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# Preface

This service and reference manual contains technical information necessary for servicing and repairing Direction SP B-Series systems. The manual includes system setup information, procedures for installing options, and troubleshooting. The manual is written for NEC CSD-trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows:

**Section 1 — Technical Information**, provides an overview of the computer features, hardware design, interface ports, and internal devices.

**Section 2 — Setup Utility**, includes procedures for configuring the system through the Setup utility program

**Section 3 — Option Installation**, provides installation procedures for adding optional expansion boards, diskette and hard disk storage devices, system memory, and processor updates.

**Section 4 — Maintenance and Troubleshooting**, includes recommended maintenance information, lists possible computer problems and their solutions, and has battery replacement procedures.

**Section 5 — Disassembly and Reassembly**, includes computer disassembly and reassembly procedures.

**Appendix A — System Specifications**, provides a list of the system specifications including dimensions, weight, environment, safety compliance, power consumption, and memory.

**Appendix B — Connector Pin Assignments**, provides a list of the internal and external system board connector pin assignments.

**Appendix C — System Resources**, includes information on IRQ settings and system board jumpers.

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## Abbreviations

|        |  |       |  |
|--------|--|-------|--|
| A      | ampere                                     | DMAC  | DMA controller                         |
| AC     | alternating current                        | DOS   | disk operating system                  |
| AT     | advanced technology<br>(IBM PC)            | DRAM  | dynamic RAM                            |
| BBS    | Bulletin Board Service                     | ECC   | error checking and correction          |
| BCD    | binary-coded decimal                       | EDO   | extended data output                   |
| BCU    | BIOS Customized Utility                    | EGA   | Enhanced Graphics Adapter              |
| BIOS   | basic input/output system                  | EPROM | erasable and programmable<br>ROM       |
| bit    | binary digit                               | EVGA  | Enhanced Video Graphics<br>Array       |
| BUU    | BIOS Upgrade Utility                       | F     | Fahrenheit                             |
| bpi    | bits per inch                              | FAX   | facsimile transmission                 |
| bps    | bits per second                            | FCC   | Federal Communications<br>Commission   |
| C      | capacitance                                | FG    | frame ground                           |
| C      | centigrade                                 | FM    | frequency modulation                   |
| Cache  | high-speed buffer storage                  | FP    | fast page                              |
| CAM    | constantly addressable memory              | FRU   | field-replaceable unit                 |
| CAS    | column address strobe                      | GB    | gigabyte                               |
| CD-ROM | compact disk-ROM                           | GND   | ground                                 |
| CG     | character generator                        | HEX   | hexadecimal                            |
| CGA    | Color Graphics Adapter                     | HGA   | Hercules Graphics Adapter              |
| CGB    | Color Graphics Board                       | Hz    | hertz                                  |
| CH     | channel                                    | IC    | integrated circuit                     |
| clk    | clock                                      | ID    | identification                         |
| cm     | centimeter                                 | IDE   | intelligent device electronics         |
| CMOS   | complementary metal oxide<br>semiconductor | IDTR  | interrupt descriptor table<br>register |
| COM    | communication                              | in.   | inch                                   |
| CONT   | contrast                                   | INTA  | interrupt acknowledge                  |
| CPGA   | ceramic pin grid array                     | IPB   | illustrated parts breakdown            |
| CPU    | central processing unit                    | IR    | infrared                               |
| DAC    | digital-to-analog converter                | IRR   | Interrupt Request register             |
| DACK   | DMA acknowledge                            | ISA   | Industry Standard Architecture         |
| DC     | direct current                             | ISR   | In Service register                    |
| DIP    | dual in-line package                       | I/O   | input/output                           |
| DLAB   | Divisor Latch Address bit                  |       |  |
| DMA    | direct memory access                       |       |  |

---

|       |                                    |        |   |
|-------|------------------------------------|--------|---|
| IPC   | integrated peripheral controller   | PLCC   | plastic leaded chip carrier             |
| ips   | inches per second                  | PLL    | phase lock loop                         |
| IRQ   | interrupt request                  | p-p    | peak-to-peak                            |
| K     | kilo (1024)                        | PPI    | programmable peripheral interface       |
| k     | kilo (1000)                        | PROM   | programmable ROM                        |
| KB    | kilobyte                           | QFP    | quad flat pack                          |
| kg    | kilogram                           | RAM    | random-access memory                    |
| kHz   | kilohertz                          | RAMDAC | RAM digital-to-analog converter         |
| lb    | pound                              | RAS    | row address strobe                      |
| LED   | light-emitting diode               | RGB    | red green blue                          |
| LSB   | least-significant bit              | RGBI   | red green blue intensity                |
| LSI   | large-scale integration            | ROM    | read-only memory                        |
| M     | mega                               | rpm    | revolutions per minute                  |
| mA    | milliamps                          | R      | read                                    |
| max   | maximum                            | RTC    | real-time clock                         |
| MB    | megabyte                           | R/W    | read/write                              |
| MDA   | Monochrome Display Adapter         | S      | slave                                   |
| MFM   | modified frequency modulation      | SCSI   | Small Computer System Interface         |
| MHz   | megahertz                          | SG     | signal ground                           |
| mm    | millimeter                         | SIMM   | single inline memory module             |
| ms    | millisecond                        | SPM    | standard page mode                      |
| MSB   | most-significant bit               | SRS    | Sound Retrieval System                  |
| NASC  | National Authorized Service Center | SVGA   | Super Video Graphics Array              |
| NC    | not connected                      | SW     | switch                                  |
| NMI   | Non-maskable Interrupt             | TAC    | Technical Assistance Center             |
| ns    | nanosecond                         | TSC    | Technical Support Center                |
| NSRC  | National Service Response Center   | TTL    | transistor/transistor logic             |
| PAL   | programmable array logic           | tpi    | tracks per inch                         |
| PC    | personal computer                  | USB    | universal serial bus                    |
| PCB   | printed circuit board              | V      | volt                                    |
| PCI   | Peripheral Component Interconnect  | Vac    | volts, alternating current              |
| PDA   | personal digital assistant         | Vdc    | volts, direct current                   |
| PFP   | plastic flat package               | VESA   | video electronics standards association |
| PIO   | parallel input/output              |        |   |
| pixel | picture element                    |        |   |

---

|      |                                  |
|------|----------------------------------|
| VFC  | VESA-compliant feature connector |
| VGA  | Video Graphics Array             |
| VRAM | video RAM                        |
| W    | watt                             |
| W    | write                            |

## Section 1

---

# Technical Information

This section provides an overview of the NEC Direction™ SP B-Series computers. These systems include the Intel® Pentium® II processor with MMX™ technology. Table 1-1 describes the available features of the different models. The subsections that follow provide more detailed information on the system features.

**Table 1-1 System Features**

| Feature         | Direction SP B350                          | Direction SP B400                          |
|-----------------|--|--|
| Processor       | Intel Pentium II<br>350-MHz MMX            | Intel Pentium II<br>400-MHz MMX            |
| System RAM      | 32 MB to 384 MB                            | 32 MB to 384 MB                            |
| Secondary Cache | 512 KB, pipeline burst                     | 512 KB, pipeline burst                     |
| Chipset         | Intel 440BX                                | Intel 440BX                                |
| Graphics        | AGP graphics board                         | AGP graphics board                         |
| Video Memory    | 4 MB SGRAM                                 | 4 MB SGRAM                                 |
| Sound           | Crystal Semiconductor CS4611<br>and CS4236 | Crystal Semiconductor CS4611<br>and CS4236 |
| Hard Disk       | 4.3 GB - 16.8 GB                           | 4.3 GB - 16.8 GB                           |
| CD-ROM Drive    | 32x or DVD                                 | 32x or DVD                                 |
| Power Supply    | 235 W                                      | 235 W                                      |

## SYSTEM BOARD

The system board contains most of the components that provide system functions. The following subsections provide a description of these components.

### Processor

The system board uses a 350-MHz or 400-MHz Intel Pentium II processor with MMX technology. The MMX processor improves audio, video, and 3D graphics performance.

The processor is packaged in a Single Edge Contact (SEC) cartridge and the cartridge plugs into the system board's slot 1.

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## System Cache/Memory

To utilize the processor's power, the system features an optimized 64-bit memory interface and provides support for a second level cache to compliment the processor's internal cache.

High-performance features include:

- pipeline 32-bit addressing
- 64-bit data
- 512-KB of pipeline burst secondary cache; direct mapped write-back and write-through organization.

The system comes with 32 to 384 MB of main system memory. Three sockets on the system board support up to 384 MB of high-speed memory using industry-standard gold-plated dual in-line memory modules (DIMMs).

The system supports PC100 Synchronous DRAM (SDRAM) only.

The system supports the following DIMM configurations:

- 1-Mbit by 64 or 1-Mbit by 72 (8-MB DIMM)
- 2-Mbit by 64 or 2-Mbit by 72 (16-MB DIMM)
- 4-Mbit by 64 or 4-Mbit by 72 (32-MB DIMM)
- 8-Mbit by 64 or 8-Mbit by 72 (64-MB DIMM)
- 16-Mbit by 64 or 16-Mbit by 72 (128-MB DIMM).

## Chipset

The Intel 440BX chipset provides DMA, memory, and bus control. The chipset includes the following chips:

- Intel 82443BX PCI/AGP (PAC) — provides bus-control signals, address paths, and data paths for transfers between the processor's host bus, PCI bus, Accelerated Graphics Port (AGP), and main memory.
  - Intel 82371EB PCI ISA IDE Xccelerator (PIIX4E) — implements the PCI-to-ISA bridge, PCI IDE functionality, Universal Serial Bus (USB) host/hub functions, and enhanced power management.
-

## PCI Local Bus

The 32-bit industry-standard PCI bus is a highly-integrated input/output (I/O) interface that offers the highest performance local bus available for the Pentium II processor. The PCI bus supports burst modes that send large chunks of data across the bus, allowing fast displays of high-resolution images.

The high-bandwidth PCI local bus eliminates data bottlenecks found in traditional systems, maintains maximum performance at high clock speeds, and provides a clear upgrade path to future technologies.

The PCI bus contains two embedded PCI devices: the PCI local bus IDE interface and the PCI video/graphics controller. The PCI bus also contains a connector for attaching the bus expansion board.

### *Expansion Bus*

The expansion bus contains one ISA slot, three PCI slots, one PCI/ISA slot, and one AGP video slot. The PCI ISA IDE Xcelerator chip (PIIX4E) provides the logic that enables the ISA bus functions. With 24-bit memory addressing, a 16-bit data path, and an eight MHz clock, the ISA bus is designed to support all peripherals compatible with the IBM® AT™ standard. For PCI functions, the Xcelerator chip provides 32-bit memory addressing, 32-bit data path, and a 33-MHz clock speed.

## BIOS

The BIOS (Basic Input Output System) is stored in the Intel 28F002 Flash EPROM. The Flash EPROM is reprogrammable and allows fast, economical BIOS upgrades.

The system memory map is shown in Table 1-2.

**Table 1-2 System Memory Map**

| Memory Address  | Size   | Function  |
|-----------------|--------|---|
| 100000-18000000 | 383 MB | Extended Memory                                     |
| E8000-FFFFFF    | 96 KB  | System BIOS   |
| E0000-E7FFF     | 32 KB  | System BIOS (Available as UMB)                      |
| C8000-DFFFF     | 96 KB  | Available high DOS memory (open to ISA and PCI bus) |
| A0000-C7FFF     | 160 KB | Video memory and BIOS                               |
| 00000-9FFFF     | 640 KB | Conventional memory                                 |

---

### ***Plug and Play Support***

The system comes with Plug and Play BIOS technology. Plug and Play eliminates complicated setup procedures for installing Plug and Play expansion boards.

To add a Plug and Play expansion board, simply power off the system, install the board, and power on the system. There are no jumpers to set and no system resource conflicts to resolve. Plug and Play automatically configures the board for the system. The system also supports non-Plug and Play boards.

Plug and Play is controlled by the Plug and Play BIOS and the system's operating system. The Plug and Play BIOS is stored in the Intel 28F002 Flash EPROM on the system board.

The Plug and Play BIOS adds several steps to the POST process. During POST, the Plug and Play evaluates the configuration of installed boards and assigns available system resources to the devices. On completion of Plug and Play POST, the operating system checks to see if there are any additional resources required, then assigns available resources to the devices.

### **CMOS Memory/Real-Time Clock Battery**

The 82371EB PCI ISA IDE Xcelerator (PIIX4E) on the system board stores system information in non-volatile CMOS memory. The chip also contains the system's real-time clock. Both are maintained by a 3-volt coin cell lithium battery on the system board. The battery is replaceable.

### **DMA/IRQ Settings**

The system automatically configures interrupts requests (IRQ), direct memory access (DMA) channels, and other parameters when adding PCI boards with minimal user intervention.

Table 1-3 and Table 1-4 list system IRQ and DMA default settings.

---



**Table 1-3 Interrupt Level Assignments**

| <b>IRQ</b> | <b>System Resource</b>                            |
|------------|---|
| NMI        | I/O channel check                                 |
| 00         | Reserved, internal timer                          |
| 01         | Reserved, keyboard controller                     |
| 02         | Reserved, cascade interrupt from slave PIC        |
| 03         | COM2*   |
| 04         | COM1*   |
| 05         | Sound/User available                              |
| 06         | Diskette drive                                    |
| 07         | LPT1*   |
| 08         | Real-time clock                                   |
| 09         | PCI/User available                                |
| 10         | User available                                    |
| 11         | Windows Sound System*/User available              |
| 12         | PS/2 mouse port (if present, else user available) |
| 13         | Reserved, numeric processor                       |
| 14         | Primary IDE (if present, else user available)     |
| 15         | Secondary IDE (if present, else user available)   |

\* Default; setting can be changed.

**Table 1-4 DMA Assignments**

| <b>DMA</b> | <b>Resource</b>           |
|------------|---------------------------|
| 00         | Audio                     |
| 01         | Audio/Parallel port       |
| 02         | Diskette drive            |
| 03         | ECP parallel port/Audio   |
| 04         | Reserved, cascade channel |
| 05         | Available                 |
| 06         | Available                 |
| 07         | Available                 |

## IDE Ports

The system board provides two fast IDE ports: primary channel and secondary channels.

Each port supports two devices for a total of four IDE devices. The system board allows the connection of an IDE CD-ROM drive for system configuration flexibility without the addition of a controller.

The IDE ports feature an enhanced IDE interface which supports up to 10 MB per second 32-bit wide data transfers on the high-performance PCI local bus. The standard hard disk and Zip drive (in some systems) are connected to the primary channel. The CD-ROM drive is attached to the secondary channel.

## I/O Ports

The system board features an enhanced parallel port, two buffered high-speed serial ports, and two Universal Serial Bus (USB) ports.

The enhanced parallel port supports Enhanced Capabilities Port (ECP) and Enhanced Parallel Port (EPP) modes for devices that require ECP or EPP protocols. These protocols allow high-speed bi-directional transfer over a parallel port and increase parallel port functionality by supporting more devices.

The two buffered high-speed serial ports use a fast 16C550 UART which supports transfer rates up to 115.2 kilobits (Kb) per second. These ports allow the installation of high-speed serial devices for faster data transfer rates.

The two USB ports allow additional new plug and play serial devices without removing the system cover. Simply plug the USB device into the port. The speed varies between 12 megabits per second (Mbps) for printers and 1.5 Mbps for mice and keyboards. Up to 127 USB devices can be connected to the computer.

The combination of the enhanced parallel port, buffered serial ports, and USB ports ensure optimum performance for future peripheral devices and operating systems.

## Sound System

The system board features the Crystal Semiconductor CS4236B audio codec and CS4611 PCI audio accelerator. The CS4236B integrates an internal FM music synthesizer and joystick logic. The chip also provides the following features.

- Advanced power management
  - Symmetrical mixer
  - Support for DirectSound™
  - Full-duplex audio
  - Sound Blaster®, Sound Blaster Pro, and Windows Sound System™ compatibility
-

The CS4611 enables burst mode transfers of audio data between the system bus and the device's internal DMA engine and stream processor. The chip provides optimized digital audio processing.

The optional AWE64D PCI sound board replaces the integrated Crystal audio system. It provides FM synthesis and 64 simultaneous voices.

## **U.S. ROBOTICS MODEM BOARD (OPTIONAL)**

Two modem boards are available: the U.S. Robotics® x2-capable Winmodem and the U.S. Robotics x2-capable Sportster. Each modem board contains fax and modem capabilities. The Winmodem provides fax and modem capabilities. The Sportster provides modem, fax, full-duplex speakerphone, and voicemail capabilities. Each board provides receive transfer rates of 56 Kbps (kilobytes per second) for data and 14.4 Kbps for fax.

## **DISKETTE DRIVE**

The system comes standard with a 1.44-MB high-density diskette drive preinstalled in the 3 1/2-inch accessible device slot (drive A). The drive is connected to the system board via a two-connector cable.

## **HARD DRIVE**

The system supports up to three IDE hard drives, the standard hard drive, and two optional hard drives (if a Zip drive does not come standard with the system).

## **CD-ROM/DVD DRIVE**

The drive can be used to load programs from a CD or it can be used to play audio CDs. The drive operates at different speeds depending on whether the CD contains music or data. The drive is fully compatible with Kodak Multisession Photo CDs™ and standard CDs.

The drive is connected to the secondary IDE/PCI port on the system board.

## **ZIP DRIVE**

Some systems come with the Iomega® Zip 100 ATA drive. The Zip drive provides removable 100-MB data disks and has a data transfer rate up to 1.4 MB per second.

## **POWER SUPPLY**

The 235-watt power supply is mounted inside the system unit. It supplies power to the system board, option boards, diskette drives, hard drives, keyboard, and mouse. A fan inside the power supply provides system ventilation. The power supply has several cables for attaching to the various devices requiring power.

---

## **POWER MANAGEMENT**

The Advanced Power Management (APM) program, located on the 82371EB PCI ISA IDE Xcelerator (PIIX4E) chip, reduces system power consumption when there is no activity detected from the keyboard, mouse, diskette drive, CD-ROM/DVD drive, or hard disk drive after a predefined period of time. As soon as activity is detected, the system resumes where it left off.

In the CMOS Setup utility, an inactivity timer is available for setting the length of time before the system enters a low-power mode.

---

## Section 2

---

# Setup Utility

This section describes the Setup utility program that allows the system configuration information to be viewed and changed.

---

**NOTE:** The system ships from the factory with the correct system parameters for the configuration. Unless setting the time and date, setting security features, customizing the system, or adding optional hardware, Setup does not need to be run.

---

### CONFIGURATION INFORMATION

System configuration information is stored in nonvolatile memory. A nonvolatile memory device retains its data when system power is turned off.

Nonvolatile memory is a complementary metal-oxide semiconductor (CMOS) chip backed up by a battery on the system board. The battery supplies continuous power to CMOS memory and maintains configuration information when system power is off.

### WHEN TO USE SETUP

The Setup utility allows the user to view and set system parameters. Use the Setup utility program:

- to set the time and date.
  - to update or check system parameters when adding or removing expansion options.
  - to change or set power management features.
  - to correct a hardware discrepancy when the Power-On Self-Test (POST) displays an error message and a prompt to run Setup.
  - to check the installation of optional memory by comparing the amount of memory installed with the amount of memory displayed by Setup.
  - to change certain system operating parameters, such as boot device sequence and keyboard parameters.
  - to configure system connections for peripherals such as the diskette drive, hard disks, and devices connected to the printer port and serial ports.
-

- to customize the system with security features such as passwords.
- to set system parameters after replacing the CMOS battery.

## HOW TO START SETUP

To start the Setup utility, follow these steps:

1. Turn on or reboot the system.
2. Press **F2** after POST begins, but before the system boots up. You have about five seconds to press F2.

Setup's Main Menu window appears similar to the following screen.

**NOTE:** The screen shown is typical of a system. The actual settings on the Main Menu depend upon the hardware installed in the system.

| BIOS Setup           |                       |                          |
|----------------------|-----------------------|--------------------------|
| Main                 | Advanced              | Security Power Boot Exit |
| BIOS Version         | xxxxxxxxxx            | Item-Specific Help       |
| Processor Type       | Pentium® II Processor | <Tab>, <Shift-Tab>, or   |
| Processor Speed      | 350 MHz               | <Enter> selects field.   |
| Cache RAM            | 512 KB                |                          |
| System Memory        | 32 MB                 |                          |
| Memory Bank 0        | Not Installed         |                          |
| Memory Bank 1        | 32 MB SDRAM           |                          |
| Memory Bank 2        | Not Installed         |                          |
| Language:            | [English (US)]        |                          |
| L2 Cache ECC Support | [Enabled]             |                          |
| System Time:         | [13:48:18]            |                          |
| System Date          | [02/11/98]            |                          |
| F1 Help              | ↑↓ Select Item        | -/+ Change Values        |
| ESC Exit             | ←→ Select Menu        | Enter Select > Sub-Menu  |
|                      |                       | F9 Defaults for Page     |
|                      |                       | F10 Previous Values      |

## HOW TO USE SETUP

The Setup utility has a Main Menu window and six top-level menus with submenus.

The Main Menu window contains the following areas:

- A title line — the top line of the Main Menu. This line displays the Setup utility name and copyright message.

- The menu bar — the line under the Setup title line. The menu bar contains six top-level menus to set system parameters.
- A Main Menu summary window — the area on the left side of the screen. This area provides a summary of Main Menu Setup parameters. Some Main Menu parameters can be set from this window or they can be set from submenus.
- The help and navigation window — the area on the right side of the screen. This area provides help information for the Setup option currently selected. The navigation keys provide a summary of commands available for making selections.
- The General Help window — a window that appears any time during Setup after pressing **F1**. This help window provides general information about using Setup.

The following subsections describe how to use the Main Menu window to set system parameters.

