*NEC® Versa® TXi Series Notebook Computers*

# VERSA TXi

# SERVICE MANUAL

# NEC
NEC COMPUTERS INC.

# Preface

This service and reference manual contains the technical information necessary to set up and maintain the NEC® Versa® TXi notebook computer.

The manual also provides hardware and interface information for users who need an overview of the system design. The manual is written for NEC-trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows:

**Chapter 1**, System Overview, provides an overview of the hardware and interface components.

**Chapter 2**, System Configuration and Setup, provides information on setup and how to operate the notebook.

**Chapter 3**, Disassembly and Reassembly, provides detailed instructions on how to disassemble the notebook.

**Chapter 4**, System Board Layout, shows the system boards and the board connectors.

**Chapter 5**, Preventive Maintenance, lists general notebook preventive maintenance procedures.

**Chapter 6**, Troubleshooting, lists troubleshooting procedures as well as helpful servicing hints.

**Chapter 7**, Specifications, lists physical specifications, memory map, and interrupt controllers.

A **Glossary** and an **Index** are included at the back of the manual.

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# System Overview

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## *About the Versa TXi Notebook*

The NEC® Versa® TXi notebook computer is a portable system designed for home, business, or travel. Standard features include an Intel® Pentium® III 750-MHz, 700-MHz, 650-MHz, or 600-MHz processor with Intel SpeedStep™ or an Intel Celeron™ 500-MHz processor that work together with the latest Peripheral Component Interconnect (PCI) architecture.

The system also includes a high-performance hard disk drive, PC card support, an external USB diskette drive, and an NEC VersaBay™ IV slot. The VersaBay IV slot might hold a CD-ROM drive, CD-read/write (RW) drive, DVD-ROM drive, or combination CD-RW and DVD-ROM drive. As an alternative, the VersaBay IV slot can hold an optional second battery for extended computer use while on battery power. As a multimedia system, the Versa TXi notebook provides the tools needed to create and present impressive images using video clips and sound.

*Versa TXi notebook computer*



## *Front Features*

The following sections describe the Versa TXi notebook front features.

### *LCD Panel*

The Versa TXi notebook comes with a 12.1-inch colour Thin Film Transistor (TFT) Extended Graphics Array (XGA) or SuperVideo Graphics Array (SVGA) panel that can be adjusted for a comfortable viewing position. To adjust the viewing angle, gently tilt the LCD panel into position.

To adjust the LCD panel brightness, press the **Fn-F8** and **Fn-F9** functions keys. For more details about using the system's function keys, see "Keyboard" later in this section.

## Base Unit

The base unit of the Versa TXi notebook has the features shown in the following figure. Feature descriptions are provided after the figure.

*LCD panel and base unit*
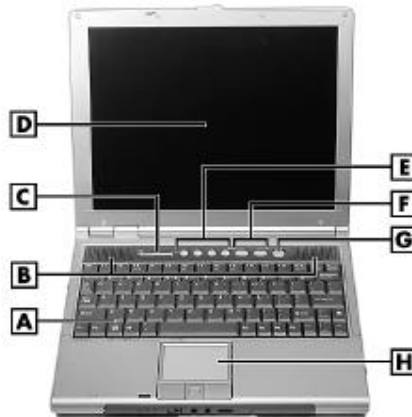


| | |
|---|---|
| **A** – Keyboard | **E** – CD Control Buttons and Operating Status LEDs |
| **B** – Stereo Speakers | **F** – Email/Internet Shortcut Keys |
| **C** – NEC Versa Logo | **G** – Power Button |
| **D** – LCD Panel | **H** – NEC VersaGlide Touchpad |

■ Keyboard — 83 keys with the standard QWERTY-key layout. (Models purchased outside of the U.S. and Canada ship with country-specific keyboard layouts.)

■ Stereo Speakers — Provide stereo sound for multimedia presentations or listening pleasure. The built-in sound system also supports 3D sound, which simulates the latest surround-sound technology.

■ LCD Panel — Provides a high-resolution display for sharp effective visuals on the system.

■ CD Control Buttons (available on some systems) — Control the CD-ROM drive, DVD-ROM drive, CD-RW drive, or combination DVD-ROM and CD-RW drive (with stop, reverse, play/pause, and fast forward).

■ Operating Status LEDs — Keep you informed of the notebook computer's current operating status. See the following figure and list for each LED's meaning.

*Operating status LEDS*
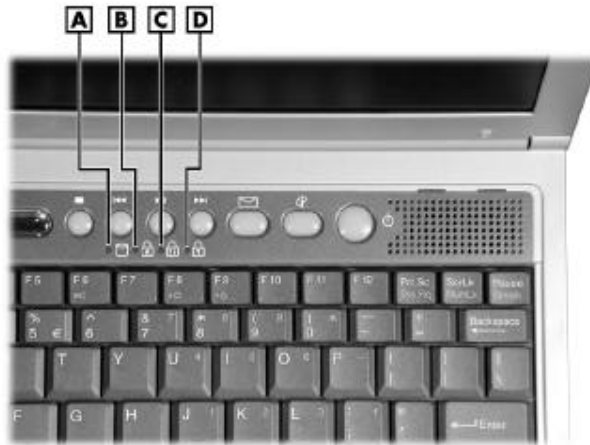


**A** – Hard Disk Drive                   **C** – Scroll Lock
**B** – Caps Lock                        **D** – Num Lock

— Hard disk drive – lights when the system writes data to or retrieves data from the internal hard drive.

— Caps Lock – lights when Caps Lock is in effect.

— Scroll Lock – lights when Scroll Lock is in effect.

— Num Lock – lights when Num Lock mode is in effect.

■ Email Shortcut Key — Launches the dial-up networking connection (if not connected to a LAN) and Microsoft$^®$ Outlook Express.

■ Internet Shortcut Key — Launches the dial-up networking connection (if not connected to a LAN) and Microsoft Internet Explorer.

*Email/Internet keys*



**A** – Email Shortcut Key                 **C** – Power Button
**B** – Internet Shortcut Key

- Power Button — Press the Power button to power on, power off, and to resume from Standby mode. For more information about the Power button, see "Power Button," next.

- NEC VersaGlide™ Touchpad — Works like a standard computer mouse. Move your fingertip over the VersaGlide Touchpad to control the position of the cursor. Use the left and right selection buttons below the VersaGlide Touchpad to select menu items. Use the scroll button to scroll up or down in a document.

## Power Button

The Power/Sleep button is a "smart" switch, meaning that it recognizes when the system is in Standby mode. If in Standby mode, you cannot power off until you press the Power button to resume operation. (The BIOS parameter "System Switch" must be set to "Sleep.")

Put the unit in Standby mode when you need to be away from the system for a short period of time and want to return to where you left off. Standby mode shuts down all devices in the system while retaining data and system status. Go to Start, Shutdown, Standby to put the system into Standby mode.

Use the Power button in the following ways:

- Press the Power button to power on.

- Press the Power button to resume from Standby mode and proceed with normal operation.

- Press and hold the Power button in place for four or more seconds to power off the system (power override). Only use this option if you cannot power off the system using Start, Shutdown.

## Keyboard

The Versa TXi notebook keyboard offers the following features, which are described after the figure.

*Keyboard*



**A** – Function Keys          **D** – Cursor Control Keys
**B** – Numeric Keys           **E** – Control Keys
**C** – Windows Keys
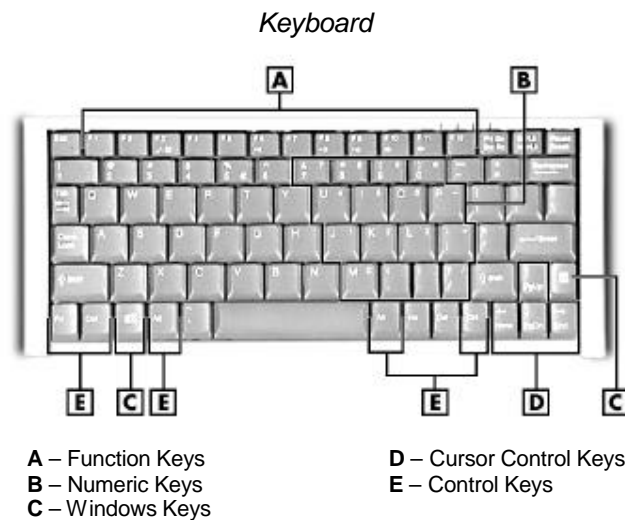
- Function keys — Twelve function keys, **F1** through **F12**, are available on the keyboard. These keys work together with the **Fn** key to activate special functions. Several keys are pre-programmed with dual functions and some are printed in blue on the key.

  Function keys are application-driven. See the specific application's user guide for information about how each function key works with the application.

  The following function key combinations are pre-programmed for the Versa TXi notebook.

  **Fn-F2** — toggles Bluetooth power on and off (only in systems with Bluetooth).

  **Fn-F3** — toggles between four video modes; LCD, CRT, both LCD and CRT, or TV-Out.

  **Fn-F5** — zooms the screen in or out slightly.

  **Fn-F6** — sets the speaker beeper volume to full on or mute.

  **Fn-F7** — functions when the Microsoft Windows® operating system is configured for Advanced Configuration Power Interface (ACPI) mode.

  **Fn-F8** — increases the LCD panel brightness.

  **Fn-F9** — decreases the LCD panel brightness.

  **Fn-ScrLck** — toggles the Num lock function.

  **Fn-Pause** — break.

  **Fn-Left Ctrl** — simulates pressing the right control key to support IBM® 327X connections (not supported in U.S./Canada).

- Numeric keypad — Pressing NumLk on the keyboard activates the numeric keypad numbers and functions printed in blue on the keys.

  The keypad lets you type numbers and mathematical operands (+, -) as you would on a calculator. The keypad is ideal for entering long lists of numbers.

  When you press NumLk again, the keys revert to their normal functions as typewriter keys.

- Cursor Control keys — Cursor control keys let you position the cursor on the screen where you want. On the screen, the cursor is a blinking underline, block, or vertical line depending on the application. The cursor indicates where the next text typed is inserted.

- Windows keys — use the following two keys for quick access to shortcut menus and the Start menu.

  Shortcut/Application key – provides quick access to shortcut menus. (The key acts like a right mouse button.)

  Floating Window key – displays the Start menu.

- Control keys — **Ctrl, Alt, Fn**, and **Shift** are controls used in conjunction with other keys to change their functions. To use control keys, press and hold the control key while pressing another key. For example, "press **Ctrl c"** means to hold down the **Ctrl** key and type the letter c. How the key combination works depends on the application.

- Typewriter keys — The typewriter keys (also called alphanumeric keys) are used to enter text and characters. Keys with blue printing on them behave differently when combined with control keys or the **Fn** key.

### Front Features

The front features of the Versa TXi notebook are described after the figure.

*Front features*
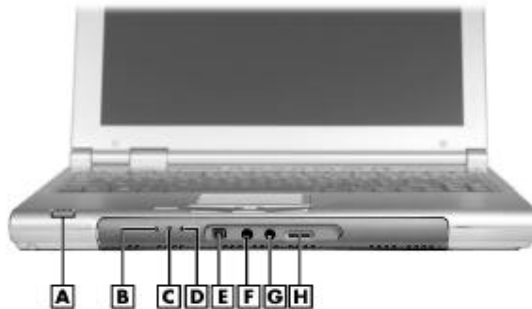


| | |
|---|---|
| **A** – Microphone | **E** – IEEE 1394 Connector |
| **B** – Power Status LED | **F** – Microphone In |
| **C** – Battery Charging LED | **G** – Dual Headphone Jack and Optical In/Out |
| **D** – Bluetooth Status LED | **H** – Volume Control |

- Microphone — Built-in microphone for recording monophonic sound directly into the notebook computer.

