-E24: BIS shutdown failed  
BIS could not be shutdown. No more data is available.
- PXE-E25: BIS get boot object authorization check flag failed  
Could not determine if BIS is enabled/disabled.
- PXE-E26: BIS free memory failed  
Could not release BIS allocated memory.
- PXE-E27: BIS get signature information failed  
Required BIS credential type information could not be determined.
- PXE-E28: BIS bad entry structure checksum

- BIS entry structure in the SM BIOS table is invalid.
- PXE-E32: TFTP open timeout  
TFTP open request was not acknowledged.
- PXE-E35: TFTP read timeout  
Next TFTP data packet was not received.
- PXE-E36: Error received from TFTP server  
A TFTP error packet was received from the TFTP server.
- PXE-E38: TFTP cannot open connection  
A hardware error occurred when trying to send the TFTP open packet out.
- PXE-E39: TFTP cannot read from connection  
A hardware error occurred when trying to send a TFTP acknowledge packet out.
- PXE-E3A: TFTP too many packages  
This message can mean one of two things. 1 – You are trying to download a file using TFTP that is larger than the allocated buffer. 2 – You started downloading a file, as a slave client, using MTFTP and the file increased in size when you became the master client.
- PXE-E3B: TFTP error--File not found  
The requested file was not found on the TFTP server.
- PXE-E3C: TFTP error--Access violation  
The request file was found on the TFTP server. The TFTP service does not have enough access rights to open/read the file.
- PXE-E3F: TFTP packet size is invalid  
The TFTP packet received is larger than 1456 bytes.
- PXE-E51: No DHCP or BOOTP offers received  
Client did not receive any valid DHCP, BOOTP or Proxy offers.
- PXE-E52: No IP address received from DHCP or BOOTP  
Client did not receive any valid DHCP or BOOTP offers. Client did receive at least one valid Proxy offer.
- PXE-E53: No boot filename received  
Client received at least one valid DHCP/BOOTP offer, but does not have a boot filename to download.
- PXE-E60: Invalid UNDI API function number  
An API being used by the base-code is not implemented in the UNDI ROM.
- PXE-E61: Media test failed, check cable  
Most likely the cable is not plugged in, or not connected. Could be a bad cable, NIC or connection.
- PXE-E63: Error while initializing the NIC  
An error occurred while trying to initialize the NIC hardware. Try another NIC.
- PXE-E64: Error while initializing the PHY  
An error occurred while trying to initialize the PHY hardware. Try another NIC.
- PXE-E65: Error while reading the configuration data  
An error occurred while reading the NIC configuration data. Try another NIC.
- PXE-E66: Error while reading the initialization data  
An error occurred while reading the NIC initialization data. Try another NIC.
- PXE-E67: Invalid MAC address  
The MAC address stored in this NIC is invalid. Try another NIC.
- PXE-E68: Invalid EEPROM checksum  
The EEPROM checksum is invalid. The contents of the EEPROM have been corrupted. Try another NIC.
- PXE-E69: Error while setting interrupt  
The interrupt hardware could not be configured. Try another NIC.
- PXE-E74: Bad or missing PXE menu and/or prompt information

- PXE tags were detected but the boot menu and/or boot prompt tags were not found/valid.
- PXE-E76: Bad or missing multicast discovery address  
Multicast discovery is enabled but the multicast discovery address tag is missing.
  - PXE-E77: Bad or missing discovery server list  
Multicast and broadcast discoveries are both disabled, or use server list is enabled, and the server list tag was not found/valid.
  - PXE-E78: Could not locate boot server  
A valid boot server reply was not received by the client.
  - PXE-E79: NBP is too big to fit in free memory base  
The NBP is larger than the amount of free base memory.
  - PXE-EA0: Network boot canceled by keystroke  
User pressed <Esc> or <Ctrl-C> during DHCP/Discovery/TFTP.
  - PXE-EC1: Base-code ROM ID structure is invalid  
UNDI boot module could not find the base-code ROM ID structure. If there is a base-code ROM image in the system, it has probably been corrupted.
  - PXE-EC3: Base-code ROM ID structure was not found  
The base-code ROM ID structure is invalid. The base-code ROM image has probably been corrupted.
  - PXE-EC4: UNDI ROM ID structure was not found  
The base-code loader module could not locate the UNDI ROM ID structure.
  - PXE-EC5: UNDI ROM ID structure is invalid  
The UNDI ROM image has probably been corrupted.
  - PXE-EC6: UNDI driver image is invalid  
The UNDI ROM image has probably been corrupted.
  - PXE-EC8: !PXE structure was not found in UNDI driver code segment  
The UNDI ROM image has probably been corrupted, or has not been initialized by the BIOS.
  - PXE-EC9: PXENV+ structure was not found in UNDI driver code segment  
The UNDI ROM image has probably been corrupted, or has not been initialized by the BIOS.