## Menu Bar

The menu bar at the top of the Main Menu window lists these menus:

- **Main** — Use the Main menu for basic system configuration. For example, select “Main” to verify processor type and speed and to set the system time and date. Use this menu to check memory parameters.
- **Advanced** — Use the Advanced menu to set serial port and printer port addresses and interrupts, diskette drive, and hard drive parameters, and to enable/disable the system’s IDE and diskette drive interfaces.

The Advanced menu also provides submenu items for setting keyboard features, video configurations, and DMI event logging.

- **Security** — Use this menu to set User and Administrator Passwords and the Unattended Start feature.
- **Power** — Use the Power menu to set power management parameters.
- **Boot** — Use this menu to set boot options.
- **Exit** — Exits the Setup utility with various save or discard options.

A Maintenance Menu appears when the system is in configure mode. See Appendix C for information on putting the system in configure mode. This menu allows you to change the processor speed and to clear user and supervisor passwords.

To select an option from the menu bar, use the left and right arrow keys. See “Exiting Setup” in this section for a description on exiting the Main Menu.

---

## Legend Bar

Use the keys listed in the legend bar on the bottom of the Setup menu to make the selections or exit the current menu. Table 2-1 describes the legend keys and their alternates.

**Table 2-1 Setup Key Functions**

| Key               | Function   |
|-------------------|--|
| F1                | Provides help for the parameter field being displayed. |
| Esc               | Exits the menu.  |
| ← or → arrow keys | Selects next menu.                                     |
| ↑ or ↓ arrow keys | Moves cursor up and down for item selection.           |
| Enter             | Executes a command or selects submenu.                 |

## Selecting a Menu Item

To select a menu item, use the up/down arrow keys to move the cursor to the desired field. Then press **Enter**. The Exit Saving Changes command in the Exit Menu saves the values currently displayed in all the menus.

## Displaying a Submenu

To display a submenu, use the up/down arrow keys to move the cursor to the desired submenu. Then press **Enter**. A pointer (a right-pointing triangle) marks all selectable submenus.

## Getting Help

A Field Help window or Item Specific Help window on the right side of each menu displays the help text for the currently selected Setup option. It updates as the cursor moves to each new field.

Pressing **F1** on any menu brings up the General Help window that describes the legend keys and their functions.

Press **Esc** to exit the current window.

## MAIN MENU

This section describes the Main Menu parameters. Other menu parameters are available by selecting submenus. Use the arrow keys to move the cursor to a parameter and press **Enter** to select a submenu. Items with lighter text are not available.

---



- BIOS Version

This field displays your system's BIOS version number.

- Processor Type

This field displays your computer's processor type.

- Processor Speed

This field displays your processor's speed.

- Cache RAM

This field displays the size of your system's L2 (external) cache.

- System Memory and Memory Banks 0 - 2

This field displays the total amount of memory installed on your system board and in which banks the memory is installed.

- Language

This field displays the current default language used by the BIOS. Depending on the system you purchased, you may choose a different display language from among the options listed below.

- English (US) (default)

- Italiano

- Français

- Deutsche

- Español

- L2 Cache ECC Support

This option allows error checking on data accessed from the L2 cache.

- System Time and Date

These two fields specify the correct time and date. To change them, press **Tab** to highlight the field you want to change, then press the + or – keys to change the setting.

---

To return to the Main Menu, press **Esc**. To move to the Advanced Menu, press the right arrow key.

## ADVANCED MENU

This section describes the Advanced Menu parameters. Other menu parameters are available by selecting submenus. Use the arrow keys to move the cursor to a parameter and press **Enter** to select a submenu. Items with lighter text are not available.

- Plug & Play O/S

This option lets you specify whether a Plug and Play-compatible operating system is being used in your system. Choose “Yes” or “No” (default).

- Reset Configuration Data

This option clears the BIOS configuration data on the next boot. The options include “No” (default) or “Yes.”

- NumLock

This option controls whether the NumLock key on the keyboard is on or off at boot up. The choices are “Auto” (default), “On,” or “Off.”

## Peripheral Configuration Submenu

This submenu can be used to configure your system’s ports or peripheral devices. To enter the submenu, highlight this field, then press **Enter**. The following options appear:

- Serial Port A/Serial Port B

These options let you configure your system’s Serial Port A or Serial Port B. You can choose “Auto” (default), “Enabled,” or “Disabled.” The “Auto” setting causes the Setup program to assign the first free COM port (for example, COM 1 3F8h, IRQ4 or COM2, 2F8h, IRQ3). Note that if you set a specific serial port address, it does not appear in the list of options for the other serial port.



**CAUTION:** An asterisk symbol appearing next to an option indicates that the selected IRQ is set to conflict with another device.

---

---

**NOTE:** If you select the Enabled option, you can see additional options that allow you to specify the Base I/O address and IRQs for the port you are configuring.

---

■ Parallel Port

This option configures the system's Parallel Port. Choose "Auto" (default), "Enabled," or "Disabled." The "Auto" setting causes the Setup program to assign LPT 1, 378h, IRQ7.

---

**NOTE:** If you select the Enabled option, you can see additional options that allow you to specify the Base I/O address and IRQs for the port you are configuring.

---

■ Mode (Parallel Port)

This option sets the mode for the parallel port. The options include "Output Only" (AT-compatible mode), "Bidirectional" (PS/2-compatible mode), "EPP" (Extended Parallel Port – high speed bidirectional), and "ECP" (Enhanced Capabilities Port – high speed bidirectional).



**CAUTION:** An asterisk symbol appearing next to an option indicates that the selected IRQ is set to conflict with another device.

---

■ Audio

This option configures the onboard audio system. Select "Enabled" (default) or "Disabled."

■ Legacy USB Support

This option configures support for legacy USB devices. Select "Enabled" or "Disabled" (default).

To return to the Advanced Menu, press **Esc**.

---

## IDE Configuration Submenu

This submenu can be used to auto-configure or manually configure the IDE devices, usually hard drives or CD-ROM drives. Depending on the system you purchased, the available options may include “User,” “Auto” (default), “CD-ROM,” “ATAPI Removable,” or “None.”

The standard hard drive (drive C) shipped with the system is configured as “Primary IDE Master.” The standard CD-ROM drive is configured as “Secondary IDE Master.”

---

**NOTE:** Jumpers on the IDE device must be set to the master or slave device (see the documentation that comes with the device).

---

### ■ IDE Controller

This option configures the system’s integrated IDE controller. Select from “Primary,” “Secondary,” “Both” (default) or “Disabled.”

### ■ Hard Disk Pre-Delay

This option set the time delay to allow the hard disk to spin up. The choices in seconds are “3,” “6,” “9,” “12,” “15,” “21,” and “30.”

These entries let you check or change the following hard disk drive parameters. They are not available if “Auto” is selected.

### ■ Cylinders/Heads/Sectors fields.

**Cylinders** — If your device configuration type is set to “Auto,” this field displays the number of cylinders for your hard drive and cannot be changed. If the Type is set to “User,” you must enter the correct number of cylinders for your hard drive.

**Heads** — If your device configuration type is set to “Auto,” this field displays the number of heads for your hard drive and cannot be changed. If the Type is set to “User,” you must enter the correct number of heads for your hard drive.

**Sectors** — If your device configuration type is set to “Auto,” this field displays the number of sectors for your hard drive and cannot be changed. If the Type is set to “User,” you must enter the correct number of sectors for your hard drive.

**Maximum Capacity** — This field displays the maximum capacity of your hard disk drive, a value based on the number of cylinders, heads and sectors.

---

**■ Multi Sector Transfers**

This option determines the number of sectors per block for multiple sector transfers. Like the Cylinders/Heads/Sectors options discussed above, you cannot access this option if the configuration type is set to “Auto.” If necessary, check the specification for your disk drive to determine the best setting for optimum drive performance. The options include:

- 2 Sectors
- 4 Sectors
- 8 Sectors
- 16 Sectors
- Disabled (default).

**■ LBA Mode Control**

This option specifies the IDE translation mode. LBA causes Logical Block Addressing to be used in place of Cylinders/Heads/Sectors. You can enable or disable (default) this option. This option cannot be changed when “Auto” is selected.



**CAUTION:** Do not change the translation mode setting from the option selected when the hard drive was formatted. Changing the option after formatting could result in corrupted data!

---

**■ Transfer Mode**

This option specifies the method for transferring data between the hard drive and system memory. This option cannot be changed when “Auto” is selected. The options include:

- Standard (default)
  - Fast PIO 1
  - Fast PIO 2
  - Fast PIO 3
  - Fast PIO 4
  - FPIO 3 and Bus Mastering
  - FPIO 4 and Bus Mastering.
-

■ Ultra DMA

This option sets the Ultra DMA Mode for the hard drive. This option cannot be changed when “Auto” is selected. The options include:

- Mode 0
- Mode 1
- Mode 2
- Disabled (default).

To return to the Advanced Menu, press **Esc**.

### Floppy Options Submenu

This submenu can be used to configure your system’s diskette drives. To enter the submenu, highlight the Floppy Options field, then press **Enter**. Select Floppy Disk Controller, Diskette A:, and Floppy Write Protect options.

■ Floppy Disk Controller

This option configures the system’s diskette drive controller. Select “Enabled” (default) or “Disabled.”

■ Diskette A:

These fields specify the capacity and physical size of Diskette Drive A. To change these, highlight the field for the drive, press **Enter** and select from the following options:

- Disabled
- 360KB, 5.25 inch
- 1.2MB, 5.25 inch
- 720KB, 3.5 inch
- 1.44/1.25 MB, 3.5 inch (default)
- 2.88 MB, 3.5 inch.

If you add an optional 5.25-inch diskette drive to your system, select Floppy B and change the parameter to 1.2 MB, 5.25 inch.

■ Floppy Write Protect

This option enables or disables write protection for the diskette drive(s). Choose the desired setting to enable or disable (default) this option.

To return to the Advanced Menu, press **Esc**.

---

## DMI Event Logging Submenu

This submenu can be used to view and modify DMI Event Logs. To enter the submenu, highlight the DMI Event Logging field, then press **Enter**. The following options appear:

- Event Log Capacity/Event Log Validity  
These fields indicate whether space is available in the Event Log, and whether the contents of the log are valid.
- View DMI Event Log  
If there are no event logs stored, you cannot access this log.
- Clear All DMI Event Logs  
This option clears the DMI Event Log after rebooting the system. Choose “No” (default) or “Yes.”
- Event Logging  
This option enables logging of DMI events. Choose “Disabled” or “Enabled” (default).
- Mark DMI Events as Read  
This option is used to mark off all DMI Events as read. If necessary, press **Enter** to access the Confirmation dialog box and confirm your preference.

To return to the Advanced Menu, press **Esc**.

## Video Configuration Submenu

This submenu can be used to configure specific video features. To enter the submenu, highlight the field, then press **Enter**. The following option appears:

- Palette Snooping  
This option controls the ability of a primary PCI graphics controller to share a common palette with an ISA add-in video board. Select “Enabled” or “Disabled” (default).
- AGP Aperture  
This option specifies the aperture size for the AGP video controller.

To return to the Advanced Menu, press **Esc**.

---

## Resource Configuration Submenu

This option allows you to reserve specific resources for use by legacy ISA devices. To enter the submenu, highlight this field, then press **Enter**. The following options are displayed:

- Memory Reservation Submenu

This option lets you configure memory blocks for use by legacy ISA devices. When selected, the submenu displays a lists of addresses from which specific addresses can be selected. Use the arrow (cursor) keys to highlight an upper memory block, then press **Enter**. Select “Available” (default) or “Reserved” with the cursor keys, then press **Enter** to change the setting.

To return to the Resource Configuration submenu, press **Esc**.

- IRQ Reservation Submenu

This option lets you reserve specific IRQs (interrupt requests) for use by legacy ISA devices. To do so, highlight this field, then press **Enter**. Use the arrow (cursor) keys to highlight the specified IRQ, then press **Enter**. Select “Available” (default) or “Reserved” with the arrow keys, then press **Enter** to change the setting.



**CAUTION:** An asterisk symbol appearing next to an option indicates that the selected IRQ is set to conflict with another device.

---

To return to the Advanced Menu, press **Esc**. Then press the right arrow (cursor) key to move to the Security Menu.

## SECURITY MENU

The Security Menu can be used to set a user password and/or an administrator password.

A User Password controls access to the system and Setup Utility program at boot up. If the User Password feature has been enabled, you need to enter your User password correctly whenever you boot the system before you can use it.

An Administrator Password controls access to the BIOS and Setup Utility program. If the Administrator Password feature has been enabled, an Administrator password must be entered correctly before all options in the Setup Utility program are available (for example, to disable password protection).

The Unattended Start feature allows the system to boot up and run but the keyboard and mouse are both locked. You must enter the User Password to use the keyboard and mouse.

---



Press the right arrow (cursor) key to move to the Power Menu.

## **POWER MENU**

The Power Menu is used to enable or disable the system's power management features. When the power management option is enabled, the following options appear in the Power Menu:

- **Power Management**

This feature lets you enable or disable BIOS power management.

- **Inactivity Timer**

The Inactivity Timer lets you set the length of time that the system needs to be inactive before entering its low-power or Standby mode. The low-power mode powers down various devices in the system until you resume using it. You can select from "Off," "1," "2," "4," "6," "8," "12" or "16 minutes." A setting of 1 minute achieves maximum power savings, while a setting of 16 minutes allows maximum performance.

- **Hard Drive**

This option controls whether or not a spin down command is issued to the hard drives when the system goes into a low-power mode. Your choices are "Enabled" (default) or "Disabled."

- **VESA Video Power Down**

This option controls power to the monitor during the low-power modes. Your choices are "Disabled" or "Enabled."

Press the right arrow (cursor) key to move to the Boot Menu.

## **BOOT MENU**

The Boot Menu can be used to adjust the system's boot features. The Boot Menu features the following options:

- **Quick Boot Mode**

This option configures the system to boot without running certain POST tests. The choices are "Enabled" (default) and "Disabled."

---

■ Scan User Flash Area

This option configures the BIOS to scan the flash memory for user binary files that are executed at boot time. The choices are “Enabled” and “Disabled” (default).

■ After Power Failure

This option specifies whether or not to restore power to the system if it is turned on and there is a power failure. The options are “Stay Off” which keeps the power off, “Power On” which restores the system’s power, and “Last State” which restores the previous power state.

■ On Modem Ring

This option specifies how the system responds when power is off and the modem detects an incoming call. The options are “Stay Off” and “Power On” (default).

■ On LAN

This option controls how the system responds to a LAN wake-up call when power is off. The options are “Stay Off” and “Power On” (default).

■ On PME

This option controls how the system responds to a PCI power management enable event when power is off. The options are “Stay Off” and “Power On” (default).

■ First/Second/Third/Fourth Boot Device

You can select the sequence of boot devices by type. Pressing your keyboard’s + (plus) or – (minus) key allows you to select the order. For maximum system accessibility, Removable Device should always be set as the First Boot Device.

## Hard Drive Submenu

This submenu lists the system’s available hard drives. Your computer tries to boot to the operating system on the first device listed on the Hard Drive submenu. If no operating system is found, the system continues trying the drives in the order they are listed until an operating system is located.

To see a list of available drives, highlight this field and press **Enter**. You can select the boot device by pressing your keyboard’s + or – key. To exit from the Hard Drive submenu, press **Esc**.

---

## Removable Devices Submenu

This submenu lists any available removable devices (if included). One common option is Legacy Floppy Drives. The operating system assigns drive letters to these devices in the order listed. You can change the sequence (and drive lettering) by highlighting this field and pressing **Enter**. Then press your keyboard's + or – key to move a device up or down the list. To exit from the Removable Devices submenu, press **Esc**.

## Removable Format Submenu

This submenu provides the format of any any available removable devices.

Press the right arrow (cursor) key to move to the Exit Menu.

## EXIT MENU

The Exit Menu allows you to choose how to exit the Setup program. Press the arrow (cursor) keys to select the desired option, then press **Enter** to make your choice (or use the arrow key to select another one).

- Exit Saving Changes

This option exits the Setup program and saves your changes to the BIOS.

- Exit Discarding Changes

This option exits the Setup program without saving your changes to the BIOS.

- Load Setup Defaults

This option loads the Setup program's default values.

- Load Custom Defaults

This option loads Custom default settings.

- Save Custom Defaults

This option saves your changes to Custom default settings.

- Discard Changes

This option loads previous values from CMOS RAM for all BIOS settings.

---

---

**NOTE:** If your system's CMOS fails, the BIOS will load custom default settings (if you've saved them) or factory default settings.

---

Finally, press **Enter** again to confirm and exit the Setup program.

## Section 3

---

# Option Installation

This section provides instructions for installing the following options:

- expansion boards
- memory upgrade
- video upgrade — see the documentation for your video board
- data storage devices
- external options.

All options (except external options) require removal of the access cover. Procedures for removing the cover are included in this section.

### **GENERAL RULES FOR INSTALLING OPTIONS**


Follow these general rules when installing system options.

- Turn off system power and unplug the power cable.
  - Turn off and disconnect all peripherals.
  - When handling boards or chips, touch the metal of the system unit to discharge static.
  - Do not disassemble parts other than those specified in the procedure.
  - Use a Phillips-head screw driver, unless otherwise specified.
  - Label any removed connectors. Note where the connector goes and in what position it was installed.
-

## PRECAUTIONS

Take care when working inside the system and when handling computer components. Avoid electric shock or personal injury by observing the following warning.


---

 **WARNING:** Before removing the access cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

Static electricity and improper installation procedures can damage computer components. Protect computer components by following these safety instructions.

---

 **CAUTION:** Electrostatic discharge can damage computer components. Discharge static electricity by touching a metal object before removing the access cover.

---

- Avoid carpets in cool, dry areas. Leave an option, such as a board or chip, in its anti-static packaging until ready to install it.
- Dissipate static electricity before handling any system components (boards, chips, etc.) by touching a grounded metal object, such as the system's unpainted metal chassis.

If possible, use anti-static devices, such as wrist straps and floor mats.

- Always hold a chip or board by its edges. Avoid touching the components on the chip or board.
- Take care when connecting or disconnecting cables. A damaged cable can cause a short in the electrical circuit. Misaligned connector pins can cause damage to system components at power-on.

When installing a cable, route the cable so it is not pinched by other components and is out of the path of the system unit cover. Prevent damage to the connectors by aligning connector pins before you connect the cable.

- When disconnecting a cable, always pull on the cable connector or strain-relief loop, not on the cable.
-

## REMOVING THE ACCESS COVER

The following subsections describe how to remove the access cover from the desktop or minitower system.



**WARNING:** Before removing the access cover, turn off the power and unplug the system power cable. Power is removed only when the power cable is unplugged.

---

1. Turn off the computer.
2. Disconnect the keyboard, mouse, monitor, and any other external options (such as a printer) from the rear of the computer.

Label all cables to make reinstallation easier.



**CAUTION:** Electrostatic discharge can damage computer components. Discharge static electricity by touching a metal object before you remove the system access cover.

---

3. If the system is a minitower, lay the system down on its right side.
4. Loosen the thumb screw at the rear of the system by turning it counterclockwise. If you installed a lock on the back of the system, unlock the lock and remove it.

Press the right release tab. While pressing the tab, push down and back on the right rear of the cover. The cover slides back about 1/2 inch.

Press the left release tab. While pressing the tab, push down and back on the left rear of the cover. The cover slides back about 1/2 inch.

---



**Figure 3-1** *Releasing the Cover*

5. Lift the access cover off the system.

## **REPLACING THE ACCESS COVER**

To replace the access cover, use the following procedure.

1. Gently set the access cover inside the edge of the case, taking care not to bend the metal tabs.
2. Align the tabs on the access cover with their corresponding slots on the system.

Insert the tabs on the edge of the access cover into their slots on the system.



**Figure 3-2** *Aligning the Tabs*

3. Slide the access cover forward to meet the front panel.
  4. Tighten the thumb screw.
-



---

**NOTE:** The cover fits tightly. If it does not slide all the way to the front panel, place one hand on the front of the unit while you slide the cover forward from the rear.

---

5. Reconnect all external peripherals.
6. Plug in power cables.

## EXPANSION BOARDS

Your computer's system board features several expansion slots that can accommodate accessory adapter boards, such as a TV board. Depending on the system you purchased, some of these devices may be installed in your system.

The Direction SP B-Series supports ISA Plug and Play expansion boards. Plug and Play allows the installation of a board in an expansion slot without changing the hardware settings. There are no system resource conflicts to resolve. Plug and Play automatically configures the board for the system.

Industry-standard 8-bit and 16-bit ISA, and 32-bit PCI expansion boards are supported in the system unit. ISA expansion boards can be Plug and Play or non-Plug and Play boards.

PCI expansion boards run at one half the system host's bus speed. The PCI bus handles 32 bits of data at a time, being wider as well as faster than the standard ISA bus. PCI boards can send and receive data much faster, thereby boosting system performance.

### Expansion Slot Locations

Your system has six expansion slots:

- one ISA slot
- three PCI slots
- one shared ISA/PCI slot
- one AGP slot.

The following figure shows expansion slot locations.

---

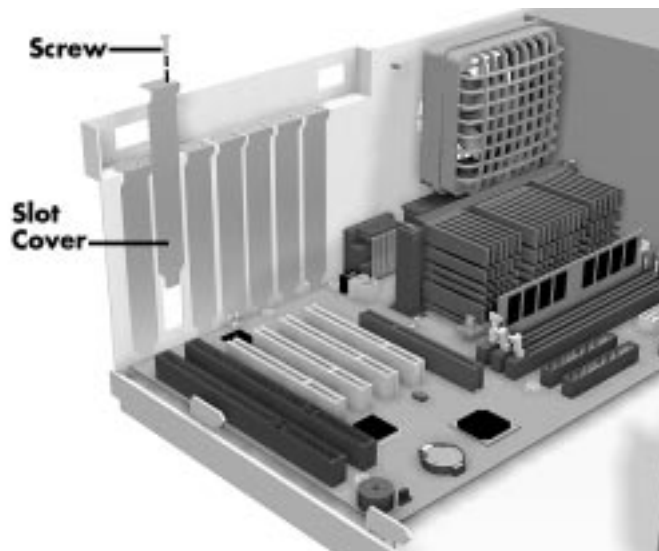


**Figure 3-3 Locating Expansion Slots**

## Expansion Board Installation

Install expansion boards in the system as follows.