- Power Status LED — Lights to indicate the following:

    — Lights green when the system power is on.

    — Blinks green when the system is in Standby mode.

    — Lights yellow (blinks when in Standby mode) to indicate that battery power is at 8% capacity or less.

    — Lights amber (blinks when in Standby mode) to indicate that battery power is at 3% capacity.

- Battery Charging LED — Lights to indicate battery charging activity.

    — Lights amber when the primary battery is charging. Blinks amber to indicate an error. The primary battery is installed in the battery bay.

    — Lights green when the secondary battery is charging. Blinks green to indicate an error. The secondary (optional) battery is in the NEC VersaBay IV slot.

- Bluetooth Status LED — Lights when Bluetooth power is on (only in systems with Bluetooth).

- IEEE Port — Use this port to daisy chain up to 63 IEEE devices to the system. IEEE devices support the 1394 standard of Plug and Play connectivity for transfer rates up to 400 Mbps.

- Microphone (MIC) — Lets you connect an external microphone for monophonic recording or amplification through the system. Plugging in an external microphone disables the built-in microphone.

■ Dual Headphone Jack and Optical In/Out Connector — Lets you connect external headphones to the system or connect a device such as a SONY Mini-Disc player/recorder. Connecting to this port disables the built-in system speakers.

■ Volume Control — Lets you control speaker or headphone volume.

## *Back Features*

The back of the Versa TXi notebook offers the following features, which are described after the figure.

*Back features*



**A** – Battery Bay          **C** – External Monitor Port
**B** – TV Out Connector

■ Battery Bay — Contains the system's standard Lithium-Ion (Li-Ion) primary battery or an optional Extra Life Li-Ion battery.

■ TV-Out Connector — Allows watching DVD movies on a TV that's connected to the system.

■ External Monitor (Video) Port — Use this 15-pin port to attach an external monitor to the notebook computer. Run the LCD display and the external monitor simultaneously or run either alone.

## Left Side Features

The left side of the Versa TXi notebook has the following features, which are described after the figure.

*Left side features*
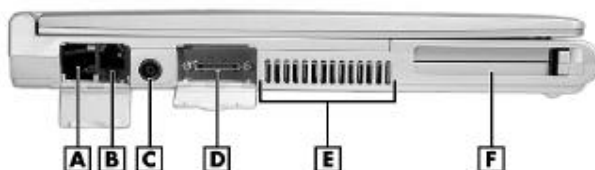
**A** – RJ-45 Jack      **D** – Parallel/Serial Port
**B** – RJ-11 Jack      **E** – Fan
**C** – AC Power Port      **F** – PC Card Slots

■ RJ-45 Jack — Use this jack to connect the internal LAN adapter to a local area network (LAN). (Not available in all systems.)

■ RJ-11 Jack — Use this jack to connect an internal modem to an analogue telephone line.

■ AC Power Port — Use this port to connect the notebook to a DC power source, such as the AC adapter or the optional DC auto adapter.

■ Parallel/Serial Port — Use this port to connect a parallel adapter cable to the notebook and to an external printer or other parallel device. This port can also be used to connect a serial adapter cable to the notebook and to an external serial device. The parallel adapter cable ships with the notebook. The serial adapter cable, when available, will also ship with the notebook.

■ Fan — Cools the interior of the notebook to maintain a safe operating environment.

⚠ **CAUTION**   Always keep the fans and vents unobstructed to allow proper notebook cooling.

■ PC card slots — Use the slots for inserting two Type II PC cards or one Type III PC card.

## *Right Side Features*

The right side of the Versa TXi notebook has the following features, which are described after the figure.

*Right side features*
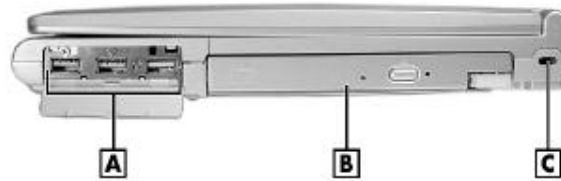
**A** – USB Ports (3)        **C** – Kensington Lock
**B** – NEC VersaBay IV Slot

- USB Ports — The Universal Serial Bus (USB) ports allow connection of up to 127 USB-equipped peripheral devices (printers, monitors, scanners, etc.) to the system.

- NEC VersaBay IV Slot — Houses a CD-ROM, CD-RW, DVD-ROM, or combination CD-RW and DVD-ROM drive. Also accepts an NEC VersaBay IV battery.

Kensington® Lock Slot — Provides added security by providing a connection for an optional Kensington Lock.

## Bottom Features

The bottom of the Versa TXi notebook has the following features, which are described after the figure.

*Bottom features*
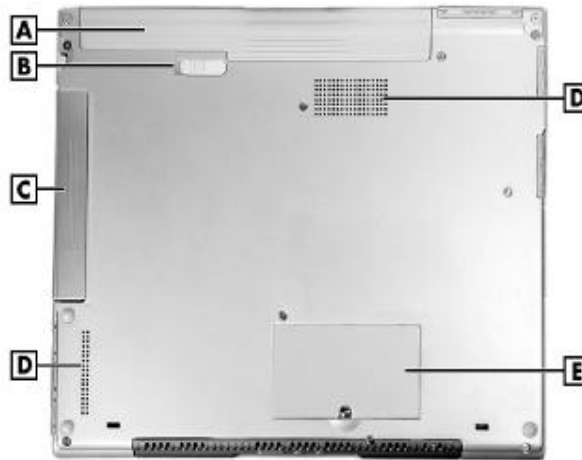


**A** – Primary Battery                **D** – Vents
**B** – Battery Release Latch          **E** – Memory Module Bay
**C** – NEC VersaBay IV Slot

- Primary Battery — Supplies power when the system is not connected to an AC power source.

- Battery Bay Release Latch — Releases the system's primary battery for removal.

- NEC VersaBay IV Slot — Houses a CD-ROM, CD-RW, DVD-ROM, or combination CD-RW and DVD-ROM drive. Also accepts an NEC VersaBay IV battery.

- Vents — Allows the system to cool properly and maintain a safe operating temperature.

⚠ **CAUTION**  Always keep the vents unobstructed to allow proper system cooling.

- Memory Module Bay — Stores the system's memory module.

# Component Features

Review the following sections for a description of the system's internal components.

## Primary Battery

The system comes with a rechargeable 3-cell or an optional rechargeable 15-cell Li-Ion battery as its transient power source. The 3-cell battery pack installs in a compartment on the bottom of the system. The optional 15-cell battery pack fits under the system, and plugs into the battery bay on the rear of the system.

## Secondary Battery

An optional rechargeable secondary Li-Ion battery can be installed in the VersaBay IV slot on the right side of the system.

## CMOS Battery

The system comes with a 3-volt lithium battery that maintains data in the system's complementary metal oxide semiconductor (CMOS) RAM. This memory area contains information on the system's configuration (for example date, time, drives, and memory).

The CMOS battery charges when the system is connected to AC power. The CMOS battery may discharge completely if the system remains unused for approximately two months.

## Hard Disk Drive

A standard 2.5-inch, 9.5 mm hard disk drive ships with the system.

## ROM Drives

A 24X CD-ROM drive, a 8X DVD-ROM drive, a CD-RW drive, or a combination CD-RW and DVD-ROM drive comes installed in the system's VersaBay IV slot.

# Chipset Features

The following table provides information on the system chipset.

### System Chipset

| Chip | Manufacturer | Description |
|---|---|---|
| Celeron CPU | Intel | 500 MHz |
| Pentium III CPU | Intel | 600, 650, 700, or 750 MHz (with Intel SpeedStep) |
| 82443BX | Intel | System Controller |
| FDC37N869 | Standard Microsystems | Super I/O |
| Mobility-M1 | ATI | Video |
| ESS® Allegro™-1988 | ESS Technology | Audio |
| M38869 | Mitsubishi | Keyboard Controller |
| TI PCI 1420 | Texas Instruments | PCI CardBus Controller |

# 2

# System Configuration and Setup

- Power Sources
- BIOS Setup
- System Power Management
- BIOS Update
- SpeedStep Applet

## *Power Sources*

The Versa TXi notebook can be powered using three different sources:

- AC adapter connected to an electrical wall outlet (using AC power)

- battery power

  — primary battery (standard 3-cell or optional extended life 15-cell battery)

  — with or without the optional secondary 6-cell battery that installs in the VersaBay IV slot

- optional Auto adapter (not available in U.S. or Canada). For details about its use, refer to the accessory sheet that ships with the option.

### *Using the AC Adapter*

Use the AC adapter and power cable that came with the system to run the system on alternating current (AC) power, or to recharge the battery pack.

Keep the adapter connected whenever possible. The AC adapter charges the battery when it is connected, whether the system is powered on or off.

*AC adapter*



⚠ **WARNING** Do not attempt to disassemble the AC adapter. The AC adapter has no user-replaceable or serviceable parts inside. Dangerous voltage in the AC adapter can cause serious personal injury or death. The AC adapter is intended for use with a computer and must meet EN609050 standards.

### *Connecting the AC Adapter*

*Note* The AC power cable type that the system uses depends on the country where it is being used. Contact the local dealer to purchase the correct power cable.

Connect the AC adapter as follows:

1. Connect the AC adapter cable to the power port on the left side of the system.

2. Plug one end of the AC power cable into the AC adapter and the other end into a properly grounded 120- or 240-volt, 50- or 60-Hz wall outlet.

*Connecting the AC adapter*
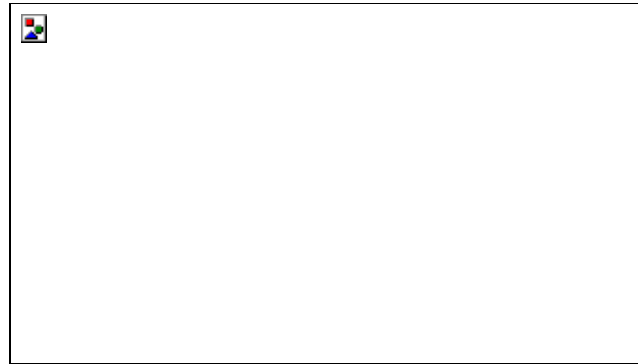


**A** – AC Power Port            **C** – Power Cable
**B** – AC Adapter

⚠ **CAUTION** Do not cover or place objects on the AC adapter. Keeping the adapter clear of objects lets the adapter cool properly during use.

Only use the AC adapter that comes with the Versa TXi notebook. Although other adapters look similar, using them can damage the system.

## Powering On the System

Power on the system as follows:

1. Locate the latch on the front of the LCD panel, slide it to the right, and raise the panel.

2. Locate the power button and press it to turn on system power.

*Note*    When powering on the Versa TXi notebook running the Microsoft® Windows® 2000 operating system, you might see a warning message suggesting that a problem exists with the hibernation file on the system. The warning message is inaccurate. To disable this message, enable hibernate support. See the section "Microsoft Windows 2000 Hibernate" for details about enabling hibernate support.

## System Batteries

The Versa TXi notebook comes with a Li-Ion primary battery and a CMOS battery. In addition, an optional Li-Ion secondary battery and an optional extended life 15- cell Li-Ion battery are available.

## Primary Battery

The Li-Ion primary battery is the power source for the system. The system comes with either a 3-cell Li-Ion battery that fits into the battery bay on the rear of the system, or an optional 15-cell Li-Ion battery that attaches to the bottom of the system.

## Secondary Battery

An optional rechargeable secondary Li-Ion battery can be installed in the VersaBay IV slot on the right side of the system. Installing a second fully charged battery increases battery life while away from an AC power source.