## Appendix B: Regulatory and Integration Information

This appendix contains:

- Safety standards, electromagnetic compatibility regulations, and product certification markings for this Workstation Board.
- Instructions and precautions for integrators who are installing this Workstation Board in a chassis.

### Regulatory Compliance

This Workstation Board complies with the following safety and EMC regulations when correctly installed in a compatible chassis.

**Table 28. Safety Regulations**

Regulation	Title
<i>UL 1950/CSA950, 3<sup>rd</sup> edition, Dated 07-28-95</i>	Bi-National Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (USA and Canada)
<i>EN 60950, 2<sup>nd</sup> Edition, 1992 (with Amendments 1, 2, 3, and 4)</i>	The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (European Community)
<i>IEC 950, 2<sup>nd</sup> edition, 1991 (with Amendments 1, 2, 3, and 4)</i>	The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (International)
<i>EMKO-TSE (74-SEC) 207/94</i>	Summary of Nordic deviations to EN 60950. (Norway, Sweden, Denmark, and Finland)

**Table 29. EMC Regulations**

Regulation	Title
<i>FCC Class B</i>	Title 47 of the Code of Federal Regulations, Parts 2 and 15, Subpart B, pertaining to unintentional radiators. (USA)
<i>CISPR 22, 2<sup>nd</sup> Edition, 1993 (Class B)</i>	Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (International)
<i>VCCI Class B (ITE)</i>	Implementation Regulations for Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines. (Japan)
<i>EN55022 (1994) (Class B)</i>	Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (Europe)
<i>EN50082-1 (1992)</i>	Generic Immunity Standard; Currently compliance is determined via testing to IEC 801-2, -3, and -4. (Europe)
<i>ICES-003 (1997)</i>	Interference-Causing Equipment Standard, Digital Apparatus, Class B (Including CRC c.1374) (Canada)
<i>AS/NZ 3548</i>	Australian Communications Authority (ACA), Standard for Electromagnetic Compatibility

## Product Certification Markings

This printed circuit assembly has the following product certification markings:

- UL Joint Recognition Mark: Consists of small c followed by a stylized backward UR and followed by a small US (Component side)
- Manufacturer's recognition mark: Consists of a unique UL recognized manufacturer's logo, along with a flammability rating (94V-0) (Solder side)
- UL File Number for motherboards: E186194 (Component side)
- PB Part Number: Intel bare circuit board part number (Solder side) 730515-004
- Battery "+ Side Up" marking: located on the component side of the board in close proximity to the battery holder
- FCC Logo/Declaration: (Solder side)
- ACA (C-Tick) mark: Consists of a unique letter C, with a tick mark; followed by N-232. Located on the component side of the workstation board and on the shipping container.
- CE Mark: (Component side) The CE mark should also be on the shipping container

## Installation Precautions

When you install and test the Workstation Board, observe all warnings and cautions in the installation instructions.

To avoid injury, be careful of:

- Sharp pins on connectors
- Sharp pins on printed circuit assemblies
- Rough edges and sharp corners on the chassis
- Hot components (like processors, voltage regulators, and heat sinks)
- Damage to wires that could cause a short circuit
- Observe all warnings and cautions that instruct you to refer computer servicing to qualified technical personnel.