1. Remove the access cover.
2. Follow any preinstallation instructions that come with the expansion board (such as setting switches or jumpers on the board).
3. Remove the screw securing an expansion slot cover and remove the cover.



**Figure 3-4 Removing the Slot Cover**

---

Save the screw for installing the expansion board. Be sure to save the slot cover for future use.

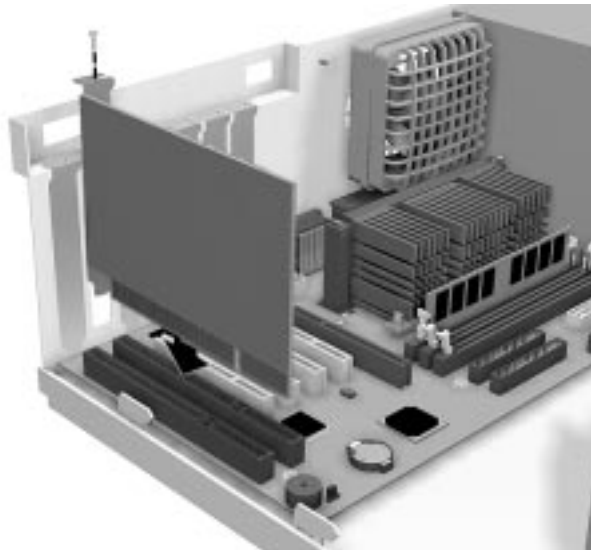


**CAUTION:** A slot cover can damage the system board or any option board if it falls into the system. Take care to keep the slot cover from falling when removing the screw.

---

If the slot cover does fall into the unit, remove it before replacing the cover.

4. Hold the board by its edges and insert it into the expansion slot.
5. Press the board firmly into the expansion slot connector. Gently rock the board from side-to-side to seat it into the connector.
6. Insert the screw removed earlier to secure the expansion board to the support bracket.



**Figure 3-5** *Installing a Board*

7. Attach any cables required by the expansion board.
8. Replace the access cover.

### **Expansion Board Removal**

1. Remove the system access cover.
  2. Label and remove any cables connected to the board.
-

3. Remove the screw that secures the board to the support bracket.
4. Pull the board out of the connector. Gently rock the board from side-to-side to release it from its connector.
5. Replace the access cover.

## MEMORY UPGRADE

Your system comes factory-installed with 32 MB to 384 MB of main system memory, in one to three 168-pin sockets on the system board for Dual In-line Memory Modules (DIMMs).

Install memory in one, two, or three sockets. The memory size and speed may vary between sockets. Single- and double-sided DIMMs are supported.

Depending on product upgrade availability, your system memory can be upgraded to a total of 384 MB. When upgrading your system memory, note the following conditions:

- Be sure to use 168-pin 3.3V DIMMs with gold-plated contacts.
- Bus speed of 100 MHz is supported.
- Non-Error Correcting and Checking (64-bit) and ECC (72-bit) DIMMs are both supported. When ECC memory is installed, the BIOS automatically detects its presence and offers the Setup option to enable ECC mode.

---

**NOTE:** Although memory size may vary, the SDRAM DIMMs must meet the Intel 4-clock, PC100, unbuffered SDRAM DIMM specification for either 64-bit or 72-bit SDRAM.

---

Use the following procedure to:

- Check the memory installed in the system
- Determine the DIMM configuration needed to increase memory
- Identify DIMM sockets.

---

**NOTE:** If any cables block access to the DIMM sockets, label and disconnect them. If any boards block access to the sockets, remove them.

---

1. Locate the three DIMM sockets, J6J1 – Bank 0, J6J2 – Bank 1, and J7J1 – Bank 2. See Appendix B to identify the sockets.
  2. Use the following table to determine the DIMM configuration needed to upgrade memory. The table provides sample memory configurations; it is not a complete list of all memory configurations.
-

**Table 3-1 Sample Memory Configurations**

| Bank 0             | Bank 1             | Bank 2             | Total RAM          |
|--------------------|--------------------|--------------------|--------------------|
| 1 M x 64 (8 MB)    | Empty (0 MB)       | Empty (0 MB)       | 8 MB (min. memory) |
| Empty (0 MB)       | 4 M x 64 (32 MB)   | 8 M x 64 (64MB)    | 96 MB              |
| 16 M x 64 (128 MB) | Empty (0 MB)       | 2 M x 64 (16 MB)   | 144 MB             |
| 2 M x 72 (16 MB)   | 2 M x 72 (16 MB)   | 4 M x 72 (16 MB)   | 64 MB (ECC)        |
| 2 M x 64 (16 MB)   | Empty (0 MB)       | 2 M x 64 (16 MB)   | 32 MB              |
| 4 M x 64 (32 MB)   | 4 M x 64 (32 MB)   | 8 M x 64 (64 MB)   | 128 MB             |
| 8 M x 64 (64 MB)   | 1 M x 64 (8 MB)    | 4 M x 64 (32 MB)   | 104 MB             |
| 2 M x 64 (16 MB)   | 4 M x 64 (32 MB)   | 1 M x 64 (8 MB)    | 56 MB              |
| 4 M x 64 (32 MB)   | 8 M x 64 (64 MB)   | 2 M x 64 (16 MB)   | 112 MB             |
| Empty (0 MB)       | 16 M x 72 (128 MB) | 16 M x 72 (128 MB) | 256 MB (ECC)       |
| 16 M x 64 (128 MB) | 2 M x 64 (16 MB)   | 8 M x 64 (64 MB)   | 210 MB             |
| 16 M x 64 (128 MB) | 4 M x 64 (32 MB)   | 8 M x 64 (64 MB)   | 224 MB             |
| 16 M x 72 (128 MB) | 8 M x 72 (64 MB)   | 1 M x 72 (8 MB)    | 200 MB (ECC)       |
| 16 M x 64 (128 MB) | 16 M x 64 (128 MB) | 16 M x 64 (128 MB) | 384 MB             |
| 16 M x 72 (128 MB) | 16 M x 72 (128 MB) | 16 M x 72 (128 MB) | 384 MB (ECC)       |

Note: The number in parentheses is the memory in megabytes configuration.

## DIMM Removal

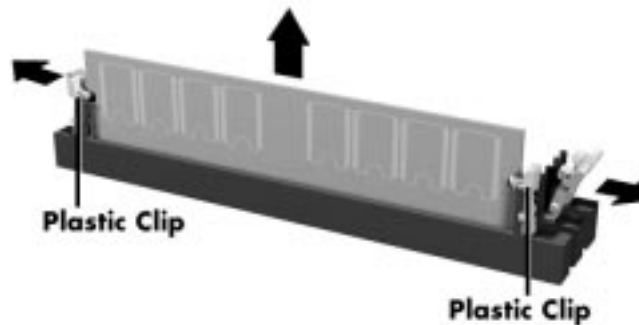
Use the following procedure to remove a DIMM.



**CAUTION:** Reduce static discharge by touching the system's metal chassis.

1. Remove the access cover.
2. Locate the DIMM sockets.
3. To remove a DIMM from its socket, press the plastic clips at the outer edges of the socket away from the DIMM.

4. Carefully rock the DIMM to pull it from the socket.



**Figure 3-6** Removing a DIMM


5. Store the DIMM in an antistatic bag (available at electronic supply stores) or a cardboard box.

## DIMM Installation

Use the following procedure to install a DIMM.

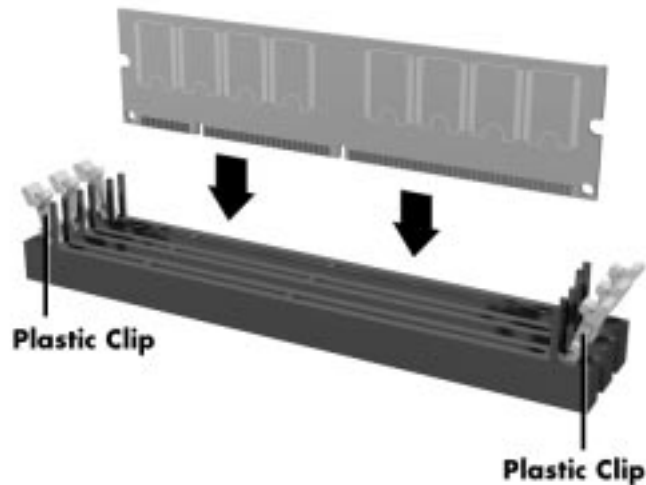
1. Remove the access cover.
2. Locate the DIMM sockets.
3. Remove any currently-installed DIMMs that are not needed. See “DIMM Removal” in this chapter.

---

 **CAUTION:** Before installing a DIMM, reduce static discharge by touching the system’s metal chassis.

---

4. To install a DIMM, align the module with an empty socket. Make sure that the notches on the DIMM line up with the keys in the sockets.
5. Insert the DIMM into the socket. Close the plastic clips at both ends of the socket.



**Figure 3-7** *Installing a DIMM*

6. Replace any cables or boards that may have been removed.
7. Replace the access cover.

## **VIDEO UPGRADE**

Your computer comes with an AGP video board.

See your video board's documentation for information on upgrade capabilities.

## **DATA STORAGE DEVICES**

The system board in your computer supports the following storage devices:

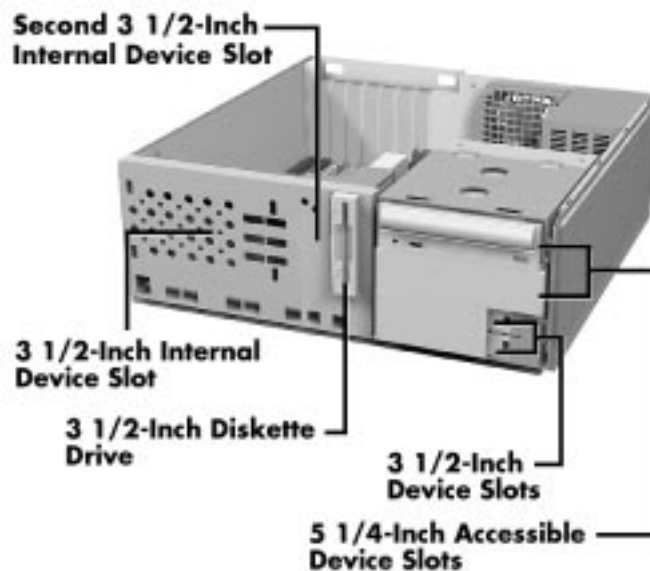
- two diskette drives, including the standard 1.44-MB diskette drive and a tape backup unit
  - up to four IDE drives.
-

## Device Slots

Your computer has seven storage device slots:

- a 3.5-inch accessible device slot (contains the standard 1.44-MB diskette drive)
- two internal 3.5-inch hard drive slots (one contains the hard drive)
- four accessible device slots
  - two accessible 5.25-inch device slots (one contains the standard CD-ROM drive)
  - two 3.5-inch device slots; the lower 3.5-inch slot is not accessible on the desktop model.

Figure 3-8 shows the device slot locations in the system.



**Figure 3-8** Locating Device Slots

## Device Preparation

Before installing a storage device in the system, follow any preinstallation instructions that come with the device. For example, check the following:

- Diskette drive — remove any termination jumpers on the optional diskette drive. See the documentation that comes with the drive.
  - IDE device — check the jumper settings on the device before installing it. See the documentation that comes with the device for jumper setting information.
-



- An IDE device, such as an IDE hard disk or IDE CD-ROM drive, must be set correctly as the first (master) or second (slave) device on the IDE channel.
- The standard IDE hard disk is set as the master device on the primary IDE connector. The standard CD-ROM drive is the master device on the secondary IDE connector.
- SCSI device — The last SCSI device connected to the system (internally or externally) must have a termination resistor, either installed manually or set automatically if the device is self-terminating. Check the manufacturer's documentation.
- Installation hardware — check to be certain you have the screws necessary to secure the drive in an accessible drive slot.

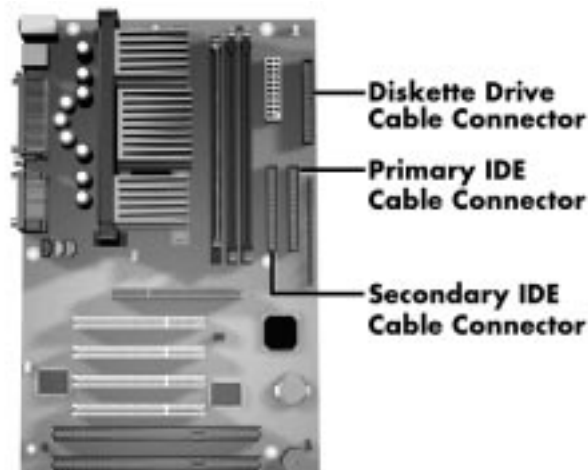
## Device Cables

The cables used for the installation of optional storage devices include:

- diskette drive signal cable
- IDE signal cables
- system power cables.

The addition of a diskette drive might require the replacement of the existing diskette drive cable. The addition of an IDE device does not require the replacement of the existing IDE cable. The existing IDE cables support two devices on each cable.

Cable connector locations are shown in Figure 3-9.



**Figure 3-9** System Board Cable Connectors

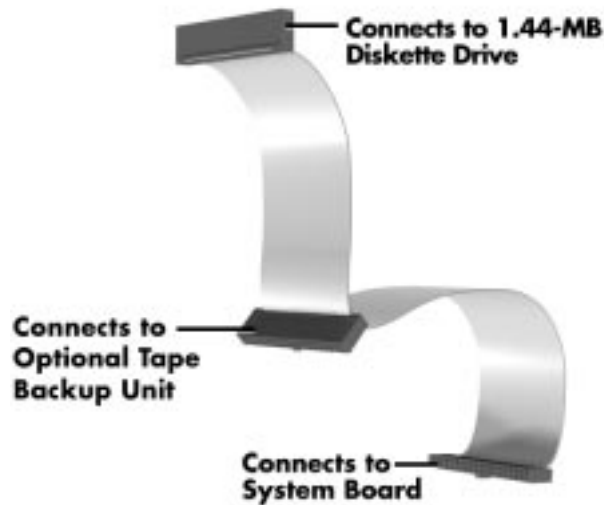
**Diskette Drive Signal Cable**

A two-connector diskette drive signal cable comes attached to the system board and to the standard 1.44-MB diskette drive. If your system comes standard with an Iomega Ditto tape backup unit, the signal cable has three connectors.

Depending on your system, installation of a tape backup unit may require the replacement of the existing diskette drive signal cable with a three-connector cable. Connect an optional tape backup unit to the middle connector on the three-connector diskette drive signal cable.

The colored edge of the cable goes to pin 1 on the cable connector. Align the red edge of the cable with pin 1 (the notched end) on the drive connector.

Figure 3-10 shows a three-connector diskette drive signal cable.



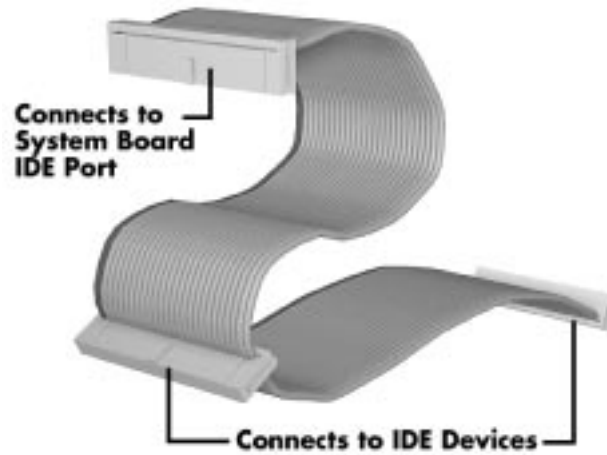
**Figure 3-10** Diskette Drive Signal Cable

**IDE Signal Cables**

Each system comes with a three-connector IDE interface cable attached to the primary IDE connector and the installed hard disk. A second IDE cable connects to the CD-ROM drive and to the secondary IDE connector. In some systems, a Zip drive also comes attached to the primary IDE cable.

Figure 3-11 shows a typical three-connector IDE cable. If the IDE cable is not keyed with a connector tab, align the colored edge of the cable with the pin 1 side of the drive connector.

---

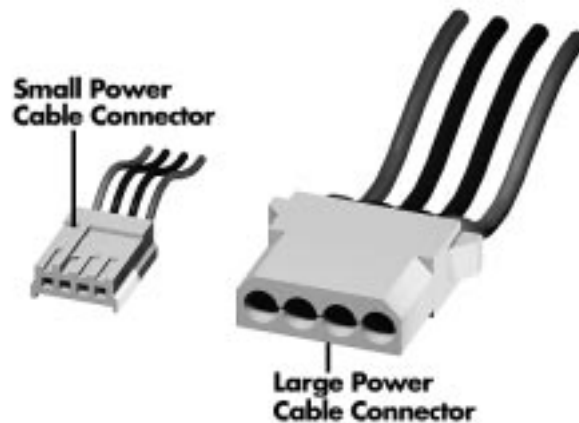


**Figure 3-11 IDE Signal Cable**

### **System Power Cables**

Power cables come from the power supply and are attached to the standard storage devices. System power cables vary in length and provide connector sizes to accommodate a variety of supported storage configurations.

Power cable connectors are keyed to fit only in the correct position. Figure 3-12 shows the power cable connectors.



**Figure 3-12 Power Cable Connectors**

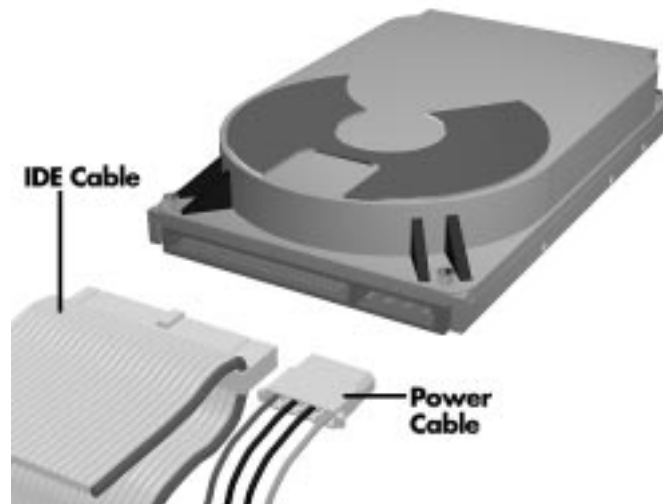
---

## Device Cabling

All storage devices require a power and signal cable connection. Devices shipped with the system are already connected. Cable optional devices as follows.

### *Cabling an IDE Device*

1. Connect the IDE signal cable connector to the connector on the IDE device.  
Take care to prevent bending drive connector pins. Align the IDE cable connector as shown in Figure 3-13.
2. Locate an available power connector coming from the power supply.
3. Connect the appropriate power cable to the power connector on the IDE device.

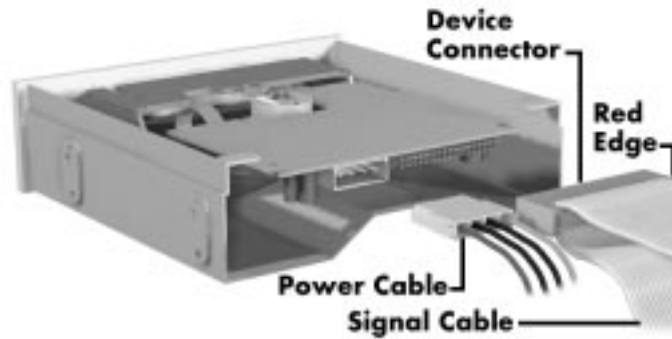


**Figure 3-13** *Connecting IDE Device Cables*

4. If installing an IDE CD-ROM drive, also connect the audio cable (see the instructions that come with the reader).

### *Cabling an Accessible 5 1/4-Inch Device*

1. Connect the diskette drive signal cable connector to the signal connector on the device (see Figure 3-14).
  2. Locate an available power connector.
  3. Connect the power cable to the power connector on the device.
-



**Figure 3-14** Connecting an Accessible 5 1/4-Inch Device

## Storage Device Installation

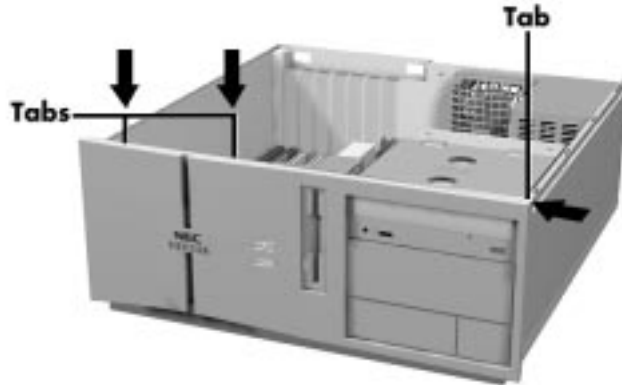
The following subsections describe how to install 3 1/2-inch and 5 1/4-inch devices. The installation procedures include:

- removing the front panel
- removing the CD-ROM/DVD drive
- installing a 3 1/2-inch device
- installing a 5 1/4-inch device
- replacing the front panel.

### ***Removing the Front Panel***

Use the following procedure to remove the front panel.