## CMOS Battery

The system comes with a 3-volt lithium battery that maintains data in the system's complementary metal oxide semiconductor (CMOS) RAM. This memory area contains information on the system's configuration (for example date, time, drives, and memory).

The CMOS battery charges when the system is connected to AC power. The CMOS battery may discharge completely if the system remains unused for approximately two months.

## Using the Primary Battery

The Versa TXi notebook comes with a rechargeable 3-cell Li-Ion primary battery that's easy to install and remove.

*Standard Lithium-Ion primary battery*



**A** – Alignment Grooves          **B** – Battery Connectors

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**Note**    The system may come with the optional 15-cell extended life battery for greater battery life.

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**⚠ WARNING**  To prevent accidental battery ignition or explosion, adhere to the following:

- Keep the battery away from extreme heat.
- Keep metal objects away from the battery connectors to prevent a short circuit.
- Make sure the battery is properly installed in the battery bay.
- Read the precautions printed on the battery.

## Determining Battery Status

The Versa TXi notebook has tools to help keep track of the primary (and an optional) battery's power level. If the system is configured (default setting) to display the power icon on the taskbar, an electrical plug displays when the system is connected to an AC power source or a battery icon displays when the system is not connected to an AC power source.

Use the system's power meter to determine battery status. Access the system's power meter in the following ways.

- Move the cursor over the power icon on the taskbar to display the remaining battery power for the system's primary battery.

- Right click the power icon on the taskbar to open the power meter or to adjust power properties.

- Double click the power icon on the taskbar to display the remaining power for both the primary and optional (if attached) battery.

- Go to Start, Settings, Control Panel, and double click the Power Management icon and select the Power Meter tab.

## Low Battery Status

When battery power is low (8% or less), the power LED lights yellow. When battery power is very low (3% or less), the power LED flashes amber. When the system is in a low battery status do one of the following.

- Power off the system, remove the battery, and replace it with a fully charged battery.

- Leave the battery in the system and connect the system to the AC adapter and a wall outlet. If you connect the system to AC power and keep the system within standard operating temperatures, the battery recharges in approximately 2-3 hours whether or not the system is used.

## Returning the Battery to its Normal State

To return the battery to its normal state, try the following:

- remove and then reinstall the battery

- reinstall the battery in the system and fully recharge the battery to 100%.

## Extending Battery Life

Primary battery life can be extended by keeping the brightness setting low. Use the **Fn**-**F8** and **Fn**-**F9** function keys to control the brightness.

In addition, NEC Computers recommends that the system operate on AC power when using an external device and when playing DVD movies.

## Battery Handling

Keep the following in mind when removing or replacing a battery.

- Use only the battery designed for the Versa TXi notebook. Mixing other manufacturers' batteries, or using a combination of very old and new batteries can deteriorate battery and equipment performance.

- Turn off power to the notebook after use. Keeping power on can degrade battery performance and shorten battery life.

- Clean the battery terminals with a dry cloth when they get dirty.

- Keep the battery out of the reach of children.

## Replacing the Battery

The following symptoms indicate that battery life is nearing an end. Replace batteries that display these symptoms:

- shorter work times
- discoloration, warping
- hot to the touch
- strange odour.

Refer to Chapter 3, "Disassembly and Reassembly," for battery removal/replacement procedures.

## Charging the Battery

Charge the primary battery and optional secondary battery by connecting the system to an AC power source. To monitor the charging activity, observe the battery charging LED on the front of the system. The battery charging LED lights as follows:

- lights amber when the primary battery is charging
- blinks amber if the primary battery encounters an error while charging
- lights green when the secondary battery is charging
- blinks green if the secondary battery encounters an error while charging.

## Battery Precautions

To prevent accidental battery ignition, rupture, or explosion, adhere to the following warning.

**⚠ 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.

To avoid personal injury and property damage, read these battery precautions on handling, charging, and disposing Li-Ion batteries.

- Keep the battery away from heat sources including direct sunlight, open fires, microwave ovens, and high-voltage containers. Temperatures over 140º F (60º C) may cause damage.
- Do not drop or impact the battery.
- Do not disassemble the battery.
- Do not solder the battery.
- Do not puncture the battery.
- Do not use a battery that appears damaged or deformed, has any rust on its casing, is discoloured, overheats, or emits a foul odour.
- Keep the battery dry and away from water.
- Keep metal objects away from battery connectors. Metal objects in contact with the connectors can cause a short circuit and damage.

If the battery leaks:

- If the battery leaks onto skin or clothing, wash the area immediately with clean water. Battery fluid can cause a skin rash and damage fabric.
- If battery fluid gets into eyes, DO NOT rub; rinse with clear water immediately and consult a doctor.
- Take extra precautions to keep a leaking battery away from fire. There is a danger of ignition or explosion.

### *Precautions for Recharging the Battery*

Adhere to the following precautions when recharging the primary or secondary battery.

- Charge the battery for the specified charge time only.

- During charging, keep the environmental temperature between 32°F and 104°F (0°C to 40°C).

# BIOS Setup

The Versa TXi notebook comes with a BIOS Setup program that allows the viewing and setting of system parameters. BIOS Setup also allows setting password features to protect the system from unauthorized use.

Use BIOS Setup to:

- set the current time and date

- customize the operating system to reflect system hardware

- secure the system with a password

- balance performance needs with power conservation.

Access the BIOS utility at power-on. Press **F2** when the following prompt appears.

Press <F2> to Enter BIOS Setup. <F12> to Network Boot.

When you press **F2** to enter BIOS Setup, the system interrupts the Power-On Self-Test (POST) and displays the current CMOS RAM settings.

If the system detects an error during POST, it prompts you with a double beep and a message: "Press <F1> to resume." If you press **F1**, the system enters BIOS Setup automatically. If you want to fix the error, carefully read the error message that appears above the prompt (taking notes if you want), and press **F2**. You will see this message if the CMOS battery becomes fully discharged.

## BIOS Setup Main Menu

After pressing **F2**, the system displays the BIOS Setup Main Menu screen, similar to the following.

*Main Setup Menu*

```
                    PhoenixBIOS Setup Utility

    Main      Advanced      Security      Boot        Exit

    System Time:      [12:08:28]              Item Specific Help
    System Date:      [12 / 07 / 2001]
    Language:         [English (US) ]        <Tab>, <Shift-Tab>, or
                                             <Enter> selects Field.
 >  Internal HDD      [10056MB]

    Internal CD/DVD   [CD/DVD]


    Boot Display Device   [Both]

    System Memory     640 KB
    Extended Memory   60416 KB
    CPU Type          (CPU Type)
    CPU Speed         (CPU Speed)
    BIOS Version      309A0500




 F1    Help      ↑↓  Select Item    F5/F6  Change Values       F9   Setup Defaults
 ESC   Exit      ←→  Select Menu    Enter  Select Submenu >    F10  Save and Exit
```

## How to Use Setup

The Setup utility has a Main Menu window and five top-level menus with submenus. The menu bar at the top of the Main Menu window lists the following top-level menus.

■ Main — Use the Main Menu for basic system configuration. For example, select Main to set the system time and date, set diskette and hard disk parameters, or check memory parameters.

■ Advanced — Use the Advanced Menu to set serial port and printer port addresses and interrupts, I/O device configuration, LCD panel view, Intel SpeedStep technology options and more.

■ Security — Use this menu to choose a security mode, set User and Supervisor Passwords, password on boot, fixed disk boot sector, and diskette access.

■ Boot — Use this menu to set boot sequence.

■ Exit — Exits the Setup utility with various save or discard options.

Use the keys listed in the legend bar on the bottom of the Setup Menu to make the selections or exit the current menu. The following table describes the legend keys.

### Setup Key Functions

| Key | Function |
| --- | --- |
| F1 or Alt-H | Displays general help. |
| Esc | Exits the menu. |
| Up or down arrow keys | Moves cursor up and down for item selection. |
| Left or right arrow keys | Selects next menu. |
| F5/F6 | Changes values. |
| Enter | Executes a command or selects submenu. |
| F9 | Loads the default configuration values for the current menu. |
| F10 | Saves the current values and exits Setup. |

To select one of the five menus from the menu bar, use the left and right arrow keys. Use the up or down arrow keys to select an item under the menu.

Menu items preceded by a > contain a submenu of selectable fields for setting system parameters. Display a submenu by using the up or down arrow keys to move the cursor to the desired submenu, then press **Enter**.

An 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.

The following subsections describe the five top-level menus and their submenus.

### Main Menu

Choose the Main Menu by selecting Main in the legend bar on the Main Menu screen. Other Main Menu options are available by selecting submenus.

Use the arrow keys to select one of the Main Menu options and press **Enter** to select a submenu. Items with greyed-out text are not available. Explanations of each Main Menu item are in the following table.

⚠ **CAUTION**  Setting items on this menu to incorrect values can cause the system to malfunction.

#### Main Menu Items

| Menu Item | Settings (default is bold) |
|---|---|
| System Time | Set system time in this field. Press **Tab** or **Enter** to move between hour, minute, and second fields. |
| | Example:  09:30:00 |
| System Date | Set system date in this field. Press **Tab** or **Enter** to move between month, date, and year fields. |
| | Example:  07/09/2001 |
| Language | **English**, Japanese, French |
| | Selects the display language for the BIOS. |
| Internal HDD | Displays the HDD capacity. |
| | Example: 10056 MB |
| | Bring up the Internal HDD submenu by pressing **Enter**. The submenus include Type and LBA Format. |
| | See the table, "Internal HDD Menu Items" for descriptions of each submenu and its fields. |
| Internal CD/DVD | **CD/DVD Installed**, None |
| | This field is read-only and cannot be changed from BIOS Setup. |
| Boot Display Device | Both, CRT, **LCD** |
| | Allows you to choose either display devices, or both. |
| System Memory | Displays amount of conventional memory detected during boot. |
| | This field is read-only and cannot be changed from BIOS Setup. |
| | Example: 640 KB |

## Main Menu Items

| Menu Item | Settings (default is bold) |
|---|---|
| Extended Memory | Displays amount of extended memory detected during boot. |
| | This field is read-only and cannot be changed from BIOS Setup. |
| | Example: 63488 KB |
| CPU Type | Displays the processor type. |
| | This field is read-only and cannot be changed from BIOS Setup. |
| | Example: Pentium® III |
| CPU Speed | Displays the processor speed. |
| | This field is read-only and cannot be changed from BIOS Setup. |
| | Example: 750 MHz |
| BIOS Version | Displays the BIOS version number. |
| | This field is read-only and cannot be changed from the BIOS Setup. |
| | Example: 309A0500 |

## Internal HDD Submenu Items

| Menu Item | Settings (default is bold) |
|---|---|
| Type | **Auto**, None, User, CD-ROM, ATAPI Removable Device |
| | When set to Auto, the values for Cylinders, Heads, Sectors, and Maximum Capacity are read only. |
| | When set to Auto, the BIOS detects what the drive is capable of, not the translation mechanism that was used to format the drive. If a drive is run in a mode other than the mode in which it was partitioned and formatted, unpredictable results may occur, including data loss. |
| | When set to None, informs the system to ignore this drive. |
| | When set to User, allows the manual entry of all fields described next. |
| | When set to CD-ROM, IDE Removable, ATAPI Removable, or Other ATAPI, allows the manual entry of all fields described next. |

## Internal HDD Submenu Items

| Menu Item | Settings (default is bold) |
| --- | --- |
| Cylinders | When Type is Auto, value in the Cylinders field is auto-detected and field is read only. |
| Heads | When Type is Auto, value in Heads field is auto-detected and field is read only. |
| Sectors | When Type is Auto, value in Sectors field is auto-detected and field is read only. |
| Maximum Capacity | This field is read-only and cannot be changed from BIOS Setup. Example: 10056 MB |
| Multi-Sector Transfers | Disabled, 2, 4, 8, 16 sectors, Max. Determines the number of sectors per block for multi-sector transfers. When Type is Auto, value in Multi-Sector Transfers field is auto-detected and field is read only. |
| LBA Mode Control | **Enabled**, Disabled When Enabled is selected, it causes logical block addressing to be used in place of cylinders, heads, and sectors. When Type is set to Auto, the value in the LBA Mode field is auto-detected and the field is read only. |
| 32-Bit I/O | **Disabled**, Enabled When Enabled, allows 32 bit data transfers. |
| Transfer Mode | Standard, Fast PIO1, Fast PIO2, Fast PIO3, **Fast PIO4**, Fast PIO3/DMA1, Fast PIO4/DMA2 Selects the method for moving data to and from the drive. When Type is set to Auto, the value in the field is auto-detected and the field is read only. |
| SMART Monitoring | Enabled, **Disabled** This field is read-only and cannot be changed from BIOS Setup. |
| Ultra DMA Mode | **Disabled**, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4 Selects the Ultra DMA Mode for moving data to and from the drive. Autotype the drive to select the optimum transfer mode. When Type is set to Auto, the value in the field is auto-detected and the field is read only. |

## Advanced Menu

Choose the Advanced Menu by selecting Advanced in the legend bar on the Main Menu screen. Other Advanced Menu options are available by selecting submenus.