### **WARNING**

*Do not open the power supply. There is a potential risk of electric shock and burns from high voltage and rapid overheating. Refer servicing of the power supply to qualified technical personnel.*

## Installation Instructions



### CAUTION

*Follow these guidelines to meet safety and regulatory requirements when installing this Workstation Board assembly.*

Read and adhere to all of these instructions and the instructions supplied with the chassis and associated modules. If the instructions for the chassis are inconsistent with these instructions or the instructions for associated modules, contact the supplier's technical support to find out how you can ensure that your computer meets safety and regulatory requirements. If you do not follow these instructions and the instructions provided by the chassis and module suppliers, you increase the safety risk and the possibility of noncompliance with regional laws and regulations.

## Ensure Electromagnetic Compatibility (EMC)

Before computer integration, make sure that the power supply and other modules have passed EMC testing using a Workstation Board with a processor from the same family and operating at the same (or higher) speed as the processor on this Workstation Board.

In the installation instructions for the host chassis, power supply, and other modules pay close attention to the following:

- Certifications
- External I/O cable shielding and filtering
- Mounting, grounding, and bonding requirements
- Keying connectors when mis-mating of connectors could be hazardous

If the power supply and other modules have not passed applicable EMC testing before integration, EMC testing must be conducted on a representative sample of the newly completed computer.

## Ensure Chassis and Accessory Module Certifications

Make sure that the chassis, any added subassemblies, such as a board or drive assembly, and internal or external wiring, are certified for the region(s) where the end product will be used. Marks on the product are proof of certification. Certification marks are as follows:

- **In Europe**

The CE marking signifies compliance with all relevant European requirements. If the chassis does not bear the CE marking, obtain a supplier's Declaration of Conformity to the appropriate standards required by the European EMC Directive and Low Voltage Directive. Other directives, such as the Machinery and Telecommunications Directives might also apply depending on the type of product. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate overcurrent protection. A maximum 8-A current limiting circuit or a maximum 5-A fuse or positive temperature coefficient (PTC) resistor provides appropriate protection. All Intel motherboards now have PTCs on all external ports that provide DC power externally.

- **In the United States**

A certification mark by a Nationally Recognized Testing Laboratory (NRTL) such as UL, CSA, or ETL signifies compliance with safety requirements. External wiring must be UL Listed and suitable for the intended use. Internal wiring must be UL Listed or Recognized and rated for applicable voltages and temperatures. The FCC mark (Class A for commercial or industrial only or Class B for residential) signifies compliance with electromagnetic interference requirements.

- **In Canada**

A nationally recognized certification mark such as CSA or cUL signifies compliance with safety requirements. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate over-current protection. A maximum 8-A current limiting circuit or a maximum 5-A fuse or positive temperature coefficient (PTC) resistor provides appropriate protection. All Intel motherboards now have PTCs on all external ports that provide DC power externally.

## Prevent Power Supply Overload

Unless the power supply has inherent over-current protection, do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current load of all the modules within the computer is less than the output current rating of the power supply. If this precaution is not taken, the power supply could overheat, catch fire, or damage the insulation that separates hazardous AC line circuitry from low-voltage user accessible circuitry. If the load drawn by a module cannot be determined by the markings and instructions supplied with the module, contact the module supplier's technical support.

## Place Battery Marking on the Computer

There is insufficient space on this Workstation Board to provide instructions for replacing and disposing of the battery. The following warning must be placed permanently and legibly on the chassis as near as possible to the battery.



### **WARNINGS**

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



## Use Only for Intended Applications

This Workstation Board was evaluated for use in computers that will be installed in offices, homes, schools, computer rooms, and similar locations. The suitability of this product for other applications, (such as medical, industrial, alarm systems, and test equipment) might require further evaluation.