1. Locate the two plastic tabs at the front of the chassis. They are indicated by two arrows engraved on the chassis.
  2. Press down on the two tabs and press in a third tab at the end of the panel to release the panel (see Figure 3-15).
-



**Figure 3-15 Releasing the Front Panel**

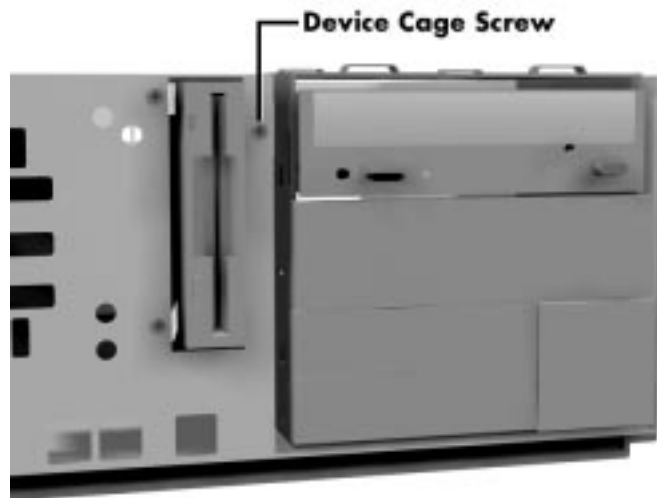
3. Pull the panel away from the chassis.

**Removing the CD-ROM/DVD Drive**

If you need to remove the CD-ROM/DVD drive, you need to remove the accessible device cage.

Use the following procedure to remove the accessible device cage.

1. Locate the screw on the front of the system between the 3.5-inch blank panel and diskette drive. Remove the screw.



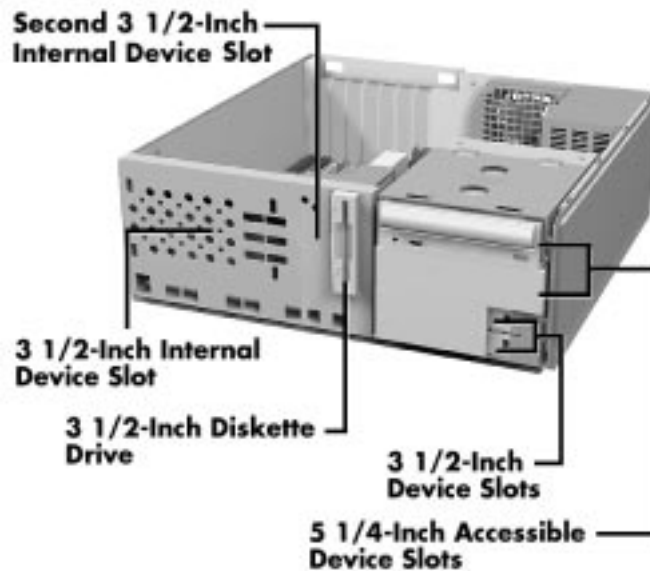
**Figure 3-16 Locating the Device Cage Screw**

2. Slide the cage towards the front of the system and lift it out of the unit.
-

### ***Installing a 3 1/2-Inch Device***

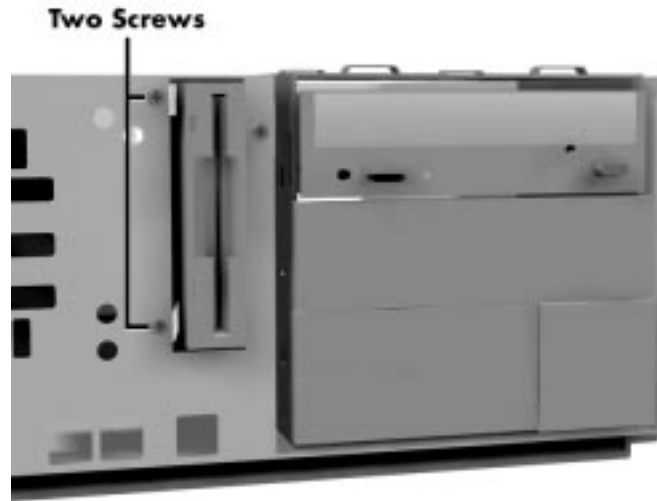
Use the following procedure to install a 3 1/2-inch device.

1. Follow the preinstallation instructions that came with the device, such as setting jumpers and switches.
2. Remove the access cover.
3. Remove and label any cables that interfere with installing the device.
4. Remove the front panel (see the previous section).
5. Choose the slot for the device being installed (see Figure 3-17).



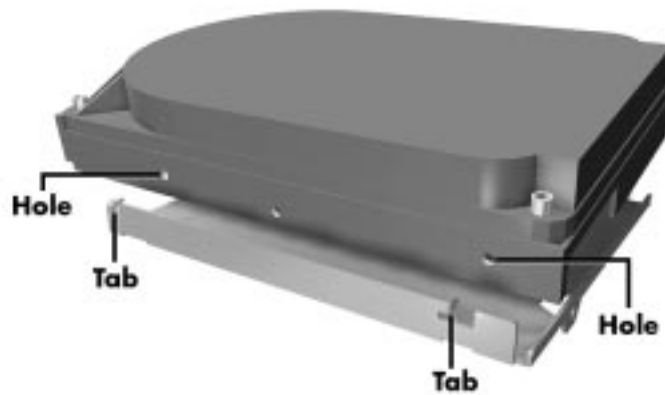
***Figure 3-17 Locating Device Slots***

- If you are installing the device in the second 3 1/2-inch internal device slot:
  - Remove the two screws securing the 3 1/2-inch hard disk bracket to the front of the system unit.



**Figure 3-18** *Removing the Bracket Screws*

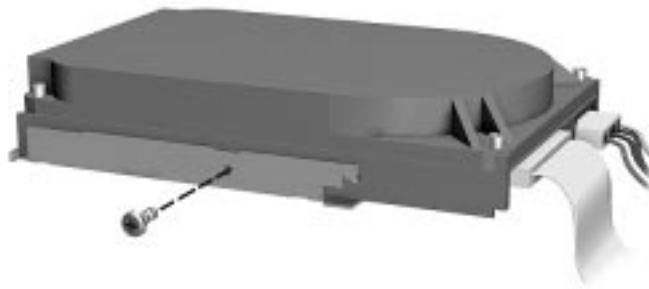
- Slide the 3 1/2-inch hard disk bracket towards the back of the system unit until it is free of the molded plastic.
- Align the two screw holes on the hard disk with the two tabs on the bracket. Slide the hard disk onto the tabs.



**Figure 3-19** *Aligning the Holes and Tabs*

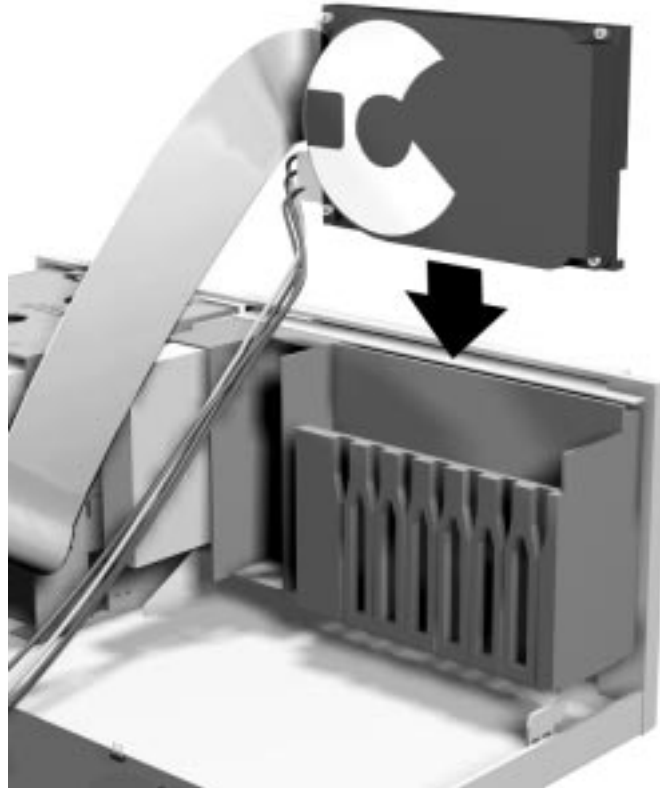


- Place the hard disk into the bracket and secure with the screw.



**Figure 3-20** *Securing the Disk*

- Slide the bracket into the molded plastic drive slot. Secure the bracket to the front panel with the two screws shown in figure 3-18.
- If you are installing the device in the standard 3 1/2-inch internal device slot, simply insert the drive into the opening until it is secured (see Figure 3-21). Secure the drive with two screws inserted into the front of the system.



**Figure 3-21** *Inserting the Device*

---

- If you are installing a device in an accessible slot, go to step 6.
6. To install a 3 1/2-inch device in an accessible slot:
    - Remove the plastic blank panel from the selected slot by pressing the panel tab inward and swinging the blank panel out (see Figure 3-22).



**Figure 3-22** *Removing the Blank Panel*

- Use a screw driver to remove the metal slot cover by carefully pressing it until it breaks away from the chassis. Be careful of sharp edges!
  - Slide the device into the slot and secure the device.
7. Connect the device cables (see “Cabling an IDE Device”).
  8. Replace the front panel.
  9. Replace the access cover.

### ***Installing a 5 1/4-Inch Device***

Install an accessible device into the device slot as follows.

1. Follow the preinstallation instructions that came with the device, such as setting jumpers and switches.
-

---

**NOTE:** If your 5 1/4-inch device comes with drive rails, do not attach them. Remove any rails attached. See the documentation that comes with the device.

---

2. Remove the access cover.
3. Remove the device cage (see “Removing the CD-ROM/DVD Drive”).
4. Remove and label any cables that interfere with installing the device.
5. Remove the front panel.
6. Remove the plastic blank panel. If you are installing a hard drive, keep the panel handy.
7. Use a screw driver to remove the metal slot cover by carefully pressing it until it breaks away from the chassis. Be careful of sharp edges.
8. From the front of the system, slide the device, connector end first, into the device slot.

---

**NOTE:** To easily access device connectors for cabling, do not insert a 5 1/4-inch device all the way into the slot.

---

9. Connect the device cables (see “Cabling Storage Devices”).
10. Align the holes in the device with the holes in the chassis.
11. Secure the device with the screws that came with the device (see Figure 3-23).



**Figure 3-23** *Installing the Device*

---

---

**NOTE:** If you removed the accessible device cage, replace it. Secure the device cage with the screw.

---

12. If you installed a hard drive in the 5 1/4-inch slot, replace the plastic panel.
13. Replace the front panel.
14. Replace the access cover.

### ***Replacing the Front Panel***

To replace the front panel, follow this procedure.

1. Align the front panel's six tabs with their corresponding slots on the system (three of the tabs have holes, the others have prongs).
2. Press the front panel squarely into position until the tabs lock the panel in place.
3. Replace the access cover.
4. After securing your system, reboot it and run the Setup program to set the new configuration.

## **ADDING EXTERNAL OPTIONS**

External connectors on the back of the system unit allow for a variety of industry-standard options.

This subsection provides the installation procedures for the most commonly used external options, which are as follows:

- parallel printer
- serial devices.

For other external devices, see the instructions that come with the option.

### **Parallel Printer**

---

**NOTE:** Before connecting a printer to the system, be sure the printer is set up correctly. Follow the setup instructions that come with the printer.

---

Connect a parallel printer to the system as follows.

---

1. Turn off power to the system and printer.
2. Connect the printer cable to the printer port on the rear of the system unit (see Figure 3-24).
3. Secure the cable with the screws provided.
4. Connect the other end to the printer.
5. Turn on the printer and the computer.



**Figure 3-24** Locating the Parallel Port

## RS-232C Device Connection

---

**NOTE:** Before connecting a serial device to the system, be sure the serial device is set up correctly. Follow the setup instructions that come with the option.

---

1. Turn off power to the system and to the serial device.
  2. Connect one end of the serial cable to one of the serial ports on the rear of the computer (see Figure 3-25).
  3. Secure the cable with the screws provided.
-

4. Connect the other end to the serial device.
5. Turn on the serial device and the computer.



*Figure 3-25 Locating Serial Ports*

## Section 4

---

# Maintenance and Troubleshooting

This section provides information on maintaining and troubleshooting the Direction SP B-Series computers. Table 4-1 provides the NEC CSD service telephone numbers. Also included in this section are the error beep code descriptions and a procedure for replacing the CMOS battery.

**Table 4-1 NEC CSD Service and Information Telephone Numbers**


| <b>Service</b>  | <b>Telephone Number</b>  |
|---|--|
| To contact the NEC CSD Direction Technical Support Center (TSC):  | In the U.S., call 1 (888) 632-2678   |
| To order spare parts:   | In the U.S., call 1 (800) 233-6321<br>In Canada, call 1 (800) 727-2787                       |
| To contact Customer Service about service and contract warranty issues:   | Call 1 (888) 632-9128  |
| To log onto the NEC CSD Electronic Bulletin Board System (BBS) to download software drivers and the latest BIOS for ROM flashing:   | Call 1 (978) 635-4706  |
| For information about NEC CSD products, call FaxFlash <sup>SM</sup> (use the automated service to have the latest Technical Information Bulletins sent to your fax machine 24 hours a day): | In the U.S., 1 (888) 329-0088<br>1 (888) FAX-0088<br>Outside the U.S., call 1 (978) 635-6090 |
| To send technical questions over email:   | tech-support@neccsd.com  |
| To fax technical questions to customer support:   | In the U.S., fax 1 (978) 635-4666  |
| To access the NEC CSD Website:  | www.necnow.com   |
| To access the NEC CSD FTP site:   | ftp.neccsdeast.com   |
| To purchase a new system through NEC NOW, or to obtain sales literature:  | Call 1 (888) 8NEC-NOW  |

## MAINTENANCE

This subsection contains general information for cleaning and checking the system, keyboard, and monitor.

The system, keyboard, and monitor require cleaning and checking at least once a year, and more often if operating in a dusty environment. No other scheduled maintenance or lubrication is required.

---

 **WARNING:** Unplug all power cords before performing any maintenance. Voltage is present inside the system and monitor even after the power button is off. All voltage is removed only when the power cord is unplugged.

---

### System Cleaning

Use the following procedure for cleaning the system.

1. Power off the system and unplug all power cables.
2. Periodically wipe the outside of the system, keyboard, mouse, and monitor with a soft, clean cloth. Remove stains with a mild detergent. Do not use solvents or strong, abrasive cleaners on any part of the system.
3. Clean the monitor screen with a commercial monitor screen cleaning kit. Or use a glass cleaner, then wipe with a clean lint-free cloth.
4. Local distributors and dealers may sell diskette drive head cleaning kits. These kits contain special diskettes and cleaning solution. Do not use the abrasive head cleaning kits (kits without cleaning solution).

Insert the diskette immediately after powering on the system, before the disk bootup. Allow the diskette drive heads to clean for about 30 seconds.

---



## Keyboard Cleaning

As necessary, inspect and clean the inside of the keyboard as follows.

1. Remove the eight screws holding the keyboard enclosure together.

---

**NOTE:** The keyboard and cable together are considered a whole-unit, field-replaceable assembly. Therefore, disassembly of the keyboard is necessary only when cleaning the inside.

---

2. Separate the two halves of the enclosure. Clean the enclosure and keys with a damp cloth. A small, soft-bristle brush may be used to clean between the keys. Do not wet or dampen the keyboard's printed circuit board (PCB). If the PCB accidentally gets wet, thoroughly dry it before reattaching the keyboard to the system unit.

## Mouse Cleaning

Under normal conditions, the mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism. Periodically, however, the mouse ball must be cleaned. Use the following procedure to clean the mouse.

1. Unplug the mouse from the system.
  2. Turn the mouse upside down and locate the mouse ball cover (see Figure 4-1).
-

3. Turn the ball cover clockwise and remove the cover.



**Figure 4-1** *Removing the Mouse Ball Cover*

4. Turn the mouse over and remove the ball.
5. Clean the mouse as follows:
  - Clean the mouse ball with tap water and a mild detergent, then dry it with a lint-free cloth.
  - Remove any dust and lint from the mouse socket.
6. Replace the mouse ball in its socket.
7. Replace the ball cover and turn it counterclockwise until it locks in place.

## TROUBLESHOOTING

This subsection provides information that helps isolate and repair system malfunctions at the field level. Step-by-step instructions for diagnosing and solving system hardware problems are provided. Technical support is available at 1-888-632-2678.

If disassembly is required, see Section 5. Connector pin assignments are given in Appendix B. Jumper settings are given in the appendices.

### Diagnosing and Solving Problems

One beep indicates that the system has completed its power-on self-test (POST) test. If intermittent beeping occurs, power off the system and try again. If the beeping persists, see Table 4-2 and Table 4-3. The following table summarizes problems that may develop during system operation and lists (in sequential order) suggested corrective actions.

**Table 4-2 Problems and Solutions**

| <b>Problem</b>           | <b>Symptom</b>  | <b>Solution</b>   |
|--------------------------|---|---|
| No power                 | Power lamp on computer status panel will not light.   | <ol style="list-style-type: none"> <li>1. Check that the power cord is plugged into the AC connector on the computer.</li> <li>Check that the other end of the cord is plugged into a live properly grounded AC power outlet.</li> <li>2. Check cable connections between the power supply and system board.</li> <li>3. Systematically eliminate possible shorted PCBs by removing cables and expansion boards.</li> <li>4. Check the +5 and +12 power supply voltages (see Appendix B, "Connector Pin Assignments"). Measure voltages with the system board installed.</li> <li>5. Replace the power supply.</li> <li>6. Replace the system board.</li> </ol> |
| Power supply malfunction | <p>Any of the following conditions could occur:</p> <p>Front panel lamps out, diskette and/or hard drives do not spin, monitor blank, interface ports not working, and keyboard lamp out and/or cannot input from keyboard.</p> | <ol style="list-style-type: none"> <li>1. Perform steps 1 through 4 listed in this table under No Power.</li> <li>2. Check power supply voltages. Voltages should be measured with a load on them (system board plugged in). See Appendix B for connector pin assignments.</li> <li>3. Replace the power supply.</li> </ol>   |

**Table 4-2 Problems and Solutions**

| <b>Problem</b>                 | <b>Symptom</b>  | <b>Solution</b>   |
|--------------------------------|---|---|
| Operating system does not boot | Intermittent beeping at power-on. Computer beeps more than once and is unable to complete bootup. | <ol style="list-style-type: none"> <li>1. Check system configuration (see Section 2).</li> <li>2. Check all jumper settings and verify that drives are enabled (see appendices and Section 2).</li> <li>3. Reseat DIMMs and option boards in their connectors. Inspect system board for dropped objects.</li> <li>4. Remove option boards and reboot.</li> <li>5. Replace system board.</li> </ol>                  |
|                                | “Invalid Configuration” message displayed.  | <ol style="list-style-type: none"> <li>1. Press <b>F2</b> to run Setup and correct the parameters.</li> <li>2. Replace the CMOS battery if the date and time must be set each time the computer is powered on.</li> </ol>   |
|                                | Computer halts during loading sequence.   | <ol style="list-style-type: none"> <li>1. Power the computer off. Check for proper jumper settings (see appendices), then power on the computer.</li> <li>2. Check condition of selected bootload device (diskette or hard disk) for bad boot track or incorrect OS files.</li> <li>3. Try booting OS from diskette or recopy OS files onto hard disk.</li> <li>4. Verify correct hard disk is selected.</li> </ol> |
| Diskette drive does not work   | Lamp on drive panel does not light when diskette is loaded.                                       | <ol style="list-style-type: none"> <li>1. Check power and signal cable connections between diskette drive, system board, and power supply.</li> <li>2. Check diskette drive jumpers.</li> <li>3. Check diskette cable. Replace as necessary.</li> <li>4. Check power supply.</li> <li>5. Replace diskette drive.</li> <li>6. Replace system board.</li> </ol>   |

**Table 4-2 Problems and Solutions**

| <b>Problem</b>                | <b>Symptom</b>   | <b>Solution</b>  |
|-------------------------------|--|--|
| Hard drive malfunction        | Hard drive lamp does not light but hard drive can be accessed. | 1. Check cable connections between lamp and system board.  |
|                               | Hard drive controller failure message displayed.               | 1. Check that the IDE port and hard drives are enabled in Setup.   |
|                               | Cannot access hard disk.                                       | 1. Check signal/power connections between hard disk, system board, power supply.<br>2. Check hard drive jumper settings.<br>3. Check power supply.<br>4. Check hard disk cable and hard disk. Replace as necessary.<br>5. Replace system board (or hard disk controller board if the system board controller is not used). |
| Memory malfunction            | Total memory not recognized.                                   | 1. Reseat DIMMs.<br>2. Systematically swap DIMMs.<br>3. Check to see if the DIMM configuration is valid (see Section 3).<br>4. Replace DIMMs.<br>5. Replace system board.  |
| Modem board malfunction       | No output from board.  | 1. Check interrupts (see Appendix C).<br>2. Check DMA channels (see Section 1).  |
| Keyboard or mouse malfunction | Monitor has prompt, but cannot input data.                     | 1. Check that keyboard/mouse is plugged in.<br>2. Check password (see Section 2).<br>3. Disable password (see Appendix C).<br>4. Replace keyboard (or mouse).<br>5. Replace system board.  |

**Table 4-2 Problems and Solutions**

| <b>Problem</b>      | <b>Symptom</b>                 | <b>Solution</b>  |
|---------------------|--------------------------------|--|
| Monitor malfunction | Unable to synchronize display. | <ol style="list-style-type: none"> <li>1. Adjust the monitor's synchronization controls.</li> <li>2. Check that the monitor's resolution matches the video setting or the video driver used.</li> <li>3. Check that the utility is not selecting a refresh rate/resolution that is not supported by the monitor.</li> <li>4. Check that the driver used matches the capabilities of the video controller and memory.</li> </ol>  |
|                     | Wavy display.                  | <ol style="list-style-type: none"> <li>1. Check that the computer and monitor are not near motors or electric fields.</li> </ol>   |
|                     | Blank display.                 | <ol style="list-style-type: none"> <li>1. Press any key or move the mouse to ensure power management has not blanked the display.</li> <li>2. Check that the monitor power switch is on.</li> <li>3. Check that the monitor cable is attached to the video connector at the back of the system.</li> <li>4. Check cable connections between the AC power supply and monitor.</li> <li>5. Adjust brightness and contrast controls on the monitor.</li> <li>6. Check cable connections between the monitor connector and the system board.</li> <li>7. Replace system board.</li> <li>8. Replace monitor.</li> </ol> |

**Table 4-2 Problems and Solutions**

| <b>Problem</b>               | <b>Symptom</b>                  | <b>Solution</b>  |
|------------------------------|---------------------------------|--|
| CD-ROM/DVD drive malfunction | System power not on.            | 1. Turn system power on.   |
|                              | Disc tray does not open.        | 1. System power not on. Turn system power on.<br>2. System power failed. Insert about an inch of a straightened paper clip into the emergency eject hole, until the tray opens.  |
|                              | Cannot access CD-ROM/DVD drive. | 1. Check that the driver software is loaded and not corrupted.<br>2. Check signal and power connections between the reader, system board, and power supply.<br>3. Check the master/slave jumper settings.<br>4. Check the IDE cable. Replace as necessary.<br>5. Check the power supply. Replace as necessary.<br>6. Check the system board. Replace as necessary. |
|                              | No sound from CDs.              | 1. Check that speaker power is on and volume is adjusted.<br>2. Check audio software settings.<br>3. Check the CD disc.<br>4. Check the drive audio cable. Replace as necessary.<br>5. Replace the CD-ROM/DVD drive.<br>6. Replace the system board.   |
| Zip drive malfunction        | System power not on             | 1. Turn system power on.   |
|                              | Cannot access Zip drive.        | 1. Check that the Zip drive driver software is loaded and not corrupted.<br>2. Check signal and power connections between the Zip drive, system board, and power supply.<br>3. Check the master/slave jumper settings.   |

**Table 4-2 Problems and Solutions**

| <b>Problem</b>      | <b>Symptom</b>                     | <b>Solution</b>  |
|---------------------|------------------------------------|--|
| Communication error | No or bad data when communicating. | <ol style="list-style-type: none"><li>4. Check the IDE cable. Replace as necessary.</li><li>5. Check the power supply. Replace as necessary.</li><li>6. Check the system board. Replace as necessary.</li><li>1. Check cable connections between system board and device.</li><li>2. Check that the interface port is selected.</li><li>3. Test or replace the device and interface cable (see the device documentation for troubleshooting).</li><li>4. Replace the system board.</li></ol> |

---



## Beep Codes

During boot up, the computer performs a series of POST (Power On Self Test) routines. A beep code may appear when an error is detected. There are fatal and nonfatal errors. The fatal errors include BIOS, CMOS, DMA, RAM, video, and keyboard controller errors. The nonfatal errors include timer tick interrupt, shutdown test, unexpected interrupt in protected mode, gate A20, RAM test, interval timer channel 2 test, clock, serial and parallel port test, numeric processor, system board select, and extended CMOS RAM.