Use the arrow keys to select one of the Advanced Menu options and press **Enter** to select a submenu. Items with out-out text are not available. Explanations of each Advanced Menu item are in the following table.

⚠ **CAUTION**   Setting items on this menu to incorrect values can cause your system to malfunction.

### Advanced Menu

| Menu Item | Settings (default is bold) |
|---|---|
| Num-Lock on Boot | LockOn, **LockOff**<br><br>Selects the state for Num Lock at power on. |
| Internal Mouse | Disabled, **Enabled**<br><br>Enabled forces the internal mouse port to be enabled regardless of whether a mouse is present. Disabled prevents any installed internal mouse from functioning, but frees up IRQ 12. |
| LCD Panel View Expansion | **Enabled**, Disabled<br><br>Disabled reduces the panel view in some video modes. Enabled expands the panel view. The enabled setting sometimes affects graphic quality. |
| Suspend Warning Tone | **Enabled**, Disabled<br><br>On enables the Suspend warning tone. |
| BootUp Message | **Enabled**, Disabled<br><br>Disabled suppresses the logo screen during boot. |
| Save to Disk Warning | Enabled, **Disabled**<br><br>Disabled prevents the Save to Disk message when the SAVE2DSK.BIN file does not exist on the hard drive. |
| Summary Screen | **Disabled**, Enabled<br><br>When set to Enabled, information about the system's configuration is displayed onscreen during boot. |
| Silent Boot | Disabled, **Enabled**, Black.<br><br>When set to Enabled, the logo screen appears during boot. Disabled causes the POST messages to appear during boot. Black causes the screen to remain black during boot. |

## Advanced Menu

| Menu Item | Settings (default is bold) |
|---|---|
| Bluetooth | **Disabled**, Enabled |
| | Enables or Disables the Bluetooth wireless functionality. |
| Remote Power On | **Disabled**, Enabled |
| | Select Enabled to allow the LAN board to wake the system. |
| Intel® SpeedStep™ | Disabled, Battery Operation, **Automatic** |
| | Use Automatic for the system to perform in full power mode when the system is running under AC power. |
| | Use Battery Operation for the system to use power conservatively whether the system is running on AC power or battery power. |
| | Use Disabled to turn off Intel SpeedStep technology. |
| I/O Device Configuration | Press **Enter** to bring up the I/O Device Configuration submenu to configure the serial and parallel ports, and the diskette drive controller. |
| Parallel port | **Auto**, Disabled, Enabled |
| | Use Enabled to manually configure the Parallel Port. Use Disabled to disable the Parallel Port. Use Auto to allow the BIOS or operating system to configure the Parallel Port. |
| Mode | Output Only, **Bi-directional**, ECP, EPP |
| Base I/O Address | 378, 3BC, 278 |
| | This selection only appears when Parallel Port is set to Enabled. Select the base I/O address for the parallel port. |
| USB Floppy | Disabled, **Enabled** |
| | Use Enabled to allow the USB diskette drive to be recognized when attached. |

## Security Menu

Choose the Security Menu by selecting Security in the legend bar on the Main Menu screen. Other Security Menu options are available by selecting submenus.

Use the arrow keys to select one of the Security Menu options and press **Enter** to select a submenu. Items with out-out text are not available. Explanations of each Security Menu item are in the following table.

### Security Menu Items

| Menu Item | Settings (default is bold) |
|---|---|
| Supervisor Password Is | Clear, Set |
| | This read-only field indicates whether a supervisor password has been set. |
| User Password Is | Clear, Set |
| | This read-only field indicates whether a user password has been set. |
| Set Supervisor Password | Press **Enter** to access. |
| | Use this field to set or change the supervisor password. Press **Enter** to bring up a dialog box where the password can be entered and confirmed. |
| Set User Password | Press **Enter** to access. |
| | Use this field to set or change the user password. Press **Enter** to bring up a dialog box where the password can be entered and confirmed. |
| Security Mode | **Password**, SmartCard, FingerPrint* |
| | Use this field to select which security mode to enable on your system. |
| Password on Boot | **Disabled**, Enabled |
| | When Enabled, requires password entry before boot. System remains in secure mode until the password is entered. |
| Fixed Disk Boot Sector | **Normal**, Write Protect |
| | Write Protect protects the boot sector on the hard disk from viruses. |
| Diskette Access | **Supervisor**, User |
| | Controls access to the diskette drive. |
| Assign HDD Password | Press **Enter** to access. |
| | Use this field to set or change the hard drive password. Press **Enter** to bring up a dialog box where the password can be entered and confirmed. |

## Security Menu Items

| Menu Item | Settings (default is bold) |
|---|---|
| Internal HDD Password | Enabled, **Disabled** |
| | This field is only active if a HDD Password has been set. When Enabled, requires password entry for the hard drive to be accessed. |

*For information on configuring SmartCard security mode or FingerPrint security mode, see the instructions that come with the device.

## Boot Menu

Choose the Boot Menu by selecting Boot in the legend bar on the Main Menu screen. Other Boot Menu options are available by selecting submenus.

Use the arrow keys to select one of the Boot Menu options and press **Enter** to select a submenu. Items with out-out text are not available. Explanations of each Boot Menu item are in the following table.

## Boot Menu Settings

| Menu Item | Settings (default is bold) |
|---|---|
| ATAPI CD-ROM Drive<br>USB Diskette Drive<br>Hard Drive<br>Network Boot | The Boot Menu displays the bootable devices in the current boot order (list varies according to bootable devices present in system). |
| | Use the up or down arrows to select a device. |
| | Press **Enter** to expand or collapse device information (presence of subentries is indicated with a plus sign). |
| | Press **Ctrl Enter** to expand all device information. |
| | Use the plus (+) or minus (-) key to move a selected device up or down in the boot order. |

### Exit Menu

Choose the Exit Menu by selecting Exit in the legend bar on the Main Menu screen. Other Exit Menu options are available by selecting submenus.

Use the arrow keys to select one of the Exit Menu options and press **Enter** to select a submenu. Explanations of each Exit Menu item are in the following table.

#### Exit Menu Items

| Menu Item | Settings |
|---|---|
| Exit Saving Changes | Implements the changes just made, and exits BIOS. |
| Exit Discarding Changes | Exits leaving BIOS unchanged. |
| Load Setup Defaults | Loads default values for all BIOS setup fields. |
| Discard Changes | Loads previous values from BIOS for all setup fields. |
| Save Changes | Saves all setup value changes to BIOS. |
| Battery Refresh | Uses the Battery Refresh option to reactivate the battery. |

# System Power Management

In the Microsoft Windows 2000/98/Me environment, the system  manages its power resources using the Advanced Configuration and Power Interface (ACPI) while the system is powered on using AC or battery (DC) power. ACPI enables the operating system to manage the power given to each attached device and to turn off a device when not in use.

Take advantage of the opportunity to manage power on the system to:

■ minimize battery drain

■ preserve the life of the Versa TXi notebook

■ save time.

## Microsoft Windows 2000 Power Options Properties

In the Microsoft Windows 2000 operating system, most ACPI power management settings are controlled through Microsoft Windows Power Options Properties, not through the BIOS Setup utility. To access Microsoft Windows 2000 Power Options Properties, go to Start, Settings, Control Panel, and double click Power Options.

The Power Options Properties features are as follows.

■ Power Schemes

■ Alarms

■ Power Meter

■ Advanced

■ Hibernate

- Intel SpeedStep technology

## Microsoft Windows 2000 Power Schemes

Use the Power Schemes options to define the appropriate Power scheme for the system, and to set timeouts for standby, LCD panel, and hard disk. Define parameters for the system when running under AC (plugged in) or DC (running on batteries) power.

### Power Schemes

| Parameter | Default Setting | Alternate Setting(s) |
|---|---|---|
| Power Schemes | Portable/Laptop | Home/Office Desk, Presentation, Always On, Minimal Power Management, Max. Battery |
| Turn off monitor (Plugged In) | After 15 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off monitor (Running on batteries) | After 5 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off hard disks (Plugged In) | After 30 Minutes | 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off hard disks (Running on batteries) | After 5 Minutes | 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System Standby (Plugged In) | After 20 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System Standby (Running on batteries) | After 5 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System hibernates (Plugged In and Running on Batteries) | After 1 Hour | 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5, 6 hours; Never |
| System hibernates (Running on Batteries) | After 10 Minutes | 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5, 6 hours; Never |

- Power Schemes — Defines the most appropriate power scheme for the system.

- Turn off monitor — Selects the time delay before the LCD panel turns off.

- Turn off hard disks — Selects the time delay before the hard disk(s) power down.

- System standby — Selects the system standby timeout period for the system when running under AC or DC power.

- System hibernates — Selects the system hibernate timeout period for the system when running on AC or DC power.

## Microsoft Windows 2000 Alarms

Use the Alarms screen to define the point at which the battery alarm activates. Define the alarm to either sound, display a warning message, or invoke Standby, Hibernate or Shutdown.

### Alarms

| Parameter | Default Setting | Alternate Setting(s) |
|---|---|---|
| Low battery alarm | 10% | 0-100% |
| Alarm Action Notification | Display message | Sound alarm |
| Alarm Action Power level | none | Standby, Power Off, Hibernate |
| Critical battery alarm | 3% | 0-100% |
| Alarm Action Notification | Display message | Sound alarm |
| Alarm Action Power level | Standby | Power Off, None, Hibernate |
| Run a program | none | When the alarm occurs, run this program. |

- Low battery alarm — Allows you to define a low battery alarm percentage, notification, and system action.
- Critical battery alarm — Allows you to define a critical battery alarm percentage, notification, and system action.
- Run a program — Allows you to run a specific program when an alarm occurs.

## Microsoft Windows 2000 Power Meter

The Power Meter screen displays the remaining battery power and charging status for the primary and secondary batteries. Choose to display either a percentage progress bar or a battery icon with percentage indicator for your battery status information.

## Microsoft Windows 2000 Advanced

The Advanced window allows you to select behaviours for the taskbar icon, standby password, LCD panel, when closed, and the Power button.