## Interrupts

**Table 30. Interrupts**

IRQ	System Resource
NMI	I/O channel check
0	Reserved, interval timer
1	Reserved, keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	COM2 <sup>1</sup>
4	COM1 <sup>1</sup>
5	LPT2 audio / user available / shared
6	Diskette drive
7	LPT1 <sup>1</sup> / shared
8	Real time clock
9	Windows Sound System <sup>1</sup> / shared
10	LAN / shared
11	User available / shared
12	Onboard mouse port (if present, else user available)
13	Reserved, math coprocessor
14	Primary IDE (if present, else user available)
15	Secondary IDE (if present, else user available)

<sup>1</sup> Default, but can be changed to another IRQ.

## Appendix C: Current BIOS Settings Record Form

Screen	Element	Settings	Your Settings
Help	Display Only	None	
System Processors	Processor Speed	Display only	
	Front Side Bus Speed	Display only	
	Processor P0 Type	Display only	
	Processor P0 L2 Cache	Display only	
	Processor P1 Type	Display only	
	Processor P1 L2 Cache	Display only	
System Memory	Total Memory	Display only	
	Memory Speed	Display only	
	Memory Slot 1	Display only	
	Memory Slot 2	Display only	
	Memory Slot 3	Display only	
	Memory Slot 4	Display only	
Boot Options	First Boot Device	Auto (default) None Available boot devices	
	Second Boot Device	Auto (default) None Available boot devices	
	Third Boot Device	None (default) Available boot devices	
	Fourth Boot Device	None (default) Available boot devices	
System Event Log	Event Log Capacity	Display only	
	Event Log Validity	Display only	
	Clear Event Log on Reboot	Enabled Disabled (default)	
	Event Log Control	Enable All Events (default) Disable All Events Disable ECC Events	
Integrated IDE	Controller Enabled	Enabled (enabled) Disabled	
	Spin Delay	0–60 seconds	
	Primary IDE	Enabled (enabled) Disabled	
	Master (Primary IDE)	Display only	

\*\*Only Pentium® III processors with 133 MHz front side bus speeds are supported.

Integrated IDE (continued)	ATA-66 (Primary Master)	Enabled (enabled) Disabled	
	Slave (Primary IDE)	Display only	
	ATA-66 (Primary Slave)	Enabled (enabled) Disabled	
	Secondary IDE	Enabled (default) Disabled	
	Master (Secondary IDE)	Display only	
	ATA-66 (Secondary Master)	Enabled (default) Disabled	
	Slave (Secondary IDE)	Display only	
	ATA-66 (Secondary Slave)	Enabled (default) Disabled	
Integrated Floppy	Floppy Controller Enabled	Enabled (default) Disabled	
	Floppy A	1.44 MB 3.5 (default) 2.88 MB 3.5	
	Write Protect A Enabled	Enabled Disabled (default)	
System BIOS	BIOS Version	Display only	
	SMBIOS Version	Display only	
	Boot Block Revision	Display only	
Peripheral Ports	Serial Port 1 (COM)	Auto (default) COM1 COM2 Disabled	
	Infrared Port (COM)	Auto COM1 COM2 Disabled (default)	
	Infrared Port (Mode)	IrDA (default)	
	Parallel Port	ECP (default) EPP Bi-directional Output only Disabled	
	Legacy USB Support	Enabled Disabled (default)	
Power Events Tab	Stand-by Mode	S3 S1 (default)	
	Power On Serial Ring Enabled	Enabled Disabled (default)	

Screen	Element	Settings	Your Settings
Power Events Tab (continued)	Power On Add-in PCI Enabled	Enabled Disabled (default)	
	Power On RTC Alarm Enabled	Enabled Disabled (default)	
Time/Date	Display	Time and Date	
General	Splash Screen Delay	2–30 seconds (default is 10 sec.)	
	Integrated NIC Enabled	Enabled (default) Disabled	
	Integrated Audio Enabled	Enabled (default) Disabled	
	AC Power Failure Recovery	Off (default) On	
	Keypad Num Lock On	On (default) Off	
	Force Full Fan Speed	On Off	
	Processor Serial Number Enabled	Enabled Disabled (default)	
Security	User Password Set	Display only (Yes, No)	
	Administrator Password Set	Display only (Yes, No)	