The following table provides a description of the beep codes.

**Table 4-3 Beep Code Descriptions**

| Beeps   | Description  |
|---------|--|
| 1-2     | Search for option ROMs                                   |
| 1-2-2-3 | BIOS ROM checksum  |
| 1-3-1-1 | Test DRAM refresh  |
| 1-3-1-3 | Test keyboard controller                                 |
| 1-3-3-1 | Autosize DRAM  |
| 1-3-3-2 | Initialize POST memory manager                           |
| 1-3-3-3 | Clear 512 KB base RAM                                    |
| 1-3-4-1 | RAM failure on address line xxxx                         |
| 1-3-4-3 | RAM failure on data bits xxxx of low byte of memory bus  |
| 1-4-1-1 | RAM failure on data bits xxxx of high byte of memory bus |
| 2-1-2-2 | POST device initialization                               |
| 2-1-2-3 | Check ROM copyright notice                               |
| 2-2-3-1 | Test for unexpected interrupts                           |
| 2-2-4-1 | Test RAM between 512 KB and 640 KB                       |

## CMOS Battery Replacement

Remove the 3-volt lithium battery from the system board as follows.

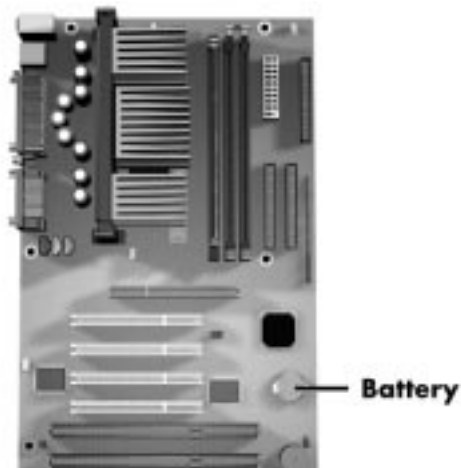
1. Turn off and unplug the system unit and any external options connected to the system.



**CAUTION:** Removing the battery from the system board causes the computer to lose system configuration information. If possible, run Setup and record the system configuration settings before removing the battery. Use that information to restore the system after replacing the battery.

---

2. Remove the system access cover.
3. Locate the battery and its socket on the system board (see Figure 4-2).



**Figure 4-2** *Locating the Battery*

4. Use fingers to carefully pull the battery up until it is clear to slide the battery out of the socket.
-



**WARNING:** The battery can explode if it is incorrectly replaced or improperly discarded. Use only the same battery or an equivalent type recommended by the manufacturer when replacing the battery. Lithium acts as a catalyst when exposed to water and causes spontaneous combustion on contact. Discard used batteries according to the manufacturer's instructions.

---

5. With the positive (+) side facing up, press the new battery into the socket.
6. Replace the system access cover.
7. Connect external peripherals and power cables.
8. Run Setup to reconfigure system parameters (see Section 2).

## Section 5

---

# Disassembly and Reassembly

This section contains step-by-step disassembly procedures for the system unit. Reassembly is the reverse of disassembly. The procedures are supported by simplified disassembly illustrations to facilitate removal.

A Phillips-head screwdriver is the only required tool. For complete disassembly of the system unit, follow the disassembly order listed in table 5-1. To reassemble, follow the table and procedures in reverse order.

Individual removal procedures do not require the total disassembly of the computer. Each of the following subsections lists the parts that must be removed before beginning the removal procedure.

**Table 5-1 Disassembly Sequence**

| <b>Sequence</b> | <b>Part</b>                         | <b>See Page</b> |
|-----------------|-------------------------------------|-----------------|
| 1               | System access cover                 | 5-2             |
| 2               | Expansion board(s)                  | 5-2             |
| 3               | Front panel                         | 5-3             |
| 4               | Side panel                          | 5-4             |
| 5               | Device cage                         | 5-4             |
| 6               | Diskette drive                      | 5-4             |
| 7               | 5 1/4-inch device                   | 5-5             |
| 8               | Optional 3 1/2-inch hard disk drive | 5-6             |
| 9               | Standard 3 1/2-inch hard disk drive | 5-7             |
| 10              | Fan assembly                        | 5-8             |
| 11              | DIMM module                         | 5-8             |
| 12              | Power supply                        | 5-9             |
| 13              | System board                        | 5-10            |

---

When disassembling the system unit, follow these general rules.

- Disconnect all peripherals.
- When handling boards or chips, touch the system unit frame to discharge static.
- Do not disassemble parts other than those specified in the procedure.
- Use a Phillips-head screw driver, unless otherwise specified.
- Label all removed connectors. Note where the connector goes and in what position it was installed.

On completion of any reassembly, perform a power-on self-test (see Section 4, “Maintenance and Troubleshooting”). If a fault occurs, verify that the reassembly was performed correctly.



**CAUTION:** When handling boards or chips, ground yourself to release static.

---

## DISASSEMBLY

Use the following procedures to disassemble the system unit.

---

**NOTE:** Unplug the power cord before disassembling the system unit. Voltage is present inside the system unit even after the power is off. All voltage is removed only when the power cord is unplugged.

---

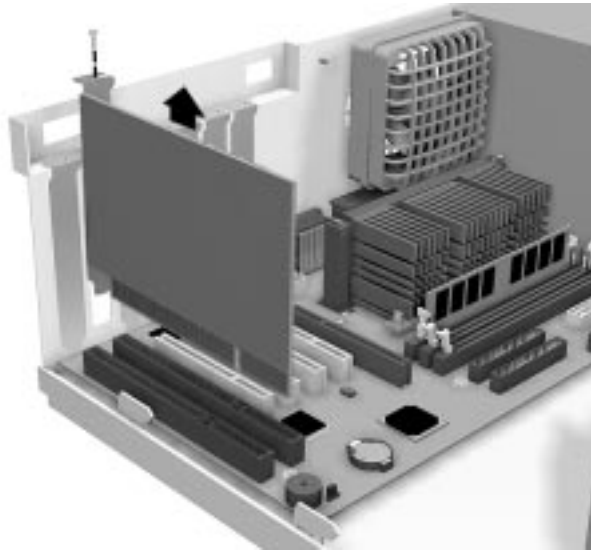
### System Access Cover

To remove and replace the system access cover, see Section 3.

### Expansion Board Removal

Remove any installed expansion board(s) per the following steps.

1. Remove the system access cover as described in Section 3.
  2. Disconnect any cables leading from the expansion board(s).
  3. Remove the screw that secures the board to the support bracket.
  4. Pull the board out of the connector. Gently rock the board from side-to-side to release it from its connector (see Figure 5-1).
-

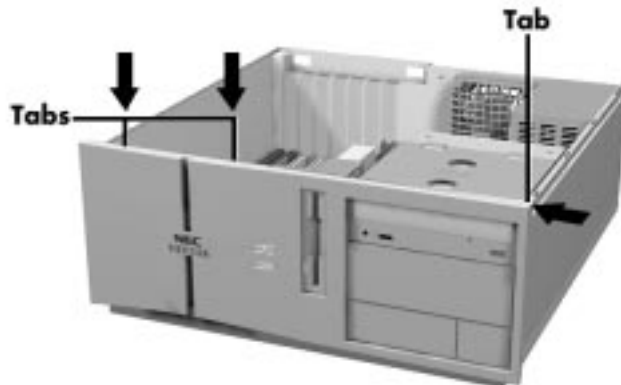


**Figure 5-1** Removing a Board

## Front Panel Removal

Remove the front panel from the system unit as follows.

1. Locate the two plastic tabs at the front of the chassis. They are indicated by two arrows engraved on the chassis.
2. Press down on the two tabs and press in a third tab at the end of the panel to release the panel (see Figure 5-2).



**Figure 5-2** Releasing the Front Panel

3. Pull the panel away from the chassis.

### Side Panel Removal

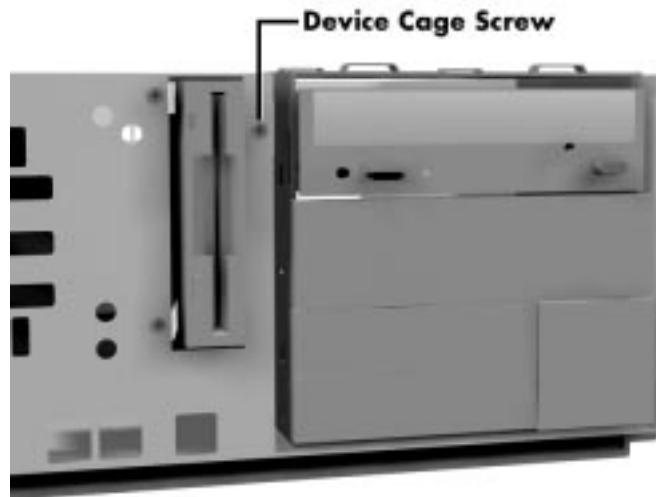
Remove the side panel from the system unit as follows.

1. Remove the system access cover and front panel as previously described.
2. Locate the two side panel securing tabs at the front of the system.
3. Pull the tabs out and away from the system.
4. Slide the side panel towards the rear of the unit and away from the unit.

### Device Cage Removal

Remove the device cage from the system unit as follows.

1. Label and disconnect any cables connected to devices in the device cage.
2. Locate the screw on the front of the system between the 3.5-inch blank panel and diskette drive (see Figure 5-3). Remove the screw.



*Figure 5-3 Locating the Device Cage Screw*

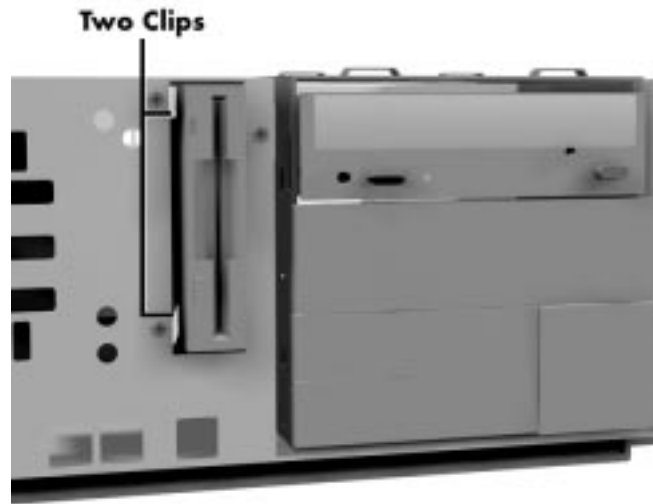
3. Slide the cage towards the front of the system and lift it out of the unit.

### Diskette Drive Removal

Remove the standard diskette drive from the system unit as follows.

1. Remove the system access cover and front panel as previously described.
  2. Label and unplug the signal and power cables for the diskette drive.
-

3. Locate the two clips at the front of the system that secure the diskette drive.



*Figure 5-4 Locating the Two Diskette Drive Clips*

4. Squeeze the two clips and pull the diskette drive out of the front of the system.

### **5 1/4-Inch Device Removal**

Remove an optional 5 1/4-inch device from the system unit as follows.

1. Remove the system access cover, front panel, and the device cage as previously described.
  2. Label and unplug the signal and power cables from the optional device in the 5 1/4-inch device cage. Unplug the audio cable from an optional CD ROM driver.
-



3. Remove the screws holding the device in the cage (see Figure 5-5).



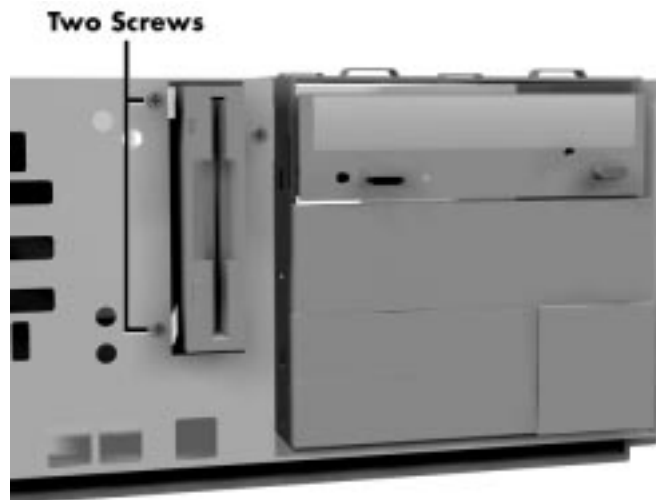
**Figure 5-5** Removing the 5 1/4-Inch Device Screws

4. Slide the device out from the front of the system unit.

### **Optional 3 1/2-Inch Hard Disk Drive Removal**

Remove the optional 3 1/2-inch hard disk drive as follows.

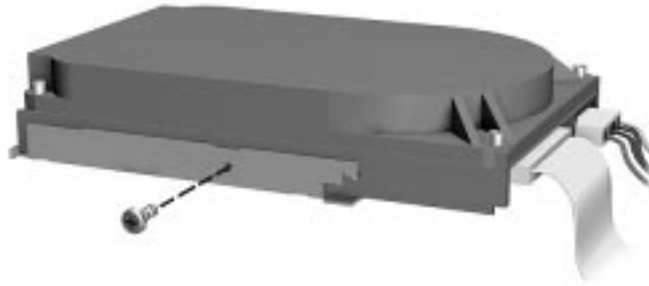
1. Remove the system access cover and front panel as previously described.
2. Label and unplug the hard disk drive power and signal cables from the hard disk drive.
3. Remove the two screws securing the 3 1/2-inch hard disk bracket to the front of the system unit (see Figure 5-6).



**Figure 5-6** The 3 1/2-Inch Device Bracket Screws

---

4. Slide the 3 1/2-inch hard disk bracket towards the back of the system unit until it is free of the molded plastic.
5. Remove the screw on the side of the hard disk securing it to the bracket.



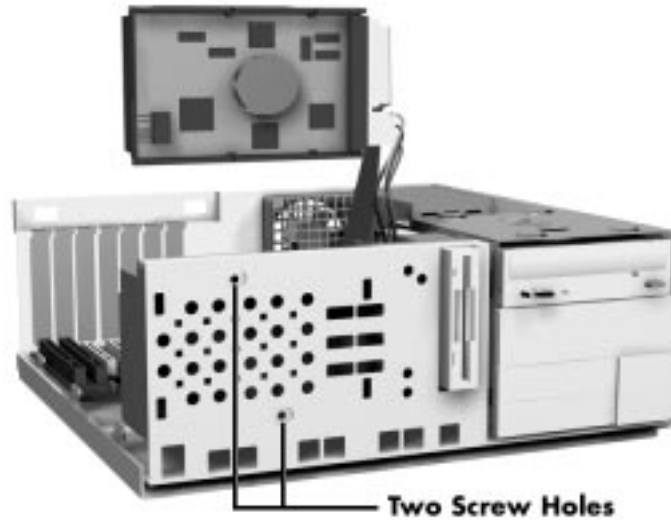
**Figure 5-7** Removing the Securing Screw

6. Slowly pull the hard disk away from the bracket and lift the disk out of the two securing tabs on the opposite side of the bracket.

### **Standard 3 1/2-Inch Hard Disk Drive Removal**

Remove the standard 3 1/2-inch hard disk drive as follows.

1. Remove the system access cover and front panel as previously described.
  2. Unplug the hard disk drive power and signal cables from the optional hard disk drive.
  3. Locate the two screws securing the 3 1/2-inch hard disk drive in the molded plastic cage at the front of the system. Remove the screws.
  4. Release the two plastic clips inside the plastic cage holding the drive in place and slide the drive up and out of the cage.
-



**Figure 5-8** *Removing the Drive*

### **Fan Assembly Removal**

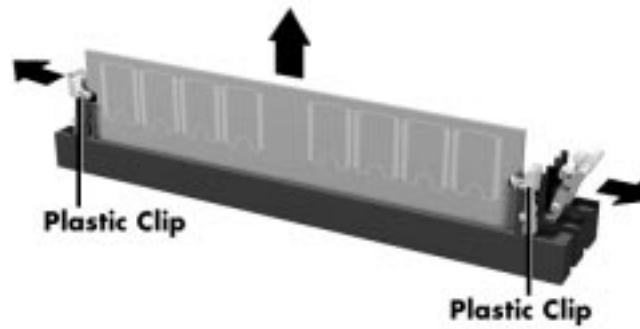
Remove the fan assembly per the following steps.

1. Remove the system access cover per Section 3.
2. At the rear of the system unit, press in on the two locking tabs securing the assembly to the chassis.
3. Remove the fan by pulling it outward away from the system board.

### **DIMM Module Removal**

Remove any optional DIMM modules from the system board as follows.

1. Remove the system access cover and any expansion boards as previously described.
  2. Press the locking clips at the ends of the socket away from the DIMM memory module (see Figure 5-9).
  3. Gently rock the module while pulling it up from the socket.
-



**Figure 5-9 Removing a DIMM**

When installing a DIMM module, align the notches on the module with the keys in the memory socket, insert the module, and press in the plastic locking clips.

### **Power Supply Removal**

Remove the power supply as follows.

1. Remove the system access cover as previously described.
2. Label and unplug the power cable attached to the system board.
3. Label and unplug the power cables from all installed devices.
4. At the back of the system unit, remove the two screws securing the power supply to the system unit (see Figure 5-10).



**Figure 5-10** Removing the Power Supply Screws

5. Pull the power supply out of the system unit.

### **System Board Removal**

Remove the system board per the following steps.

1. Remove the system access cover, expansion boards, fan assembly, and power supply as previously described.
2. Remove and label all cables connected to the system board. Appendix B provides the connector identifiers and pin assignments for each connector.
3. Locate and remove the one screw at the rear of the unit that secures the system board to the system unit (see Figure 5-11).



**Figure 5-11** Removing the System Board Screw

4. Slide the system board towards the front of the unit until it is clear of the metal shielding and the alignment clips.
5. Lift the board out of the system at an angle.
6. If replacing the system board, remove any installed DIMMs from the board. Reinstall the DIMMs on the new board.
7. Replace the access cover and reconnect all the cables. Turn the system and monitor on and note the initial boot up screen. If the displayed board's processor speed does not match the actual processor, use the following procedure to set the system's processor speed.

The following steps adjust the system's processor speed.

1. Turn off the system and remove the access cover.
  2. Locate jumper J8A1 on the system board.
  3. Move the jumper block from pins 1 and 2 (normal mode) to pins 2 and 3 (configure mode).
  4. Turn on the system. The Maintenance menu appears showing the processor speed.
  5. With the cursor on "Processor Speed," press **Enter**. Highlight the proper speed and press **Enter**.
  6. Exit saving changes. A dialog box appears. Choose to save configuration changes and exit.
  7. A screen with information about the jumper appears. Turn the system off.
  8. Move the jumper block from pins 2 and 3 to pins 1 and 2.
-

## ILLUSTRATED PARTS BREAKDOWN

This section contains the illustrated parts breakdown (IPB) and NEC CSD part numbers for the Direction SP B-Series desktop and minitower computers.

Table 5-2 lists the field-replaceable parts for the desktop and Figure 5-12 provides the illustrated parts breakdown. Table 5-3 lists the field replaceable parts for the minitower and Figure 5-13 provides the illustrated parts breakdown.