### Advanced

| Parameter | Default Setting | Alternate Setting(s) |
|---|---|---|
| Always show icon on taskbar | unchecked | checked |
| Prompt for password when computer goes off standby | checked | unchecked |
| When I close the lid on my computer | None[1] | Standby, Power Off, Hibernate |
| When I press the Power button on my computer | Power Off | Standby, Hibernate |

[1] When None is selected, LCD panel turns off when closed.

- Always show icon on the taskbar — Determines whether or not the Power Meter icon displays on the taskbar.

- Prompt for password when computer goes off standby — Determines whether or not the system prompts for the Microsoft Windows operating system password when resuming from Standby.

- When I close the lid of my computer — Defines the system action when the LCD panel is closed.

- When I press the Power button on my computer — Defines the system action when the Power button is used.

## Microsoft Windows 2000 Hibernate

Use the Hibernate window to enable hibernate support, see the amount of free disk space, and the amount of disk space required to hibernate. When the system hibernates, it performs a save-to-disk or save-to-file (STF). The current working environment is saved to the hard disk. Use the Power button to resume from hibernation and the system returns to its previous state.

To enable hibernate support, go to Start, Settings, Control Panel, and double click the Power Management Properties (Power Options Properties in Microsoft Windows 2000) icon. Select the Hibernate tab and place a check mark in the box labelled 'Enable hibernate support.' Click Apply, click OK, and close the Control Panel.

**Note**    When powering on the Versa TXi notebook running the Microsoft Windows 2000 operating system, you may encounter a warning message suggesting that a problem exists with the hibernation file on the system. The warning message is inaccurate. To disable this message, follow the instructions in the previous paragraph to enable hibernate support.

## Microsoft Windows 2000 and Intel SpeedStep Technology

Use the Intel SpeedStep technology (available in systems with Intel Pentium III processors) to optimize processing speed and conserve battery life.

Enable SpeedStep technology through the BIOS Setup utility. The available settings are Disabled, Battery Operation, and Automatic.

- Use Automatic for the system to perform in full power mode when the system is running under AC power.

- Use Battery Operation for the system to use power conservatively whether the system is running on AC power or battery power.

- Use Disabled to turn off Intel SpeedStep technology.

If SpeedStep technology is enabled in the system, an icon appears on the taskbar allowing you to adjust processing properties. However, the default settings are recommended for optimal performance and battery conservation.

For information about accessing the BIOS Setup utility, refer to "How to Use Setup" and "Advanced Menu" in earlier in this chapter.

### Microsoft Windows 98/Me Power Management Properties

In Microsoft Windows 98/Me, most ACPI power management settings are controlled through Microsoft Windows Power Management Properties, not through the BIOS Setup utility, unless otherwise noted. To access the Microsoft Windows 98 Power Management Properties, go to Start, Settings, Control Panel, and double click Power Management.

The Power Management Properties features are as follows.

- Power Schemes
- Alarms
- Power Meter
- Advanced
- Hibernate
- Intel SpeedStep technology

### Microsoft Windows 98/Me Power Schemes

Use the Power Schemes options to define the appropriate Power scheme for the system, and to set timeouts for standby, LCD panel, and hard disk. Define parameters for the system when running under AC (plugged in) or DC (running on batteries) power.

*Power Schemes*

| Parameter | Windows ME Default Settings | Windows 98 Default Setting | Alternate Setting(s) |
|---|---|---|---|
| Power Schemes | Portable/Laptop | Portable/Laptop | Home/Office Desk, Always On |
| Turn off Monitor (Plugged in) | After 15 Minutes | After 15 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off Monitor (Running on batteries) | After 3 Minutes | After 2 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off Hard Disks (Plugged in) | After 30 Minutes | After 30 Minutes | 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| Turn off Hard Disks (Running on batteries) | After 10 Minutes | After 3 Minutes | 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System Standby (Plugged in) | After 20 Minutes | After 20 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System Standby (Running on batteries) | After 5 Minutes | After 5 Minutes | 1, 2, 3, 5, 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5 hours; Never |
| System Hibernates (Plugged in and running on batteries) | After 30 Minutes (15 minutes if running on batteries only) | After 1 Hour (10 minutes if running on batteries only) | 10, 15, 20, 25, 30, 45 minutes; 1, 2, 3, 4, 5, 6 hours; Never |

- Power Schemes — Defines the most appropriate power scheme for the computer.

- Turn off monitor — Selects the time delay before the LCD panel turns off.

- Turn off hard disks — Selects the time delay before the hard disk(s) power down.

- System standby — Selects the system standby timeout period for the system when running under AC or DC power.

- System hibernates — Selects the system hibernate timeout period for the system when running on AC or DC power.

## Microsoft Windows 98/Me Alarms

Use the Alarms screen to define the point at which the battery alarm activates. Define the alarm to either sound, display a warning message, or invoke Standby, Hibernate or Shutdown.

### Alarms

| Parameter | Default Setting | Alternate Setting(s) |
|---|---|---|
| Low battery alarm | 10% | 0-100% |
| Alarm Action Notification | Display message | Sound alarm |
| Alarm Action Power level | No Action | Standby, Hibernate, Shutdown (for Win98), Power Off (for WinMe) |
| Critical battery alarm | 3% | 0-100% |
| Alarm Action Notification | Display message | Sound alarm |
| Alarm Action Power level | Standby | Hibernate, Shutdown (Win98), Power Off (WinMe) No Action |

- Low battery alarm — Allows you to define a low battery alarm percentage, notification, and system action.

- Critical battery alarm — Allows you to define a critical battery alarm percentage, notification, and system action.

## Microsoft Windows 98/Me Power Meter

The Power Meter screen displays the remaining battery power and charging status for the primary and secondary batteries. Choose to display either a percentage progress bar or a battery icon with percentage indicator for your battery status information.

## Microsoft Windows 98/Me Advanced

The Advanced window allows you to select behaviours for the taskbar icon, standby password, LCD panel, when closed, and the Power button.

### Advanced Microsoft Windows

| Parameter | Default Setting | Alternate Setting(s) |
|---|---|---|
| Always show icon on taskbar | checked | unchecked |
| Prompt for password when computer goes off standby | unchecked | checked |
| When I close the lid on my computer | Standby (Win98), Hibernate (WinMe) | Hibernate, Shutdown (Win98), Power Off (WinMe) |
| When I press the Power button on my computer | Shutdown (Win98), Hibernate (WinMe) | Standby, Hibernate |

- Always show icon on the taskbar — Determines whether or not the Power Meter icon displays on the taskbar.

- Prompt for password when computer goes off standby — Determines whether or not the system prompts for the Microsoft Windows operating system password when resuming from Standby or (for WinMe) Hibernate.

- When I close the lid of my computer — Defines the system action when the LCD panel is closed.

- When I press the Power button on my computer — Defines the system action when the Power button is used.

## Microsoft Windows 98/Me Hibernate

Use the Hibernate window to enable hibernate support. When the system hibernates it performs a save-to-disk or save-to-file (STF). The current working environment is saved to the hard disk. Use the Power button to resume from hibernation and the system returns to its previous state.

## Microsoft Windows 98/Me and Intel SpeedStep Technology

Use the Intel SpeedStep technology (available in systems with Intel Pentium III processors) to optimize processing speed and conserve battery life.

Enable SpeedStep technology through the BIOS Setup utility. The available settings are Disabled, Battery Operation, and Automatic.

- Use Automatic for the system to perform in full power mode when running under AC power.

- Use Battery Operation for the system to use power conservatively whether the system is running on AC power or battery power.

- Use Disabled to turn off Intel SpeedStep technology.

If SpeedStep technology is enabled, click on the icon to adjust processing properties. However, the default settings are recommended for optimal performance and battery conservation.

For information about accessing the BIOS Setup utility, refer to "How to Use Setup" and "Advanced Menu" earlier in this chapter.

## Microsoft Windows 2000/98/Me Power Management States

ACPI uses different levels or states of power management. These power management states occur automatically, based on the system's default settings, or manually, when invoked. Settings are configurable to occur while on battery power or AC power.

The Microsoft Windows 2000/98/Me ACPI power management states include:

- LCD timeout — manages power at the lowest level by shutting down the LCD.

- Standby — also known as Save-to-RAM (STR), Standby manages power by saving your current working environment to memory and shutting down most system devices. Conserves more power than an LCD timeout.

- Hibernate — also known as save-to-disk, or save-to-file (STF) manages power by saving the current working environment to an area on your hard disk, then powering off your system. Conserves the most battery power.

## Recognizing the Microsoft Windows Power Management States

It is important to recognize the system's behaviour when in each of these power management states. The following table describes the system behaviour for each power management state.

### Microsoft Windows 2000/98/Me Power Management Behaviour

|  | LCD Timeout | Standby (STR) | Hibernate (STF) |
|---|---|---|---|
| Manually Invoke | Close LCD panel. | Go to Start, Shutdown, Standby. | Close LCD panel.[*] |
|  |  |  | Press Power button.[*] |
| System behaviour | LCD panel is blank. | LCD panel is blank. | LCD panel is blank. |
|  | Status LED lights green. | Status LED blinks green. | Status LED turns off. |
|  |  |  | Progress bar indicates that current working environment is saved to hard disk. |
| Resume | Press any key. | Press Power button. | Press Power button. |
|  |  |  | Progress bar appears during process. |

[*] Only when set in Advanced Microsoft Windows Power Option Properties.

# Intel SpeedStep Applet

Some processors that ship with the Versa TXi notebook include the Intel SpeedStep technology that allows you to customize high-performance computing on the notebook, optimizing processing speed, and conserving battery life.

If the processor is equipped with the Intel SpeedStep technology, an icon appears on the taskbar allowing you to adjust processing properties. However, the default settings are recommended for optimal performance and battery conservation.

# *3*

# Disassembly and Reassembly

- Required Tools and Equipment
- Disassembly
- Reassembly

## Required Tools and Equipment

All Versa TXi notebook disassembly/reassembly procedures are performed using the following tools:

- small Phillips screwdrivers (# 1 and # 0)

- small flat-blade screwdriver

- tweezers.

## Disassembly

This chapter contains step-by-step disassembly procedures for the system. Reassembly is the reverse of disassembly. Each procedure is supported by a simplified disassembly illustration. The illustrated parts breakdown and parts lists for the system unit are included in Chapter 5.

For complete disassembly of the system, follow the disassembly order listed in the following table. For disassembly of a specific part, go to the section containing the part removal procedure.

### Versa TXi Notebook Disassembly Sequence

| Sequence | Part Name |
|---|---|
| 1 | Primary Battery |
| 2 | Memory Module |
| 3 | NEC VersaBay IV Slot Devices (storage devices, optional secondary battery, or weight-saving module) |
| 4 | Keyboard |
| 5 | Front Cover and VersaGlide Assembly |
| 6 | Hard Disk Drive |
| 7 | CMOS Battery |
| 8 | PC Card Assembly |
| 9 | Bluetooth Board Assembly |
| 10 | USB Board |
| 11 | Top Cover Assembly |
| 12 | Speakers |
| 13 | Switch Board |
| 14 | LCD Panel |
| 15 | Fan/Heat Plate Assembly |
| 16 | Main Board |
| 17 | Mini PCI Board (modem/network board, modem board) |
| 18 | Sound Board |

When disassembling the system unit, follow these general rules.

- Turn off the system and unplug all power and all options, including the AC adapter (if connected), primary battery, and optional secondary battery (if installed).

- Do not disassemble the system into parts that are smaller than those specified in the procedure.

- Several different type of screws are used to fasten various parts in the system. As you disassemble the system, note the screw type, length, and position. Use care to ensure that all screws are returned to their original positions.

- Label all removed connectors. Note where the connector goes and in what position it was installed.

## Primary Battery

Remove the primary battery as follows.