**Table 5-2 Direction SP B-Series Desktop Field-Replaceable Parts List\***

| Item | Description                   | Part Number    |
|------|-------------------------------|----------------|
| 1    | Keyboard, Ergo                | 229-00012      |
| 2    | 32x CD-ROM drive              | 730330         |
| 3a   | Ditto 3200 tape drive, backup | 320547         |
| 3b   | lomega Jazz drive             | 221-00018      |
| 4    | lomega ATAPI Zip drive        | 320703         |
| 5a   | 4.3-GB hard drive, IDE UDMA   | 300856         |
| 5b   | 6.4-GB hard drive, IDE UDMA   | 300857         |
| 5c   | 8.4-GB hard drive, IDE UDMA   | 300858         |
| 5d   | 9.1-GB hard drive, IDE UDMA   | 300833         |
| 5e   | 11.4-GB hard drive, IDE UDMA  | 300851         |
| 5f   | 14.4-GB hard drive, IDE UDMA  | 300849         |
| 5g   | 16.8-GB hard drive, IDE UDMA  | 300850         |
| 5h   | 9.1-GB SCSI hard drive        | 300689         |
| 6    | 3.5-inch diskette drive       | 219-00012      |
| 7    | Microphone                    | 232-00011      |
| 8    | Speaker                       | 158-056684-000 |
| 9    | Left side cover               | 158-056682-000 |
| 10   | Top cover (access cover)      | 158-056680-000 |
| 11   | Front panel                   | 158-056678-000 |
| 12   | Right side cover              | 158-056681-000 |
| 13   | Power supply - Sparkle        | 190300         |
| 14a  | Altec Lansing speakers, ACS90 | 160312         |
| 14b  | Altec Lansing speakers, ACS45 | 160314         |

\* This data was prepared June 1998. For an up-to-date listing of spare parts, please call FaxFlash<sup>SM</sup> at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102083.

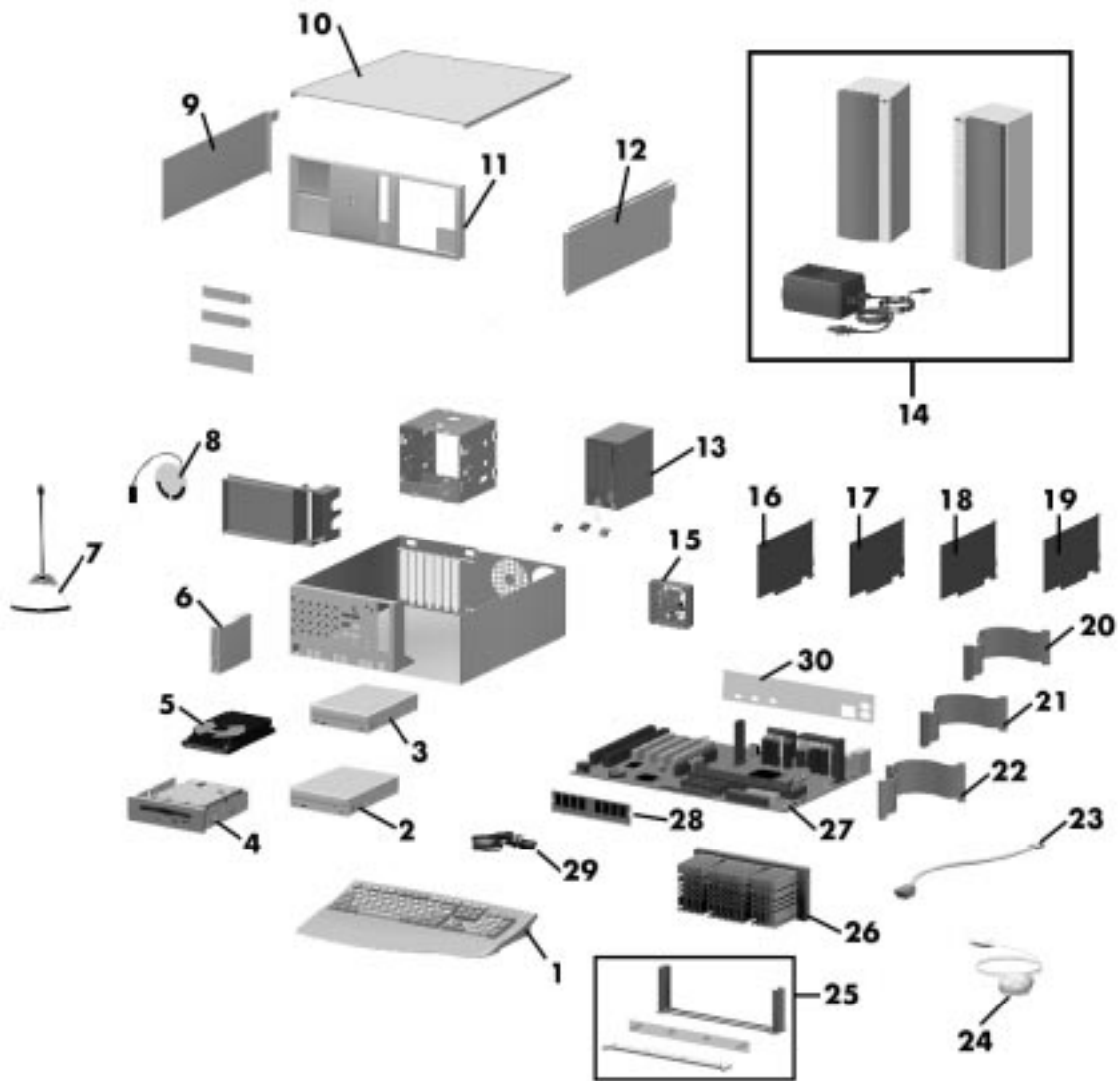
**Table 5-2 Direction SP B-Series Desktop Field-Replaceable Parts List\***

| <b>Item</b> | <b>Description</b>   | <b>Part Number</b> |
|-------------|--|--------------------|
| 14c         | Altec Lansing speakers, ACS410   | 160313             |
| 14d         | Altec Lansing speakers, ACS251   | 160315             |
| 15          | Fan assembly   | 158-056683-000     |
| 16          | Video board, V330 AGP  | 060214             |
| 17a         | 56-Kbps modem board  | 090134             |
| 17b         | 56-Kbps Winmodem   | 090304             |
| 18a         | 3C509B network board   | 203-00003          |
| 18b         | 3COM PCI 10/100 3C905TX ethernet board                                 | 204-00001          |
| 19a         | 2940 Adaptec UW SCSI adapter board                                     | 207-00121          |
| 19b         | 2930B S Adaptec SCSI adapter board                                     | 030295             |
| 20          | Diskette drive signal cable  | 070114             |
| 21          | IDE signal cable   | 233-00026          |
| 22          | Cable, audio internal, dual MPC  | 070808             |
| 23          | SCSI cable   | 233-00133          |
| 24          | Microsoft Mouse  | 230-00026          |
| 25          | Retention mechanism kit  | 130083             |
| 26a         | 350-MHz Pentium II with active heatsink                                | 202989             |
| 26b         | 400-MHz Pentium II with active heatsink                                | 202899             |
|             | Top bar heatsink (not shown in figure)                                 | 235-00006          |
| 27          | System board   | 158-056740-000     |
| 28a         | 32-MB DIMM - non-parity  | 081918             |
| 28b         | 64-MB DIMM - non-parity  | 081919             |
| 29          | AC power cable   | 070135             |
| 30          | I/O shield   | 149763             |
|             | Cable, VMI — (DVD PCI board to V330 video board) (not shown in figure) | 070805             |
|             | Cable, diskette drive, 655 mm, 3 connector (not shown in figure)       | 233-00013          |
|             | System power switch (not shown in figure)                              | 130047             |
|             | Phone cable, modem (not shown in figure)                               | 146585             |
|             | Parallel printer cable (not shown in figure)                           | 070829             |
|             | LED and cable, dual color, power (not shown in figure)                 | 070834             |



**Table 5-2 Direction SP B-Series Desktop Field-Replaceable Parts List\***

| <b>Item</b> | <b>Description</b>   | <b>Part Number</b> |
|-------------|--|--------------------|
|             | CD, Restore, Windows 95 systems only<br>(not shown in figure)  | 165406             |
|             | CD, Restore, Windows NT systems only<br>(not shown in figure)  | 165407             |
|             | Battery (not shown in figure)  | 158-060367-000     |
|             | VGA loopback cable (not shown in figure)   | 070832             |
|             | PCI video board cable (not shown in figure)  | 070831             |
|             | PCI video board (not shown in figure)  | 060221             |
|             | Wavetable board (not shown in figure)  | 030402             |
|             | Zip drive cartridge (not shown in figure)  | 380-00002          |
|             | Ditto backup unit cartridge (not shown in figure)  | 149747             |
|             | Jazz drive cartridge (not shown in figure)   | 380-00102          |
|             | SCSI cable, 3 connector (not shown in figure)  | 070833             |
|             | Monitor, NEC 15", C550 (not shown in figure)   | 011001             |
|             | Monitor, NEC 17", C700 (not shown in figure)   | 011002             |
|             | Monitor, NEC 17", A700 (not shown in figure)   | 010438             |
|             | Monitor, NEC 19", C900 (not shown in figure)   | 011027             |
|             | Monitor, NEC 20", LCD 2000 (not shown in<br>figure)  | 011026             |
|             | SPB 350 logo plate (not shown in figure)   | 144762             |
|             | SPB 400 logo plate (not shown in figure)   | 144763             |
|             | Microsoft SideWinder 3D joystick (not shown in<br>figure)  | 160409             |
|             | DirecPC PCI board (not shown in figure)  | 149834             |
|             | DVD drive, Hitachi (not shown in figure)   | 730124             |
|             | DVD PCI board, Quadrant (not shown in figure)  | 060212             |
|             | Video board, #9 Revolution 3D, AGP (4 MB)<br>(Order additional 4-MB memory upgrade,<br>060204, with this part) (not shown in figure) | 060201             |
|             | 4-MB memory upgrade for #9 Revolution 3D<br>video board (not shown in figure)  | 060204             |
|             | Video board, #9 Reality 334, AGP (not shown in<br>figure)  | 060215             |



**Figure 5-12 Direction SP B-Series Desktop Illustrated Parts Breakdown\***

\* This data was prepared June 1998. For an up-to-date listing of spare parts, please call FaxFlash<sup>SM</sup> at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102083.

**Table 5-3 Direction SP B-Series Minitower Field-Replaceable Parts List\***

| <b>Item</b> | <b>Description</b>                      | <b>Part Number</b> |
|-------------|---|--------------------|
| 1           | AC power cable                          | 070135             |
| 2           | Microphone                              | 232-00011          |
| 3           | Microsoft Mouse                         | 230-00026          |
| 4           | Keyboard, Egro                          | 229-00012          |
| 5           | Cable, audio internal, dual MPC         | 070808             |
| 6           | Diskette drive signal cable             | 070114             |
| 7           | IDE signal cable                        | 233-00026          |
| 8           | SCSI cable                              | 233-00133          |
| 9           | Video board, V330 AGP                   | 060214             |
| 10a         | 56 Kbps modem board                     | 090134             |
| 10b         | 56 Kbps Winmodem                        | 090304             |
| 11a         | 3C509B network board                    | 203-00003          |
| 11b         | 3COM PCI 10/100 3C905TX ethernet board  | 204-00001          |
| 12a         | 2940 Adaptec UW SCSI adapter board      | 207-00121          |
| 12b         | 2930B S Adaptec SCSI adapter board      | 030295             |
| 13          | System board                            | 158-056740-000     |
| 14          | I/O shield                              | 149763             |
| 15a         | 350-MHz Pentium II with active heatsink | 202989             |
| 15b         | 400-MHz Pentium II with active heatsink | 202899             |
|             | Top bar heatsink (not shown in figure)  | 235-00006          |
| 16          | Retention mechanism kit                 | 130083             |
| 17a         | 32-MB DIMM - non-parity                 | 081918             |
| 17b         | 64-MB DIMM - non-parity                 | 081919             |
| 18          | Power supply -Sparkle                   | 190300             |
| 19          | Fan assembly                            | 158-056683-000     |
| 20a         | Altec Lansing speakers, ACS90           | 160312             |
| 20b         | Altec Lansing speakers, ACS45           | 160314             |
| 20c         | Altec Lansing speakers, ACS410          | 160313             |
| 20d         | Altec Lansing speakers, ACS251          | 160315             |

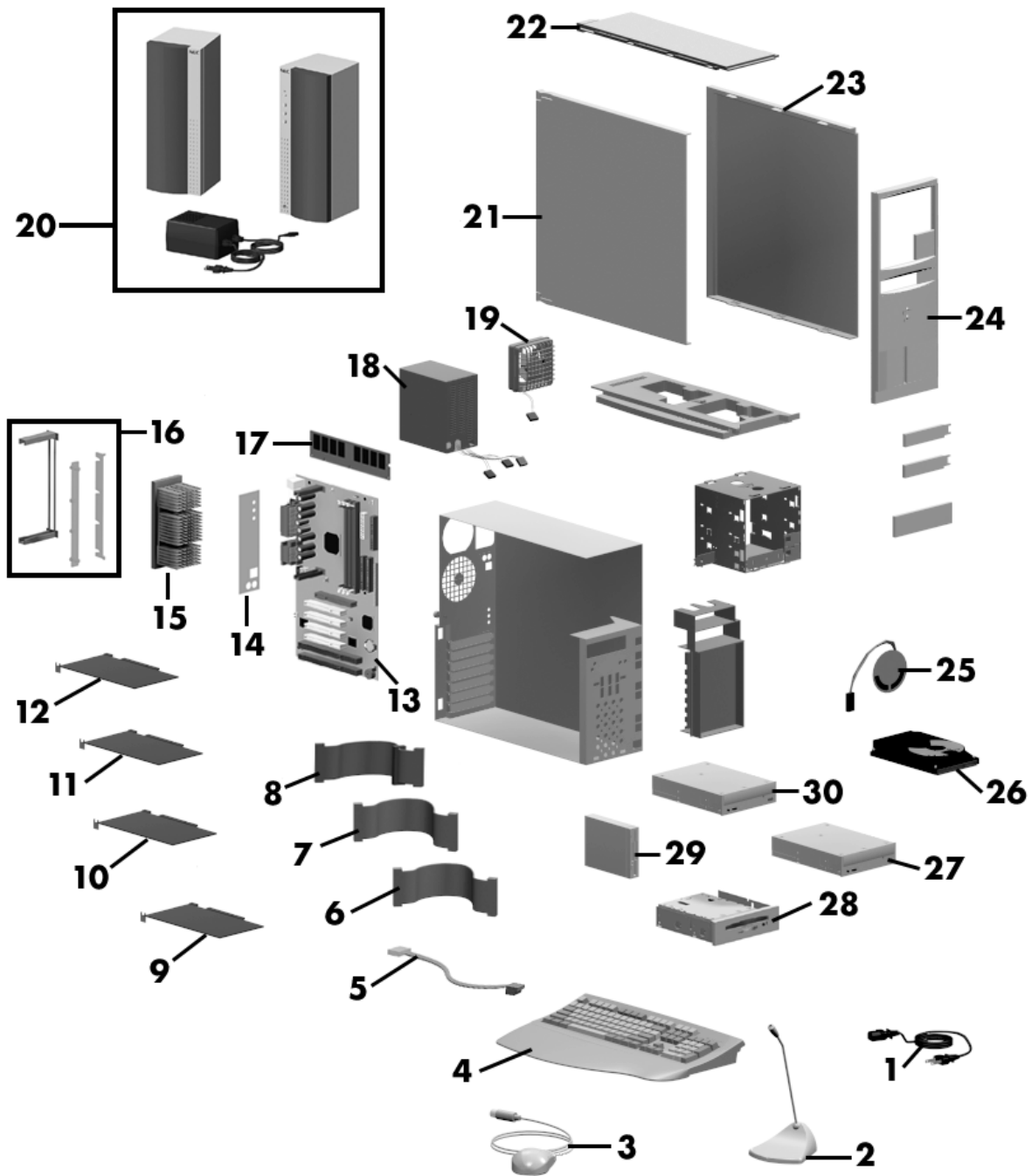
\* This data was prepared June 1998. For an up-to-date listing of spare parts, please call FaxFlash<sup>SM</sup> at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102083.

**Table 5-3 Direction SP B-Series Minitower Field-Replaceable Parts List\***

| <b>Item</b> | <b>Description</b>  | <b>Part Number</b> |
|-------------|---|--------------------|
| 21          | Left side cover (access cover)  | 158-056686-000     |
| 22          | Top cover   | 158-056685-000     |
| 23          | Right side cover  | 158-056687-000     |
| 24          | Front panel   | 158-056679-000     |
| 25          | Speaker   | 158-056684-000     |
| 26a         | 4.3-GB hard drive, IDE UDMA   | 300856             |
| 26b         | 6.4-GB hard drive, IDE UDMA   | 300857             |
| 26c         | 8.4-GB hard drive, IDE UDMA   | 300858             |
| 26d         | 9.1-GB hard drive, IDE UDMA   | 300833             |
| 26e         | 11.4-GB hard drive, IDE UDMA  | 300851             |
| 26f         | 14.4-GB hard drive, IDE UDMA  | 300849             |
| 26g         | 16.8-GB hard drive, IDE UDMA  | 300850             |
| 26h         | 9.1-GB SCSI hard drive  | 300689             |
| 27          | 32x CD-ROM drive  | 730330             |
| 28          | Imomega ATAPI Zip drive   | 320703             |
| 29          | 3.5-inch diskette drive   | 219-00012          |
| 30a         | Ditto 3200 tape drive, backup   | 320547             |
| 30b         | Imomega Jazz drive  | 221-00018          |
|             | Parallel printer cable (not shown in figure)                          | 070829             |
|             | LED and cable, dual color, power (not shown in figure)                | 070834             |
|             | Cable, VMI — DVD PCI board to V330 video board) (not shown in figure) | 070805             |
|             | Cable, diskette drive, 655 mm, 3 connector (not shown in figure)      | 233-00013          |
|             | System power switch (not shown in figure)                             | 130047             |
|             | Phone cable, modem (not shown in figure)                              | 146585             |
|             | VGA loopback cable (not shown in figure)                              | 070832             |
|             | PCI video board cable (not shown in figure)                           | 070831             |
|             | PCI video board (not shown in figure)                                 | 060221             |
|             | Wavetable board (not shown in figure)                                 | 030402             |
|             | Zip drive cartridge (not shown in figure)                             | 380-00002          |

**Table 5-3 Direction SP B-Series Minitower Field-Replaceable Parts List\***

| <b>Item</b> | <b>Description</b>   | <b>Part Number</b> |
|-------------|--|--------------------|
|             | Ditto backup unit cartridge (not shown in figure)  | 149747             |
|             | Jazz drive cartridge (not shown in figure)   | 380-00102          |
|             | SCSI cable, 3 connector (not shown in figure)  | 070833             |
|             | Monitor, NEC 15", C550 (not shown in figure)   | 011001             |
|             | Monitor, NEC 17", C700 (not shown in figure)   | 011002             |
|             | Monitor, NEC 17", A700 (not shown in figure)   | 010438             |
|             | Monitor, NEC 19", C900 (not shown in figure)   | 011027             |
|             | Monitor, NEC 20", LCD 2000 (not shown in figure)   | 011026             |
|             | Cable, CD-ROM, audio (not shown in figure)   | 070112             |
|             | Microsoft SideWinder 3D joystick (not shown in figure)   | 160409             |
|             | SPB 350 logo plate (not shown in figure)   | 144762             |
|             | SPB 400 logo plate (not shown in figure)   | 144763             |
|             | DVD drive, Hitachi (not shown in figure)   | 730124             |
|             | DVD PCI board, Quadrant (not shown in figure)  | 060212             |
|             | DirecPC PCI board (not shown in figure)  | 149834             |
|             | Video board, #9 Revolution 3D, AGP (4 MB)<br>(Order additional 4-MB memory upgrade,<br>060204, with this part) (not shown in figure) | 060201             |
|             | 4-MB memory upgrade for #9 Revolution 3D<br>video board (not shown in figure)  | 060204             |
|             | Video board, #9 Reality 334, AGP (not shown in figure)   | 060215             |



**Figure 5-13 Direction SP B-Series Minitower Illustrated Parts Breakdown\***

\* This data was prepared June 1998. For an up-to-date listing of spare parts, please call FaxFlash<sup>SM</sup> at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102083.

Table 5-4 lists Direction SP B-Series memory options.

**Table 5-4 Direction SP B-Series Memory Options**

| <b>Description</b>      | <b>Part Number</b> |
|-------------------------|--------------------|
| 32-MB DIMM (non-parity) | 081918             |
| 64-MB DIMM (non-parity) | 081919             |

Table 5-5 lists the Direction SP B-Series documentation.

**Table 5-5 Direction SP B-Series Documentation\***

| <b>Description</b>                                 | <b>Part Number</b> |
|--|--------------------|
| Direction SP B-Series User's Guide                 | 102083-01          |
| Direction SP B-Series Service and Reference Manual | 102083-SRV         |

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\* This data was prepared June 1998. For an up-to-date listing of spare parts, please call FaxFlash<sup>SM</sup> at 1-888-329-0088 (or 1-978-635-6090 outside the U.S.) and order document 42102083.

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## Appendix A

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# System Specifications

This section describes the system specifications.

### ***Processor***

Microprocessor — 350-MHz or 400-MHz Pentium II MMX

Clock Rate

- 350 MHz internally, 100 MHz externally
- 400 MHz internally, 100 MHz externally

Processor Support

- 32-bit addressing
- 64-bit data

Primary Cache — 32 KB of internal write-back cache on processor

Secondary Cache — 512 KB of pipeline burst cache

Processor Mounting

- Processor subsystem is inserted into slot 1 on the system board.
- A 242-pin edge connector is implemented on the processor card for system board installation.
- Retention Mechanism (RM) is inserted over slot 1 to act as an insertion guide and prevent movement of processor after subsystem mounting.
- For thermal protection, a heatsink is supported by a Heat Sink Support (HSS), which is attached to the system board.

### ***Random Access Memory (RAM)***

Standard RAM — 32 MB to 384 MB of PC100 SDRAM installed in industry-standard DIMM sockets on system board

Total Memory — support for up to 384 MB of high-speed PC100 SDRAM

DIMM type — gold-plated, dual in-line modules (DIMMs)

Expansion — expandable using the following modules:

---



- 1-Mbit by 64 or 1-Mbit by 72 (8-MB DIMM)
- 2-Mbit by 64 or 2-Mbit by 72 (16-MB DIMM)
- 4-Mbit by 64 or 4-Mbit by 72 (32-MB DIMM)
- 8-Mbit by 64 or 8-Mbit by 72 (64-MB DIMM)
- 16-Mbit by 64 or 16-Mbit by 72 (128-MB DIMM).

### ***Read-Only Memory (ROM)***

Flash ROM — 2 Mbit

### ***Window RAM (WRAM)***

Standard video memory — 4 MB video memory on the video board

### ***Calendar Clock***

Year/Month/Day/Hour/Minute/Second/.01 Second; maintained by battery backup

Battery Type — Real Time Clock (RTC) battery

### ***Input/Output (I/O) Facilities***

Integrated Industry-Standard Interfaces

- Parallel — bidirectional, ECP/EPP support; one 25-pin connector
  - Serial — two high-speed RS-232C ports using 16C550-compatible UARTs, supports transfer rates up to 115.2 Kbits per second; 9-pin connectors
  - Universal Serial Bus (USB) — two USB ports, support two USB peripherals directly to the system; with appropriate connector, each port supports up to 127 daisy-chained devices; supports 12 megabits (Mbs) per second
  - Keyboard — PS/2-compatible, 6-pin connector (mini DIN)
  - Mouse — PS/2 compatible, 6-pin connector (mini DIN)
  - IDE — dual IDE channels
    - two fast IDE channels
    - CD-ROM drive and hard disk on separate channels
    - support for up to 33 MB/second 32-bit transfers on PCI bus
    - support for a total of four IDE devices; 40-pin connectors
    - support for PIO mode 3 and mode 4, multiword DMA2, Ultra DMA33
  - Diskette Drive — supports two devices, 34-pin connector
-

**Expansion Slots**

I/O Bus — PCI/ISA

Six expansion slots

- One 8-/16-bit ISA slot
- Three 32-bit PCI slots
- One shared ISA/PCI slot
- One AGP slot

**Keyboard and Mouse**

Keyboard — Windows 95 enhanced, PS/2-compatible

- Function Keys — 12 keys, capable of up to 48 functions
- Status Lamps — numeric lock, capital lock, and scroll lock keys
- Numeric Keypad — standard
- Separate Cursor Control Keys — standard

Mouse — PS/2<sup>®</sup>-compatible; six-pin connector

**Storage Devices**

Accessible Devices

- 3 1/2-inch, 1.44-MB diskette drive
- CD-ROM/DVD drive
- Zip Drive — Iomega Zip 100 ATA drive on some systems; removable 100-MB data disks; data transfer rate up to 1.4 MB per second

**Device Slots**

Seven device slots:

- a 3.5-inch accessible device slot contains the standard 1.44-MB diskette drive
  - one internal 3.5-inch hard drive slot for the hard drive, a second internal 3.5-inch hard drive slot is available
  - four accessible device slots
    - One accessible 5.25-inch device slot contains the standard CD-ROM/DVD drive
    - One accessible 5.25-inch device slot
-

- Two 3.5-inch device slots; the lower 3.5-inch slot is not accessible on the desktop model

### **Graphics**

Video Memory — 4 MB

Support for High Color at 1024 by 768, 800 by 600, 640 by 480, and True Color at 800 by 600 and 640 by 480

- Graphics Support (with 4 MB video memory)
  - 1280 by 1024 pixels, 256 colors
  - 1024 by 768 pixels, 256/64,000 colors
  - 800 by 600 pixels, 256/64,000/16.8 million colors
  - 640 by 480 pixels, 16/256/64,000/16.8 million colors
- Text
  - 80 columns by 25 lines
  - 132 columns by 25 lines
  - 132 columns by 43 lines

### **Sound System**

Audio integrated on system board based on the Crystal CS4236B and CS4611 chips or optional upgrade board AWE64D (in some systems)

- Compatible with Sound Blaster<sup>®</sup>, Sound Blaster Pro<sup>™</sup>, and Microsoft<sup>®</sup> Windows Sound System<sup>™</sup> for PC sound applications
- Stereo jacks — microphone in, line in, line out
- Symmetrical mixer
- FM music synthesizer
- Advanced power management
- Plug and Play compatibility

### **Dimensions**

System Unit

- Height — 17.1 in. (43.43 cm)
  - Desktop Width — 6.5 in. (16.51 cm)
-

- Minitower Width — 7.8 in. (19.81)
- Depth — 17.3 in. (43.94 cm)

#### Keyboard

- Height — 1.6 in. (4.1 cm)
- Width — 19.0 in. (48.3 cm)
- Depth — 8.4 in. (21.3 cm)

#### ***Weight***

The following weights are averages. Weights depend upon the system configuration.

System Unit — 27.5 lb (12.46 kg)

Keyboard — 3.5 to 4 lb (1.6 to 1.8 kg)

#### ***Power***

Universal Power Supply — 235 W

Power Management — Partial- and full-power reductions, Sleep button

#### ***Recommended Operating Environment***

Temperature — 50°F to 95°F (10°C to 35°C)

Relative Humidity — 20% to 80%

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## Appendix B

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# Connector Pin Assignments

This appendix describes the system board connector pin assignments.

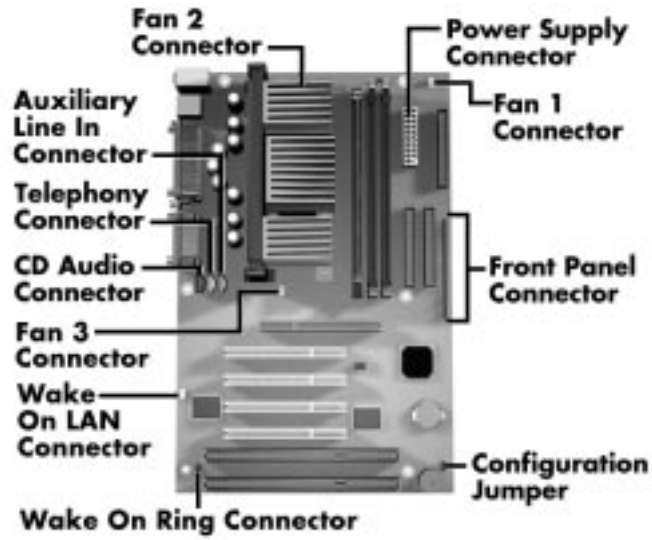
Table B-1 lists the connectors and sockets on the system board. The table also cross-references the page numbers where the connectors and their pinouts are described.

Table B-2 and Table B-3 list each connector by its function, number, and type.

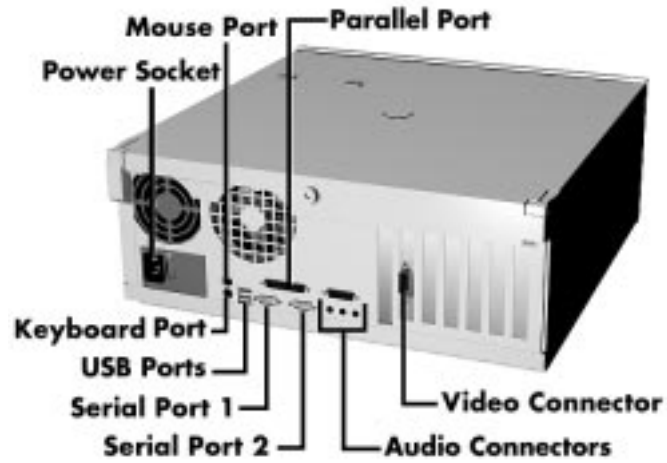
Figure B-1 shows the locations of the connectors and slots on the system board. Figure B-2 shows the locations of the connectors on the back of the system unit.

**Table B-1 System Board Connectors**

| Connector(s)       | Page Number |
|--------------------|-------------|
| Power supply       | B-6         |
| Diskette drive     | B-8         |
| IDE                | B-9         |
| DIMM Sockets       | B-10        |
| Front panel        | B-7         |
| ISA                | B-12        |
| PCI                | B-14        |
| AGP                | B-11        |
| Parallel Interface | B-5         |
| Serial Interface   | B-4         |
| Mouse/Keyboard     | B-6         |
| USB port           | B-15        |



*Figure B-1 System Board Connectors and Slots*



*Figure B-2 System Board External Connectors*

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**Table B-2 System Board Internal Connectors**

| Description             | Connector Number |
|-------------------------|------------------|
| CD-ROM Audio            | J2F1             |
| Auxiliary Line-in Audio | J2F2             |
| Telephony               | J2F1             |
| Fan 3                   | J3F2             |
| Diskette Drive          | J8K1             |
| PCI IDE                 | J8G1, J7G1       |
| Fan 1                   | J8M1             |
| Fan 2                   | J4M1             |
| Power Supply            | J7L1             |

**Table B-3 System Board Connector Numbers and Types**

| Function                                | Number  | Type                           |
|---|---|--------------------------------|
| Parallel Interface                      |   | 25-pin female sub D-shell      |
| Serial Interface (Serial Ports 1 and 2) |   | 9-pin D-shell                  |
| Mouse                                   |   | 6-pin PS/2 style connector     |
| Keyboard                                |   | 6-pin PS/2 style connector     |
| Diskette Drive                          | J8K1  | 2 x 17-pin male                |
| Power Supply (Primary)                  | J7L1  | 2 x 10-pin locking header      |
| DIMM Memory Sockets                     | J6J1 (Bank 0)<br>J6J2 (Bank 1)<br>J7J1 (Bank 2) | 72 pin single inline connector |
| IDE Interface (primary)                 | J8G1  | 2 x 20-pin header              |
| IDE Interface (secondary)               | J7G1  | 2 x 20-pin header              |
| Front Panel                             | J8G3  | 1 x 25-pin header              |
| USB                                     | J1L1  | Female USB Stacked Connector   |

## SERIAL INTERFACE CONNECTORS

Pin assignments for the serial interface port connector are listed in Table-B-4.

**Table-B-4 RS-232C Serial Port Connector Pin Assignments**

| <b>Pin</b> | <b>Signal</b> | <b>Description</b>  |
|------------|---------------|---------------------|
| 1          | DCD           | Carrier detect      |
| 2          | Serial In#    | Receive data        |
| 3          | Serial Out#   | Transmit data       |
| 4          | DTR#          | Data terminal ready |
| 5          | Ground        | Signal ground       |
| 6          | DSR           | Data set ready      |
| 7          | RTS           | Request to send     |
| 8          | CTS           | Clear to send       |
| 9          | RI            | Ring indicator      |



## PARALLEL INTERFACE CONNECTOR

Parallel interface specifications for this port conform to the IBM-PC interface. Pin assignments for the parallel interface connector are listed in Table B-5.

**Table B-5 Parallel Port Connector Pin Assignments**

| Pin | Signal             | Pin | Signal               |
|-----|--------------------|-----|----------------------|
| 1   | Strobe#            | 14  | Auto feed#           |
| 2   | Data bit 0         | 15  | Fault#               |
| 3   | Data bit 1         | 16  | INIT# (Initialize)   |
| 4   | Data bit 2         | 17  | SLCT IN# (Select in) |
| 5   | Data bit 3         | 18  | Ground               |
| 6   | Data bit 4         | 19  | Ground               |
| 7   | Data bit 5         | 20  | Ground               |
| 8   | Data bit 6         | 21  | Ground               |
| 9   | Data bit 7         | 22  | Ground               |
| 10  | ACK# (Acknowledge) | 23  | Ground               |
| 11  | Busy               | 24  | Ground               |
| 12  | Error              | 25  | Ground               |
| 13  | Select             |     |                      |

## POWER SUPPLY (PRIMARY)

Voltages from the power supply are input to the system board through the primary power supply connector. Table B-6 shows the connector pin locations and pin assignments.

**Table B-6 Primary Power Supply Connector Pin Assignments**

| Pin | Signal                               | Pin | Signal                                      |
|-----|--------------------------------------|-----|---|
| 1   | +3.3 V                               | 11  | +3.3 V                                      |
| 2   | +3.3 V                               | 12  | -12 V                                       |
| 3   | Ground                               | 13  | Ground                                      |
| 4   | +5 V                                 | 14  | PS-ON# (Power supply remote on/off control) |
| 5   | Ground                               | 15  | Ground                                      |
| 6   | +5 V                                 | 16  | Ground                                      |
| 7   | Ground                               | 17  | Ground                                      |
| 8   | PWRGD (Power Good)                   | 18  | -5 V  |
| 9   | +5 VSB (Standby for real-time clock) | 19  | +5 V  |
| 10  | +12 V                                | 20  | +5 V  |

## KEYBOARD AND MOUSE CONNECTORS

The keyboard and mouse use standard PS/2 connectors. Pin assignments are given in Table B-7.

**Table B-7 Keyboard and Mouse Connector Pin Assignments**

| Pin | Keyboard Connector | Mouse Connector |
|-----|--------------------|-----------------|
| 1   | Keyboard Data      | Mouse Data      |
| 2   | No connect         | No connect      |
| 3   | Ground             | Ground          |
| 4   | +5V (fused)        | +5V (fused)     |
| 5   | Keyboard Clock     | Mouse Clock     |
| 6   | No connect         | No connect      |

## FRONT PANEL

The front panel connector provides cabling for the buttons and panel LEDs (power and hard disk). The connector pin assignments are given in Table B-8.

**Table B-8 Front Panel Connector Pin Assignments**

| Pin                          | Signal  | Description     |
|------------------------------|---|-----------------|
| 1<br>2                       | SW_ON#<br>Ground                                  | Power On        |
| 3<br>4                       | SLEEP_REQ<br>Ground                               | Sleep/Resume    |
| 5                            | Key   | none            |
| 6<br>7<br>8<br>9<br>10<br>11 | +5V<br>Key<br>IrR_RX<br>Ground<br>Ir_TX<br>Ir_SL1 | IrDA            |
| 12                           | Key   | none            |
| 13<br>14<br>15<br>16         | +5V<br>Key<br>HD Active#<br>HD_PWR                | HD LED          |
| 17                           | Key   | none            |
| 18<br>19<br>20               | PWR_LED0<br>Key<br>PWR_LED1                       | Sleep/Power LED |
| 21                           | Key   | none            |
| 22<br>23                     | Ground<br>FP_RESET                                | Reset           |
| 24<br>25<br>26<br>27         | PC_SPKR#<br>Key<br>+5V<br>+5V                     | Speaker         |

## DISKETTE DRIVE INTERFACE PIN ASSIGNMENTS

Table B-9 provides the pin assignments for the diskette drive interface connector.

**Table B-9 Diskette Drive Connector Pin Assignments**

| Pin | Description | Pin | Description                      |
|-----|-------------|-----|----------------------------------|
| 1   | Ground      | 2   | DENSEL                           |
| 3   | Ground      | 4   | Reserved                         |
| 5   | Key         | 6   | FDEDIN                           |
| 7   | Ground      | 8   | FDINDX# (Index)                  |
| 9   | Ground      | 10  | FDM00# (Motor enable A)          |
| 11  | Ground      | 12  | No connect                       |
| 13  | Ground      | 14  | FDDS0# (Drive select A)          |
| 15  | Ground      | 16  | No connect                       |
| 17  | MSEN1       | 18  | FDDIR# (Stepper motor direction) |
| 19  | Ground      | 20  | FDSTEP# (Step pulse)             |
| 21  | Ground      | 22  | FDWD# (Write data)               |
| 23  | Ground      | 24  | FDWE# (Write enable)             |
| 25  | Ground      | 26  | FDTRK0# (Track 0)                |
| 27  | MSEN0       | 28  | FDWPD# (Write protect)           |
| 29  | Ground      | 30  | FDRDATA# (Read data)             |
| 31  | Ground      | 32  | FDHEAD# (Side 1 select)          |
| 33  | Ground      | 34  | DSKCHG# (Diskette change)        |

## IDE INTERFACE CONNECTORS

All signal levels in the IDE interface are TTL compatible. A logic 1 is a signal whose voltage level is between 2.0 and 5.0 V. A logic 0 is a signal measuring between 0.00 V and 0.70 V.

The two system board IDE connectors are physically identical. Electrically, the primary IDE/PCI bus IDE connector is faster and the secondary IDE/PCI connector is slower. Table B-10 provides the IDE pin assignments. All signals on the Host interface have the prefix HOST. All negatively active signals are further prefixed with a “-” designation. All positively active signals are prefixed with a “+” designation.

**Table B-10 IDE/PCI Connector Pin Assignments**

| Pin | Description                       | Pin | Description                      |
|-----|-----------------------------------|-----|----------------------------------|
| 1   | Reset IDE                         | 2   | Ground                           |
| 3   | Data 7                            | 4   | Data 8                           |
| 5   | Data 6                            | 6   | Data 9                           |
| 7   | Data 5                            | 8   | Data 10                          |
| 9   | Data 4                            | 10  | Data 11                          |
| 11  | Data 3                            | 12  | Data 12                          |
| 13  | Data 2                            | 14  | Data 13                          |
| 15  | Data 1                            | 16  | Data 14                          |
| 17  | Data 0                            | 18  | Data 15                          |
| 19  | Ground                            | 20  | Key                              |
| 21  | DDRQ0 (DDRQ1)                     | 22  | Ground                           |
| 23  | I/O write#                        | 24  | Ground                           |
| 25  | I/O read#                         | 26  | Ground                           |
| 27  | IOCHRDY                           | 28  | P_ALE (Cable select pullup)      |
| 29  | DDACK0# (DDACK1#)                 | 30  | Ground                           |
| 31  | IRQ 14 (IRQ 15)                   | 32  | Reserved                         |
| 33  | Address 1                         | 34  | Reserved                         |
| 35  | Address 0                         | 36  | Address 2                        |
| 37  | Chip select 1P# (Chip select 1S#) | 38  | Chip select 3P# (Chipselect 3S#) |
| 39  | Activity#                         | 40  | Ground                           |

**Note:** Signal names in parentheses ( ) are for the secondary IDE connector.

**DIMM SOCKETS**

Table B-11 provides the DIMM type, configuration, and technology by DIMM size.

**Table B-11 DIMM Socket Pin Assignments**

| Pin | Description      | Pin | Description            | Pin | Description      | Pin | Description            |
|-----|------------------|-----|------------------------|-----|------------------|-----|------------------------|
| 1   | V <sub>SS</sub>  | 43  | V <sub>SS</sub>        | 85  | V <sub>SS</sub>  | 127 | V <sub>SS</sub>        |
| 2   | DQ0              | 44  | NC                     | 86  | DQ32             | 128 | CKE0                   |
| 3   | DQ1              | 45  | $\overline{S_2}$       | 87  | DQ33             | 129 | NC                     |
| 4   | DQ2              | 46  | DQM2                   | 88  | DQ34             | 130 | DQM6                   |
| 5   | DQ3              | 47  | DQM3                   | 89  | DQ35             | 131 | DQM7                   |
| 6   | V <sub>DD</sub>  | 48  | NC                     | 90  | V <sub>DD</sub>  | 132 | NC (A13)               |
| 7   | DQ4              | 49  | V <sub>DD</sub>        | 91  | DQ36             | 133 | V <sub>DD</sub>        |
| 8   | DQ5              | 50  | NC                     | 92  | DQ37             | 134 | NC                     |
| 9   | DQ6              | 51  | NC                     | 93  | DQ38             | 135 | NC                     |
| 10  | DQ7              | 52  | CB2                    | 94  | DQ39             | 136 | CB6                    |
| 11  | DQ8              | 53  | CB3                    | 95  | DQ40             | 137 | CB7                    |
| 12  | V <sub>SS</sub>  | 54  | V <sub>SS</sub>        | 96  | V <sub>SS</sub>  | 138 | V <sub>SS</sub>        |
| 13  | DQ9              | 55  | V <sub>SS</sub>        | 97  | DQ41             | 139 | DQ48                   |
| 14  | DQ10             | 56  | DQ17                   | 98  | DQ43             | 140 | DQ49                   |
| 15  | DQ11             | 57  | DQ18                   | 99  | DQ43             | 141 | DQ50                   |
| 16  | DQ12             | 58  | DQ19                   | 100 | DQ44             | 142 | DQ51                   |
| 17  | V <sub>DD</sub>  | 59  | V <sub>DD</sub>        | 101 | DQ45             | 143 | V <sub>DD</sub>        |
| 18  | V <sub>DD</sub>  | 60  | DQ20                   | 102 | V <sub>DD</sub>  | 144 | DQ52                   |
| 19  | DQ14             | 61  | NC                     | 103 | DQ46             | 145 | NC                     |
| 20  | DQ15             | 62  | NC (V <sub>REF</sub> ) | 104 | DQ47             | 146 | NC (V <sub>REF</sub> ) |
| 21  | CB0              | 63  | CKE1                   | 105 | CB4              | 147 | NC                     |
| 22  | CB1              | 64  | V <sub>SS</sub>        | 106 | CB5              | 148 | V <sub>SS</sub>        |
| 23  | V <sub>SS</sub>  | 65  | DQ21                   | 107 | V <sub>SS</sub>  | 149 | DQ53                   |
| 24  | NC               | 66  | DQ22                   | 108 | NC               | 150 | DQ54                   |
| 25  | NC               | 67  | DQ23                   | 109 | NC               | 151 | DQ55                   |
| 26  | V <sub>DD</sub>  | 68  | V <sub>SS</sub>        | 110 | V <sub>DD</sub>  | 152 | V <sub>SS</sub>        |
| 27  | $\overline{WE}$  | 69  | DQ24                   | 111 | $\overline{CAS}$ | 153 | DQ56                   |
| 28  | DQM0             | 70  | DQ25                   | 112 | DQM4             | 154 | DQ57                   |
| 29  | DQM1             | 71  | DQ26                   | 113 | DQM5             | 155 | DQ58                   |
| 30  | $\overline{S_0}$ | 72  | DQ27                   | 114 | NC               | 156 | DQ59                   |
| 31  | NC               | 73  | V <sub>DD</sub>        | 115 | $\overline{RAS}$ | 157 | V <sub>DD</sub>        |
| 32  | V <sub>SS</sub>  | 74  | DQ28                   | 116 | V <sub>SS</sub>  | 158 | DQ60                   |
| 33  | A0               | 75  | DQ29                   | 117 | A1               | 159 | DQ61                   |
| 34  | A2               | 76  | DQ30                   | 118 | A3               | 160 | DQ62                   |
| 35  | A4               | 77  | DQ31                   | 119 | A5               | 161 | DQ63                   |
| 36  | A6               | 78  | V <sub>SS</sub>        | 120 | A7               | 162 | V <sub>SS</sub>        |
| 37  | A8               | 79  | CK2                    | 121 | A9               | 163 | CK3                    |
| 38  | A10              | 80  | NC                     | 122 | BA0              | 164 | NC                     |
| 39  | NC (BA1)         | 81  | NC                     | 123 | NC (A11)         | 165 | SA0                    |
| 40  | V <sub>DD</sub>  | 82  | SDA                    | 124 | V <sub>DD</sub>  | 166 | SA1                    |
| 41  | V <sub>DD</sub>  | 83  | SCL                    | 125 | CK1              | 167 | SA2                    |
| 42  | CK0              | 84  | V <sub>DD</sub>        | 126 | NC (A12)         | 168 | V <sub>DD</sub>        |

**AGP CONNECTOR**

Table B-12 provides the pin assignments for the AGP slot.