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**Note**  Only use batteries that were specifically designed for use in the Versa TXi notebook. Installing another manufacturer's battery, or using a combination of very old and new batteries can deteriorate battery and equipment performance.

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1. Turn off system power.

2. Close the LCD panel and turn the system over.

3. Slide the battery release latch toward the side of the system and hold firmly.
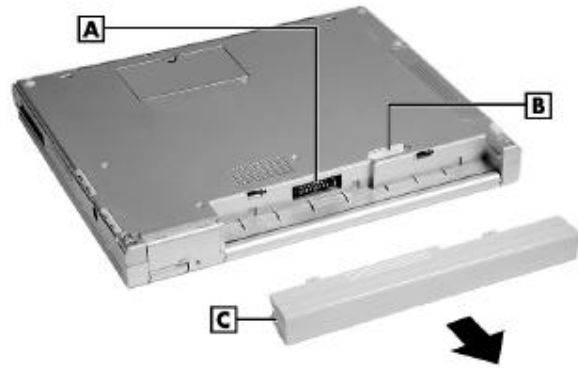
*Locating the battery release latch*
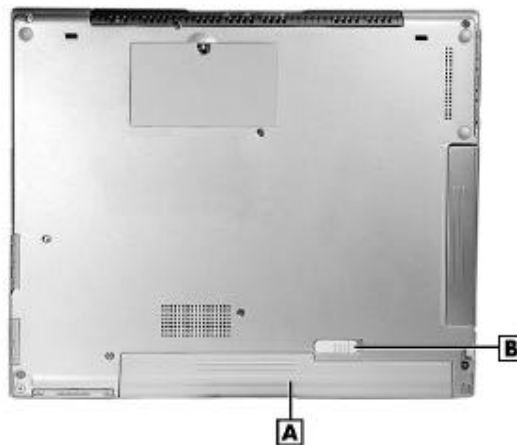


**A** – Primary Battery          **B** – Battery Release Latch

4. Continue to hold the battery release latch as you pull the battery out of the system.

*Removing the primary battery*



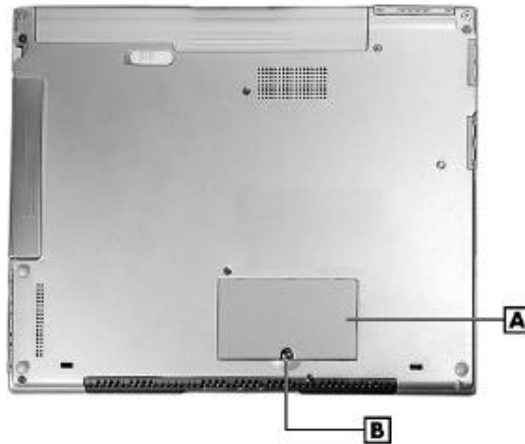**A** – Battery Bay Connectors      **C** – Primary Battery
**B** – Battery Release Latch

## Memory Module

Remove the memory module as follows.

**1.** Turn off system power and close the LCD panel.

**2.** Turn the system over and locate the memory module bay.

*Locating the memory module bay*



**A** – Memory Module Bay Cover      **B** – Screw

**3.** Remove the screw and bay cover.

4. Locate the memory module and remove it as follows:

   ■ Press the locking tabs away from the sides of the module and hold while gently lifting on the edge of the module.

   ■ When the edge of the module pops up and is at approximately a 60 degree angle, pull the module from the socket.

*Removing an installed memory module*
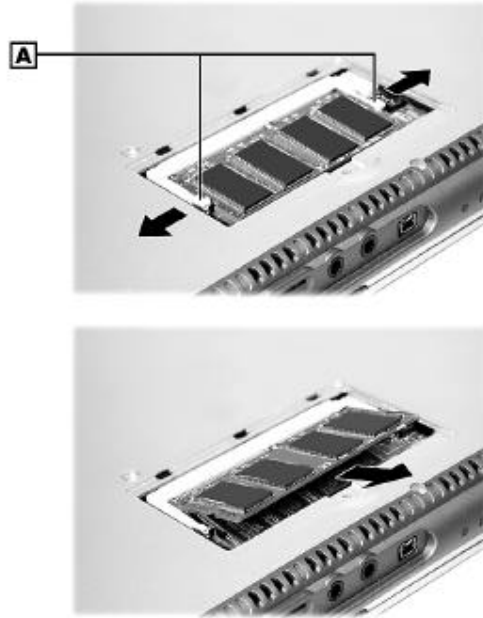


**A** – Memory Module Locking Tabs

### NEC VersaBay IV Slot Devices

The system comes with a CD-ROM drive, CD-RW drive, a DVD-ROM drive, or a combination CD-RW and DVD-ROM drive installed in the NEC VersaBay IV slot. If the system has no storage device in the slot, there might be a weight saving module or an optional secondary battery in the slot.

Remove a device as follows.

**1.** Turn off and unplug the system, and close the LCD panel.

*Note*     A storage device can be removed while the system is on (hot swapping) or in a sleep state (warm swapping). However, using the swap feature requires that the Phoenix BaySwap Utility be installed and running. See the *Versa TXi User's Guide* for detailed information on using the utility and hot swapping or warm swapping a storage device.

⚠ **CAUTION**  Do not remove or install the optional secondary battery while the system is powered on or plugged in. Power down and unplug the system first.

**2.** Locate the device release latch to the right of the VersaBay IV slot.

**3.** Position the latch to the open position.

**4.** Press in the latch to eject the device from the slot.

**5.** Pull the device out of the system.

**6.** Position the latch to the closed position to avoid damage to the latch.

⚠ **CAUTION**  Install the weight-saving module in the slot if no other device is to be installed.

*Removing a device from the NEC VersaBay IV slot*

### Keyboard

Remove the keyboard assembly as follows.

**1.** Power off the system, unplug any attached peripherals, and remove the primary battery.

**2.** Turn the notebook over.

**3.** Locate and remove the bottom screws (see the following figure).

■ If you need to remove the keyboard, front cover and VersaGlide assembly, hard disk drive, CMOS battery, PC card assembly, Bluetooth board, or USB board, only remove the four front cover screws from the bottom of the notebook.

■ If you need to remove the top cover, LCD panel, main board, Mini PCI board, or sound board, remove the four front cover screws and the seven top cover and LCD panel screws from the bottom of the system. Also remove the LCD panel screw at the back side of the notebook.

**Note** Several different types and lengths of screws are used. As you remove the screws, note the screw type, length, and position. Use care to ensure that all screws are returned to their original positions.

*Removing the bottom screws*
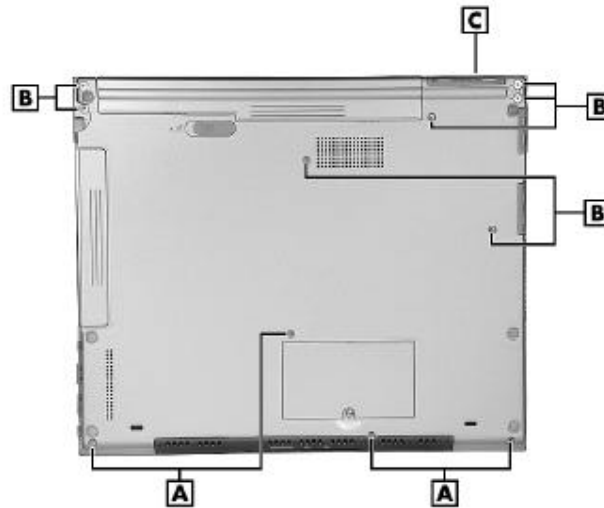


**A** – Front Cover Screws (4)  **C** – LCD Panel Screw (on back side)
**B** – Top Cover and LCD Panel Screws (7)

**4.** Grasp the top and bottom of the notebook to hold it together, turn it over, and open the LCD panel.

**5.** Carefully lift up the front cover and VersaGlide assembly and slide it away from the keyboard about a half-inch. Use care to avoid pulling out the cover's cables.

**6.** Lift up the keyboard at the Fn and End keys and tilt the keyboard vertically.

7.  Unplug the keyboard cable from connector P19 on the main board.

8.  Remove the keyboard from the notebook.

*Removing the keyboard*
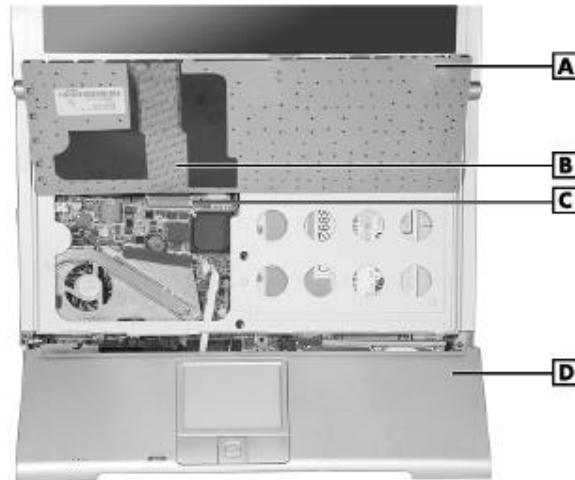


A – Keyboard               C – Connector P19
B – Keyboard Cable         D – Front Cover and VersaGlide Assembly

## Front Cover and VersaGlide Assembly

Remove the front cover and VersaGlide assembly as follows.

1.  Remove the primary battery and keyboard.

2.  Unplug the front cover and VersaGlide assembly cables from P20 (VersaGlide) and P26 (microphone) on the main board. Slide the VersaGlide cable out from under the support bar.

3.  Pull up on the corners of the front cover and VersaGlide assembly to release it.

4.  Remove the front cover and VersaGlide assembly from the notebook.

## Hard Disk Drive

Remove the internal hard disk drive as follows.

1. Remove the primary battery, keyboard, and front cover and VersaGlide assembly from the notebook.

2. Locate the hard disk drive on the right side of the notebook.

3. Unplug the hard disk drive cable from connector P13 on the main board.

4. Lift the drive up and remove from the notebook.

*Removing the hard disk drive*



**A** – Connector P13          **C** – Hard Disk Drive
**B** – Hard Disk Drive Cable

### CMOS Battery

Remove the CMOS battery as follows.

1.  Remove the main battery, keyboard, and front cover and VersaGlide assembly from the notebook.

2.  Unplug the CMOS battery cable from connector P18 on the main board.

3.  Lift the CMOS battery up to release it from the main board. The battery is held in place on the board with elastic adhesive.

*Removing the CMOS battery*
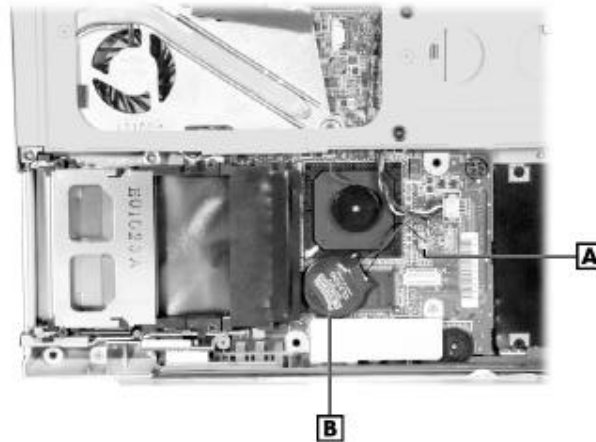


**A** – Connector P18                    **B** – CMOS Battery

## *PC Card Assembly*

Remove the PC card assembly as follows.

1.  Remove the primary battery, keyboard, and front cover and VersaGlide assembly from the notebook.

2.  Locate the PC card assembly on the left side of the notebook.

3.  Remove the four screws securing the assembly to the notebook.

4.  Pull up on the assembly to unplug it from connector P2 on the main board.

5.  Lift the assembly out of the notebook.

*Removing the PC card assembly*
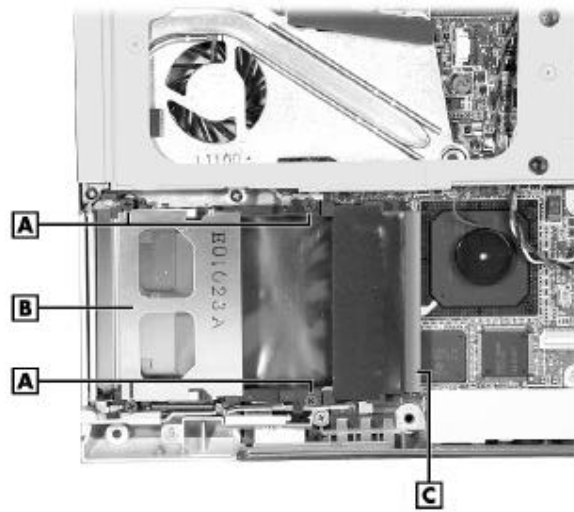


**A** – Screws (4)                  **C** – Connector P2
**B** – PC Card Assembly

## Bluetooth Board Assembly

Remove the Bluetooth board and attached antenna board as follows.

1. Remove the primary battery, keyboard, front cover and VersaGlide assembly, and PC card assembly from the notebook.

2. Locate the Bluetooth board and attached antenna board on the left side of the notebook, under the former location of the PC card assembly. Note that the boards are hardwired together.

3. Remove the three screws securing the antenna bracket to the notebook.

4. Remove the two screws securing the Bluetooth board to the notebook.

5. Turn the Bluetooth board over and unplug the cable from its connector on the board.

6. Remove the Bluetooth board, antenna bracket, and antenna board from the notebook.

*Removing the Bluetooth board, antenna bracket, and antenna board*
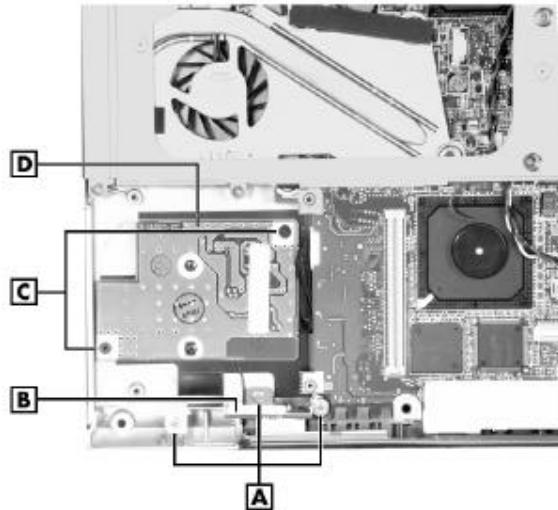


**A** – Bracket Screws (3)      **C** – Bluetooth Board Screws (2)
**B** – Antenna Bracket          **D** – Bluetooth Board

### USB Board

Remove the USB board as follows.

1. Remove the primary battery, keyboard, front cover and VersaGlide assembly, and hard disk drive from the notebook.

2. Locate the USB board on the right side of the notebook, under the location of the hard disk drive.

3. Locate and remove the two screws fastening the USB board to the notebook.

4. Locate and remove the standoff post screw from the USB board.

   ■ Remove the screw from the top of the standoff post.

   ■ Insert the end of a small flat blade screwdriver through the hole where the screw was and into the slot on the top of the standoff post. Use care to avoid damaging the standoff's internal threads.

   ■ Loosen the standoff post.

5. Carefully unplug USB board connector P56 from connector P52 on the sound board under the USB board.

6. Remove the USB board and standoff post from the notebook.

*Removing the USB board*
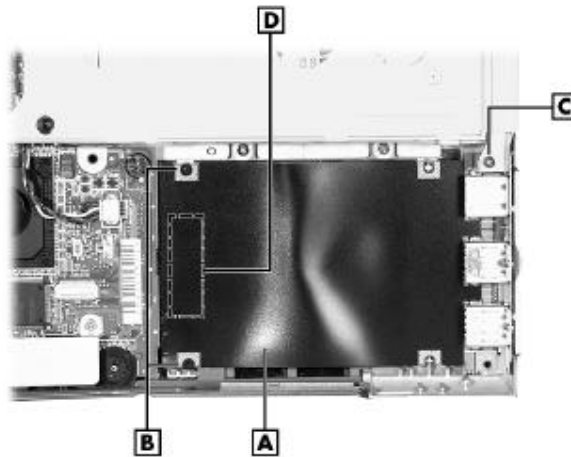


**A** – USB Board        **C** – Standoff Screw and Post
**B** – Screws (2)        **D** – Connector P56 (underside of USB board)

### Top Cover Assembly

Remove the top cover assembly as follows.

**1.** Turn the notebook over.

**2.** Locate and remove the four front cover screws and the seven top cover and LCD panel screws from the bottom of the notebook. Also remove the LCD panel screw at the back of the notebook.

*Note* Several different types and lengths of screws are used. As you remove the screws, note the screw type, length, and position. Use care to ensure that all screws are returned to their original positions.

*Removing the bottom screws*
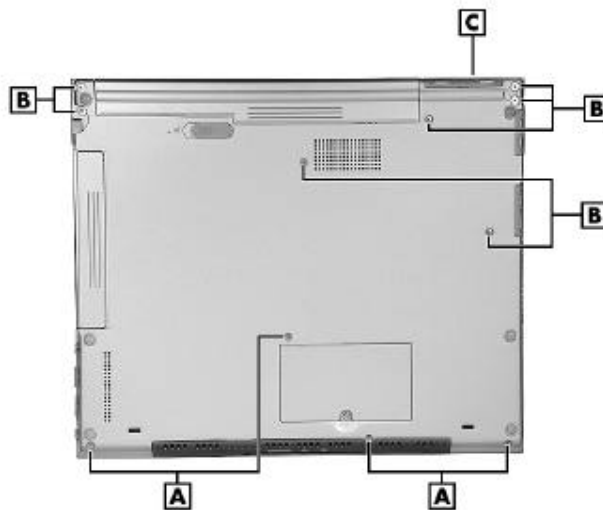


**A** – Front Cover Screws (4)                    **C** – LCD Panel Screw (on rear of notebook)
**B** – Top Cover and LCD Panel Screws (7)

**3.** Grasp the top and bottom of the notebook to hold it together, turn it over, and open the LCD panel as much as possible.

**4.** Remove the primary battery, keyboard, front cover and VersaGlide assembly, hard disk drive, and PC card assembly from the notebook.

**5.** Unplug the following top cover cables from the main board:

- control panel cable from P10 on the main board

- left and right speaker cables from P22 on the main board.

**6.** Locate and remove the eight screws securing the top cover assembly to the top of the notebook.

*Note*     Several different types and lengths of screws are used. As you remove the screws, note the screw type, length, and position. Use care to ensure that all screws are returned to their original positions.

*Removing the top cover assembly*
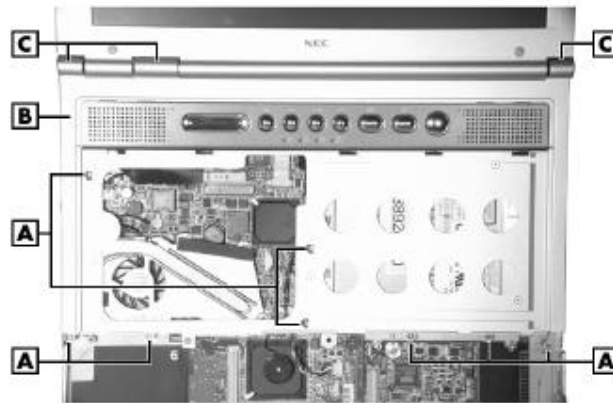


**A** – Top Cover Screws (8)      **C** – Hinge Covers
**B** – Top Cover

**7.** Grasp the top cover at the left and right sides, near the LCD panel hinge covers. Carefully pull up on the top cover to release it from the LCD panel. The cover fits tightly and requires a strong pull to release.

**8.** Remove the top cover assembly from the notebook.

### Speakers

Remove the left and right speakers from the top cover assembly as follows.

1. Remove the primary battery, keyboard, front cover and VersaGlide assembly, and top cover assembly from the notebook.

2. Locate the two speakers on the underside of the top cover assembly, one at each end.

3. Remove the screw and clamp fastening each speaker to the top cover assembly.

4. Lift up the cable end of the speaker and slide the speaker out of its clips.

5. Remove the speaker(s) from the notebook.

*Removing the speakers*
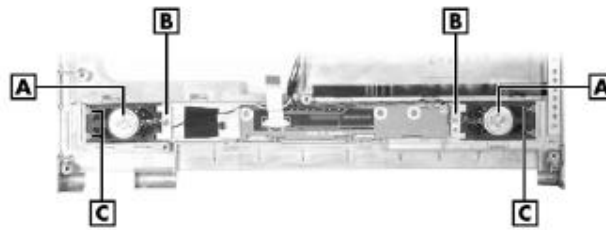


**A** – Speakers          **C** – Clips
**B** – Screws

## Switch Board

Remove the switch board from the top cover assembly as follows. The board contains notebook LEDS and buttons.

1. Remove the primary battery, keyboard, front cover and VersaGlide assembly, and top cover assembly from the system.

2. Locate and remove the three screws fastening the switch board to the underside of the top cover assembly.

*Removing the switch board*
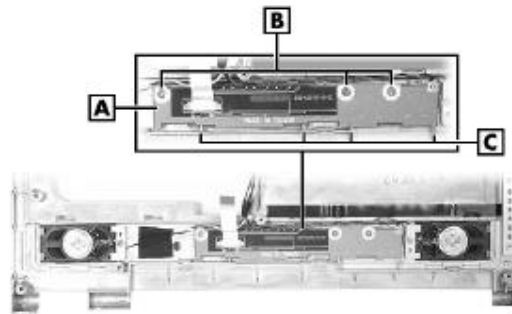


|     |     |
| --- | --- |
| **A** – Switch Board | **B** – Clips |
| **B** – Screws |     |

3. Slide the switch board out of its clips.

4. Remove the switch board from the notebook.

## LCD Panel

Remove the LCD panel as follows.

1. Remove the primary battery, keyboard, front cover and VersaGlide assembly, and top cover assembly from the system.

2. Unplug the following cables from the main board:

   - LCD panel interface cable from P5 on the main board
   - LCD panel microswitch cable from P24 on the main board.

3. Locate and remove the screw and cable bracket holding the interface cable in place. Note how the cable bracket holds the cable.

4. Locate and remove the four screws fastening the LCD panel to the system. Remove the LAN bracket.

5. Remove the LCD panel from the notebook.

*Removing the LCD panel*
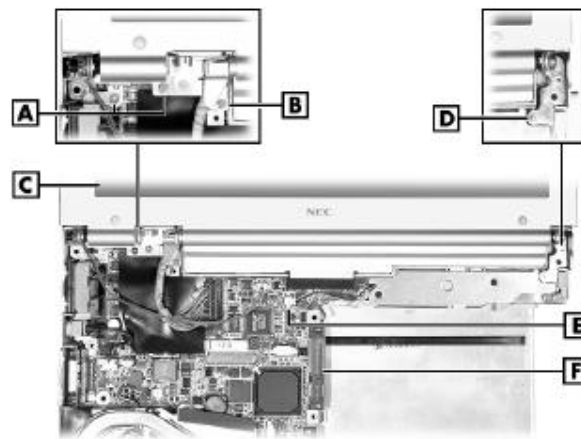


**A** – Left Screws (2)        **D** – Right Screw (1)
**B** – Cable Bracket Screw        **E** – Connector P24
**C** – LCD Panel        **F** – Connector P5

## Fan/Heat Plate Assembly

Remove the fan/heat plate assembly as follows.