**Table B-12 AGP Connector Pin Assignments**

| Pin | Description | Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| A1  | +12V        | B1  | No connect  | A34 | Vcc3.3      | B34 | Vcc3.3      |
| A2  | No connect  | B2  | Vcc         | A35 | AD22        | B35 | AD21        |
| A3  | Reserved    | B3  | Vcc         | A36 | AD20        | B36 | AD19        |
| A4  | No connect  | B4  | No connect  | A37 | Ground      | B37 | Ground      |
| A5  | Ground      | B5  | Ground      | A38 | AD18        | B38 | AD17        |
| A6  | INTA#       | B6  | INTB#       | A39 | AD16        | B39 | C/BE2#      |
| A7  | RST#        | B7  | CLK         | A40 | Vcc3.3      | B40 | Vcc3.3      |
| A8  | GNT1#       | B8  | REQ#        | A41 | FRAME#      | B41 | IRDY#       |
| A9  | Vcc3.3      | B9  | Vcc3.3      | A42 | Reserved    | B42 | +3.3V aux   |
| A10 | ST1         | B10 | ST0         | A43 | Ground      | B43 | Ground      |
| A11 | Reserved    | B11 | ST2         | A44 | Reserved    | B44 | Reserved    |
| A12 | PIPE#       | B12 | RBF#        | A45 | Vcc3.3      | B45 | Vcc3.3      |
| A13 | Ground      | B13 | Ground      | A46 | TRDY#       | B46 | DEVSEL#     |
| A14 | No connect  | B14 | No connect  | A47 | STOP#       | B47 | Vcc3.3      |
| A15 | SBA1        | B15 | SBA0        | A48 | PME#        | B48 | PERR#       |
| A16 | Vcc3.3      | B16 | Vcc3.3      | A49 | Ground      | B49 | Ground      |
| A17 | SBA3        | B17 | SBA2        | A50 | PAR         | B50 | SERR#       |
| A18 | Reserved    | B18 | SB_STB      | A51 | AD15        | B51 | C/BE1#      |
| A19 | Ground      | B19 | Ground      | A52 | Vcc3.3      | B52 | Vcc3.3      |
| A20 | SBA5        | B20 | SBA4        | A53 | AD13        | B53 | AD14        |
| A21 | SBA7        | B21 | SBA6        | A54 | AD11        | B54 | AD12        |
| A22 | Key         | B22 | Key         | A55 | Ground      | B55 | Ground      |
| A23 | Key         | B23 | Key         | A56 | AD9         | B56 | AD10        |
| A24 | Key         | B24 | Key         | A57 | C/BE0#      | B57 | AD8         |
| A25 | Key         | B25 | Key         | A58 | Vcc3.3      | B58 | Vcc3.3      |
| A26 | AD30        | B26 | AD31        | A59 | Reserved    | B59 | AD_STB0     |
| A27 | AD28        | B27 | AD29        | A60 | AD6         | B60 | AD7         |
| A28 | Vcc3.3      | B28 | Vcc3.3      | A61 | Ground      | B61 | Ground      |
| A29 | AD26        | B29 | AD27        | A62 | AD4         | B62 | AD5         |
| A30 | AD24        | B30 | AD25        | A63 | AD2         | B63 | AD3         |
| A31 | Ground      | B31 | Ground      | A64 | Vcc3.3      | B64 | Vcc3.3      |
| A32 | Reserved    | B32 | AD_STB1     | A65 | AD0         | B65 | AD1         |
| A33 | C/BE3#      | B33 | AD23        | A66 | SMB0        | B66 | SMB1        |

## ISA EXPANSION BUS CONNECTOR PIN ASSIGNMENTS

The expansion slots signals, voltages, and grounds are supplied through the bus connectors. Table B-13 provides the pin assignments for the ISA expansion slots.

**Table B-13 ISA Expansion Slot Pin Assignments**

| Pin | Direction    | Signal  | Pin | Direction    | Signal             |
|-----|--------------|---------|-----|--------------|--------------------|
| A1  | Input        | IOCHCK# | B1  | Ground       | Ground             |
| A2  | Input/Output | SD7     | B2  | Reset        | RESET (RESDRV)     |
| A3  | Input/Output | SD6     | B3  | Power        | +5V                |
| A4  | Input/Output | SD5     | B4  | Input        | IRQ9               |
| A5  | Input/Output | SD4     | B5  | Power        | -5V                |
| A6  | Input/Output | SD3     | B6  | Input        | DRQ2               |
| A7  | Input/Output | SD2     | B7  | Power        | -12V               |
| A8  | Input/Output | SD1     | B8  | Input        | SRDY#(N0WS#)       |
| A9  | Input/Output | SD0     | B9  | Power        | +12V               |
| A10 | Input        | IOCHRDY | B10 | Ground       | Ground             |
| A11 | Output       | AEN     | B11 | Output       | SMEMW#<br>(SMWTC#) |
| A12 | Input/Output | SA19    | B12 | Output       | SMEMR#<br>(SMRDC#) |
| A13 | Input/Output | SA18    | B13 | Input/Output | IOW# (IOWC#)       |
| A14 | Input/Output | SA17    | B14 | Input/Output | IOR# (IOWC#)       |
| A15 | Input/Output | SA16    | B15 | Output       | DACK3#             |
| A16 | Input/Output | SA15    | B16 | Input        | DRQ3               |
| A17 | Input/Output | SA14    | B17 | Output       | DACK1              |
| A18 | Input/Output | SA13    | B18 | Input        | DRQ1               |
| A19 | Input/Output | SA12    | B19 | Input/Output | REFRESH#           |
| A20 | Input/Output | SA11    | B20 | Output       | BCLK               |
| A21 | Input/Output | SA10    | B21 | Input        | IRQ7               |
| A22 | Input/Output | SA9     | B22 | Input        | IRQ6               |
| A23 | Input/Output | SA8     | B23 | Input        | IRQ5               |
| A24 | Input/Output | SA7     | B24 | Input        | IRQ4               |
| A25 | Input/Output | SA6     | B25 | Input        | IRQ3               |
| A26 | Input/Output | SA5     | B26 | Output       | DACK2#             |
| A27 | Input/Output | SA4     | B27 | Output       | TC                 |
| A28 | Input/Output | SA3     | B28 | Output       | BALE               |
| A29 | Input/Output | SA2     | B29 | Power        | +5V                |



**Table B-13 ISA Expansion Slot Pin Assignments**

| <b>Pin</b> | <b>Direction</b> | <b>Signal</b>    | <b>Pin</b> | <b>Direction</b> | <b>Signal</b>          |
|------------|------------------|------------------|------------|------------------|------------------------|
| A30        | Input/Output     | SA1              | B30        | Output           | OSC                    |
| A31        | Input/Output     | SA0              | B31        | Ground           | Ground                 |
| C1         | Input/Output     | SBHE#            | D1         | Input            | MEMCS16#<br>(M16#)     |
| C2         | Input/Output     | LA23             | D2         | Input            | IOCS16# (IO16#)        |
| C3         | Input/Output     | LA22             | D3         | Input            | IRQ10                  |
| C4         | Input/Output     | LA21             | D4         | Input            | IRQ11                  |
| C5         | Input/Output     | LA20             | D5         | Input            | IRQ12                  |
| C6         | Input/Output     | LA19             | D6         | Input            | IRQ15                  |
| C7         | Input/Output     | LA18             | D7         | Input            | IRQ14                  |
| C8         | Input/Output     | LA17             | D8         | Output           | DACK0#                 |
| C9         | Input/Output     | MEMR#<br>(MRDC#) | D9         | Input            | DRQ0                   |
| C10        | Input/Output     | MEMW#<br>(MWTC#) | D10        | Output           | DACK5#                 |
| C11        | Input/Output     | SD8              | D11        | Input            | DRQ5                   |
| C12        | Input/Output     | SD9              | D12        | Output           | DACK6#                 |
| C13        | Input/Output     | SD10             | D13        | Input            | DRQ6                   |
| C14        | Input/Output     | SD11             | D14        | Output           | DACK7#                 |
| C15        | Input/Output     | SD12             | D15        | Input            | DRQ7                   |
| C16        | Input/Output     | SD13             | D16        | Power            | +5V                    |
| C17        | Input/Output     | SD14             | D17        | Input            | Master16#<br>(MASTER#) |
| C18        | Input/Output     | SD15             | D18        | Ground           | GND                    |

## PCI EXPANSION BUS CONNECTOR PIN ASSIGNMENTS

The expansion slots signals, voltages, and grounds are supplied through the bus connectors. Table B-14 provides the pin assignments for the PCI expansion slots.

**Table B-14 PCI Expansion Pin Assignments**

| Pin | Signal         | Pin | Signal        | Pin | Signal    | Pin | Signal    |
|-----|----------------|-----|---------------|-----|-----------|-----|-----------|
| A1  | Ground (TRST#) | B1  | -12V          | A32 | AD16      | B32 | AD17      |
| A2  | +12V           | B2  | Ground(TCK)*  | A33 | +3.3V     | B33 | C/BE2#    |
| A3  | +5V (TMS)*     | B3  | Ground        | A34 | FRAME#    | B34 | Ground    |
| A4  | +5V (TDI)*     | B4  | no con (TDO)* | A35 | Ground    | B35 | IRDY#     |
| A5  | +5V            | B5  | +5V           | A36 | TRDY#     | B36 | +3.3V     |
| A6  | INTA#          | B6  | +5V           | A37 | Ground    | B37 | DEVSEL#   |
| A7  | INTC#          | B7  | INTB#         | A38 | STOP#     | B38 | Ground    |
| A8  | +5V            | B8  | INTD#         | A39 | +3.3V     | B39 | LOCK#     |
| A9  | Reserved       | B9  | PRSNT1#*      | A40 | SDONE*    | B40 | PERR#     |
| A10 | +5V (I/O)      | B10 | Reserved      | A41 | SBO#*     | B41 | +3.3V     |
| A11 | Reserved       | B11 | PRSNT2#*      | A42 | Ground    | B42 | SERR#     |
| A12 | Ground         | B12 | Ground        | A43 | PAR       | B43 | +3.3v     |
| A13 | Ground         | B13 | Ground        | A44 | AD15      | B44 | C/BE1#    |
| A14 | +3.3V aux      | B14 | Reserved      | A45 | +3.3V     | B45 | AD14      |
| A15 | RST#           | B15 | Ground        | A46 | AD13      | B46 | Ground    |
| A16 | +5V (I/O)      | B16 | CLK           | A47 | AD11      | B47 | AD12      |
| A17 | GNT#           | B17 | Ground        | A48 | Ground    | B48 | AD10      |
| A18 | Ground         | B18 | REQ#          | A49 | AD09      | B49 | Ground    |
| A19 | PME#           | B19 | +5V (I/O)     | A50 | Key       | B50 | Key       |
| A20 | AD30           | B20 | AD31          | A51 | Key       | B51 | Key       |
| A21 | +3.3V          | B21 | AD29          | A52 | C/BE0#    | B52 | AD08      |
| A22 | AD28           | B22 | Ground        | A53 | +3.3V     | B53 | AD07      |
| A23 | AD26           | B23 | AD27          | A54 | AD06      | B54 | +3.3V     |
| A24 | Ground         | B24 | AD25          | A55 | AD04      | B55 | AD05      |
| A25 | AD24           | B25 | +3.3V         | A56 | Ground    | B56 | AD03      |
| A26 | IDSEL          | B26 | C/BE3#        | A57 | AD02      | B57 | Ground    |
| A27 | +3.3V          | B27 | AD23          | A58 | AD00      | B58 | AD01      |
| A28 | AD22           | B28 | Ground        | A59 | +5V (I/O) | B59 | +5V (I/O) |
| A29 | AD20           | B29 | AD21          | A60 | REQ64C#   | B60 | ACK64C#   |
| A30 | Ground         | B30 | AD19          | A61 | +5V       | B61 | +5V       |
| A31 | AD18           | B31 | +3.3V         | A62 | +5V       | B62 | +5V       |

**UNIVERSAL SERIAL BUS (USB) CONNECTORS**

Table B-15 lists the pin assignments and signal names for the USB connectors.

***Table B-15 USB Connectors***

| <b>Pin</b> | <b>Signal Name</b> |
|------------|--------------------|
| 1          | Power              |
| 2          | USBP0# (USBP1#)    |
| 3          | USBP0 (USBP1)      |
| 4          | Ground             |

---

## Appendix C

---

# System Resources

The following sections include information about:

- default system settings
- viewing system resources
- jumper settings on the system board.

### IRQ SETTINGS

The following settings are the default IRQ settings:

- IRQ0 (timer)
  - IRQ1 (keyboard)
  - IRQ2 (cascade interrupt)
  - IRQ3 (COM2)
  - IRQ4 (COM1)
  - IRQ5 (sound/user available)
  - IRQ6 (diskette drive)
  - IRQ7 (LPT1)
  - IRQ8 (real time clock)
  - IRQ9 (PCI/user available)
  - IRQ10 (user available)
  - IRQ11 (Windows Sound System/user available)
  - IRQ12 (mouse)
  - IRQ13 (numeric processor)
  - IRQ14 (primary IDE)
  - IRQ15 (secondary IDE).
-

## VIEWING SYSTEM RESOURCES

Some hardware option installations might require system resources such as interrupt request (IRQ) lines, direct memory access (DMA) channels, and input/output (I/O) addresses. See the following procedures to view system resources.

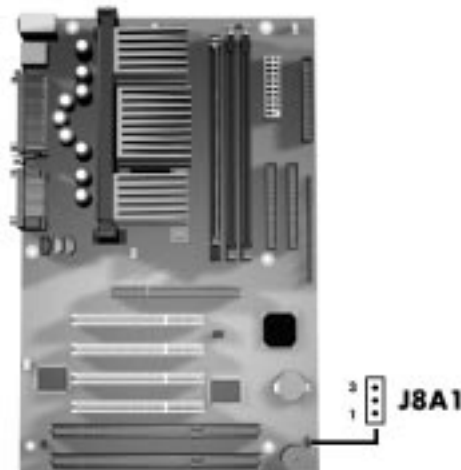
Follow these steps to view system resources:

1. From the Windows 95 desktop, click the “My Computer” icon with the **right** mouse button.
2. Click “Properties.” The System Properties box appears.
3. Click the Device Manager tab.
4. Double click “Computer.” The Computer Properties box appears and displays the View Resources folder.

The View Resources folder shows the system resources used by your computer. For example, it shows a list of interrupts and how they are allocated. If an interrupt is not in the list, it is available.

## LOCATING THE JUMPER

The following figure shows the jumper location on the system board.



*Figure C-1 Locating the Jumper*

The following table summarizes the system board jumper settings.

---

**Table C-1 System Board Jumper Settings**


| Function       | Jumper J8A1 | Configuration   |
|----------------|-------------|---|
| Normal Mode    | 1-2         | Factory setting. Sets the system for normal operation. The BIOS uses current configuration information and passwords for booting.   |
| Configure Mode | 2-3         | Allows system configuration. After POST, Setup runs automatically. The Maintenance Menu appears for setting configuration parameters (including speed and password settings). |
| Recovery Mode  | None        | Enables BIOS recovery procedures. BIOS attempts to recover the BIOS configuration. A recovery diskette is required (downloadable from the NEC CSD Web site).                  |

## Clearing Your Password

The following sections describe how to clear your password.

1. Turn off the power and unplug the system and any peripherals.

---

 **WARNING:** Turn off the system before you change any jumper settings.

---

2. Remove the access cover (see Section 3, “Removing the Access Cover”).
3. Locate the Configuration jumper (J8A1) on the system board (see “Locating the Jumper” in the previous subsection).
4. You may have to remove any installed expansion boards to access the jumper (see Section 3, “Expansion Board Removal”).
5. Remove the jumper block from pins 1-2 and set it on pins 2-3. We recommend that you use needle nose pliers to move a jumper.
6. Replace the access cover (see Section 3, “Replacing the Access Cover”).
7. Connect system power cables and monitor.
8. Power on the system.

The system enters Setup and the Maintenance menu appears. You can disable the user and administrator passwords.

---

If you removed the jumper, the system attempts to recover the BIOS. A recovery diskette is needed.


9. Power off, unplug the system and monitor, and remove the access cover.
10. Remove the jumper block from pins 2-3 and replace it on pins 1-2.
11. If you removed any expansion boards, replace them (see Section 3, “Expansion Board Installation”).
12. Replace the access cover. Reconnect the system power cables and peripheral devices.
13. Power on the system.
14. Run Setup (see Section 2).

## Recovering the BIOS

The following sections describe how to recover the system BIOS.

1. Turn off the power and unplug the system and any peripherals.

---

 **WARNING:** Turn off the system before you change any jumper settings.

---

2. Remove the access cover (see Section 3, “Removing the Access Cover”).
3. Locate the Configuration jumper (J8A1) on the system board (see “Locating the Jumper” in the previous subsection).
4. You may have to remove any installed expansion boards to access the jumper (see Section 3, “Expansion Board Removal”).
5. Remove the jumper block from pins 1-2. We recommend that you use needle nose pliers to move a jumper.
6. Replace the access cover (see Section 3, “Replacing the Access Cover”).
7. Connect system power cables and monitor.
8. Power on the system.

The system attempts to recover the BIOS. A recovery diskette is needed.

9. Power off, unplug the system and monitor, and remove the access cover.
  10. Replace it on pins 1-2.
-

- 11.** If you removed any expansion boards, replace them (see Section 3, “Expansion Board Installation”).
- 12.** Replace the access cover. Reconnect the system power cables and peripheral devices.
- 13.** Power on the system.
- 14.** Run Setup (see Section 2).



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(For United States Use Only)

## FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

**WARNING:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.

Use a shielded and properly grounded I/O cable to ensure compliance of this unit to the specified limits of the rules.

### **FCC Modem Connection Requirements**

The Federal Communications Commission (FCC) has established Rules that permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.

If the modem is malfunctioning, it may also be harming the telephone network. Disconnect the modem until the source of the problem is determined and repairs are made. If this is not done, the telephone company may temporarily disconnect service.

The telephone company may make changes in its technical operations and procedures. If such changes affect the compatibility or use of the modem, the telephone company is required to give adequate notice of the changes. You will be advised of your right to file a complaint with the FCC.

If the telephone company requires information on what equipment is connected to their lines, inform them of:

- The telephone number to which this unit is connected
- The ringer equivalence number (see the modem label)
- The USOC jack required.
- The FCC Registration number (see the modem label).

The ringer equivalence (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the RENs of all devices on any one line should not exceed five (5). If too many devices are attached, they may not ring properly.

### **Modem Service Requirements**

If the modem malfunctions, all repairs should be performed by NEC Computer Systems Division or an NEC CSD Authorized Service Center. It is the responsibility of users requiring service to report the need for service to NEC Computer Systems Division or to an NEC CSD Authorized Service Center. Service can be obtained at:

Phone: 1-888-632-2678

### **(For Canadian Use Only)**

This equipment is a Class B digital apparatus which complies with the Radio Interference Regulations, C.R.C., c.1374.

Cet appareil numérique de la classe B est conforme au Règlement sur le brouillage radioélectrique, C.R.C., ch.1374.

## **Canadian Department of Communications Modem Connection Requirements**

**NOTE:** The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**WARNING:** Users should not attempt to make such connections themselves, but should contact the appropriate inspection authority or electrician.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

## **BATTERY REPLACEMENT**

A lithium battery in your computer maintains system configuration information. In the event that the battery fails to maintain system configuration information, NECCSD recommends that you replace the battery (see Section 4, "Maintenance and Troubleshooting," for battery removal procedures).

**WARNING:** There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the 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.

## BATTERY DISPOSAL

Do not place used batteries in your regular trash.

The nickel-cadmium or nickel metal-hydride batteries must be collected, recycled, or disposed of in an environmentally-approved manner.

The incineration, landfilling, or mixing of batteries with the municipal solid waste stream is **prohibited by law** in most areas.

Return batteries to a federal or state approved battery recycler. This may be where you purchased the battery or a local seller of automotive batteries.

Contact your local waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the batteries.