**1.** Remove the primary battery, keyboard, front cover and VersaGlide assembly, and top cover assembly from the system.

**2.** Unplug the CPU fan cable from connector P17 on the main board.

**3.** Locate and remove the four screws securing the fan/heat plate assembly to the notebook. Remove any foam pads covering the screws.

**4.** Remove the fan/heat plate assembly from the notebook.

*Removing the fan/heat plate assembly*
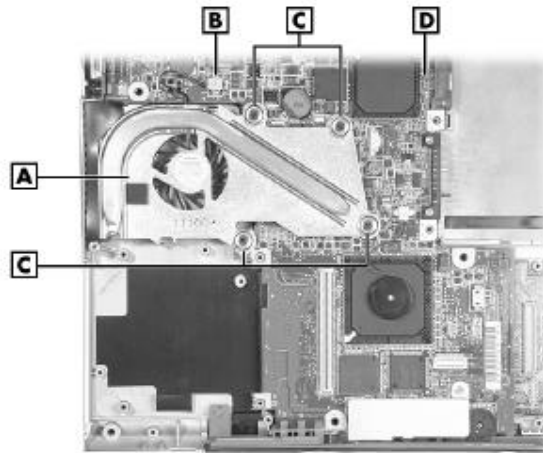
**A** – Fan/Heat Plate Assembly     **C** – Fan/Heat Plate Screws (4)
**B** – Connector P17     **D** – Main Board

### Main Board

Remove the main board as follows.

1. Remove the primary battery, CD-ROM drive (or other installed device), keyboard, front cover and VersaGlide assembly, top cover assembly, Bluetooth board and antenna board, LCD panel, and processor fan/heat plate assembly (removal optional) from the notebook.

2. Unplug the following cables from the main board:

   - VersaBay IV slot latch microswitch cable from P11 on the main board

   - power cable from P4 on the main board.

3. Locate and remove the two main board screws and the bracket screw that secure the main board to the notebook base.

*Removing the main board*
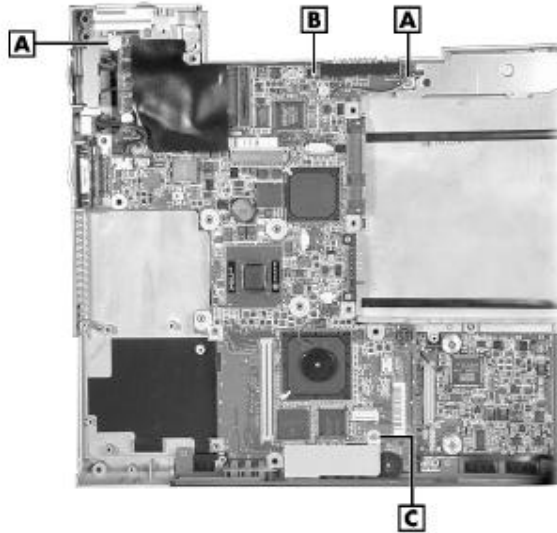


**A** – Main Board Screws (2)    **C** – Bracket Screw (1)
**B** – Main Board

4. Unplug the main board from connector P51 on the sound board, then lift the main board, starting at the right side first, then move the board away from the notebook to clear the audio connectors.

## Mini PCI Board

Remove the Mini PCI modem/network board (or modem board) as follows.

1. Remove the primary battery, CD-ROM drive (or other installed device), keyboard, front cover and VersaGlide assembly, top cover assembly, Bluetooth board and antenna, LCD panel, and main board from the system.

2. Turn the main board over and locate the network board.

3. Press outward on the two locking levers, one on each side of the board.

4. Pull the board out of its connector on the main board.

*Removing the network board*
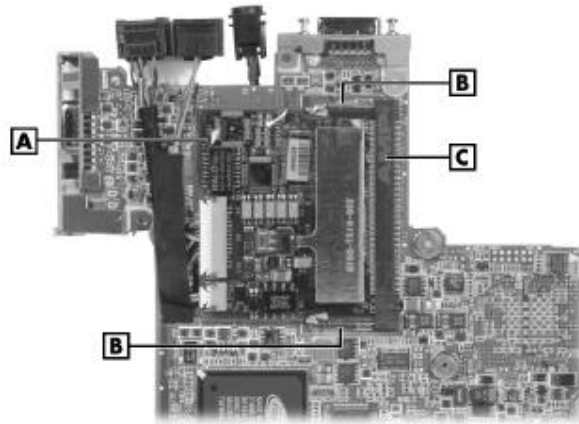


**A** – Mini PC Board        **C** – Connector
**B** – Locking Levers

### Sound Board

Remove the sound board as follows.

1. Remove the primary battery, CD-ROM drive (or other installed device), keyboard, front cover and VersaGlide assembly, top cover assembly, Bluetooth board and antenna, LCD panel, and main board from the notebook.

2. Locate the sound board on the right side.

3. Locate and remove the two screws and standoffs fastening the board to the notebook.

4. Remove the board from the notebook.

*Removing the sound board*
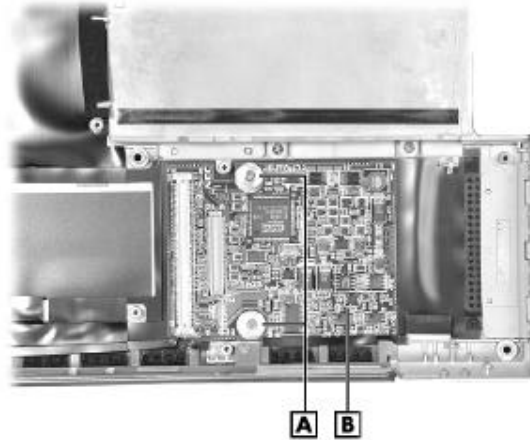


**A** – Screws with/Standoffs (2)     **B** – Sound Board

# Reassembly

Reassembly is the reverse of the disassembly process. Use care to ensure that all cables and screws are returned to their original positions.

# 4

# System Board Layout

- Bluetooth Board

- USB Board

- Switch Board

- Sound Board

- Main Board, Side 1

- Main Board, Side 2

- Mini-PCI Board

The following figures show the system boards and their connectors.

## Bluetooth Board

The optional Bluetooth™ board (G1ACR) is located under the PC card assembly in the system. Hard wired to the board is an antenna board (G1ABN). The following figure shows the Bluetooth and antenna boards.
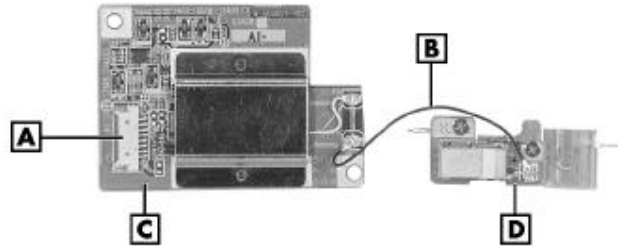


**A** – Main Board Cable Connector P1    **C** – Bluetooth Board
**B** – Antenna Board Cable (hard wired)    **D** – Antenna Board

## USB Board

The USB board (G1ACT 2/5) is located under the hard disk drive in the system. The following figure shows the board and its connectors and ports.
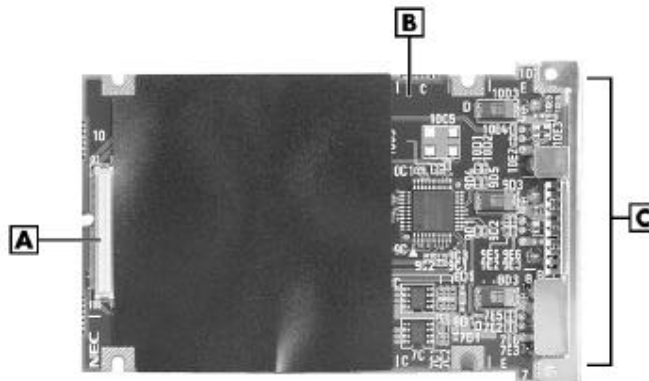


**A** – Sound Board Connector P56    **C** – USB Ports
**B** – USB Board

## Switch Board

The switch (LED and button) board (G1ACT 3/5) is located on the back side of the front cover assembly. The following figure shows the board and its connector.
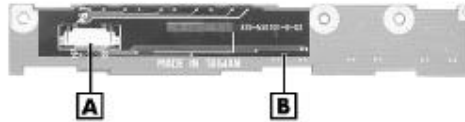


**A** – Main Board Cable Connector P61     **B** – Switch Board

## Sound Board

The sound board (G1ACT 1/5) is located under the USB board. The following figure shows the sound board and its connectors.
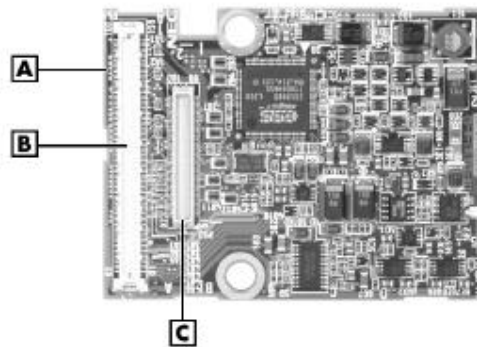


**A** – Sound Board                      **C** – USB Board Connector P52
**B** – Main Board Connector P51

## Main Board, Side 1

The main board (G1ABN) is located on the bottom of the unit frame. The following figure shows the processor side of the main board and the board's connectors.
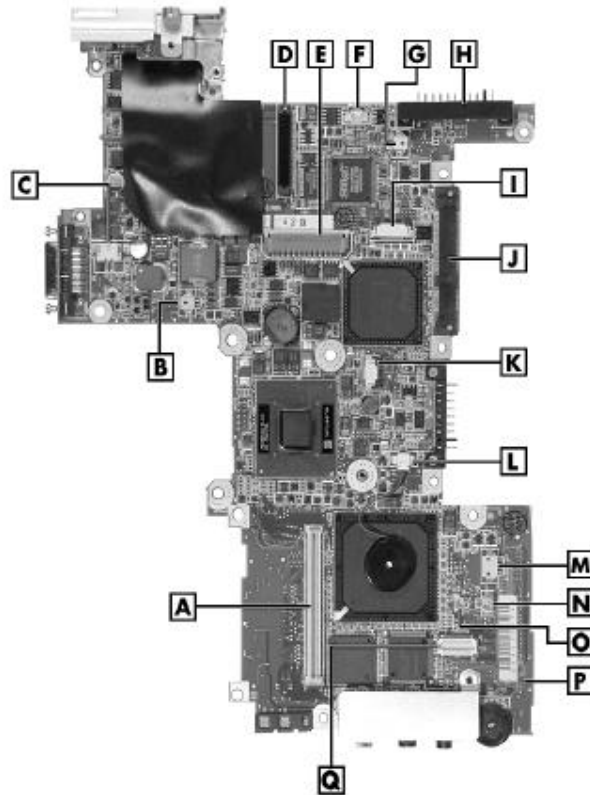


**A** – PC Card Assembly Connector P2
**B** – CPU Fan Connector P17
**C** – Power Port Connector P4
**D** – LCD Panel Interface Cable Connector P6
**E** – Keyboard Connector P19
**F** – LCD Panel Cable Connector P24
**G** – LCD Panel Microswitch Connector P11
**H** – Main Battery Connector
**I** – Control Panel Connector P10

**J** – VersaBay IV Connector P8
**K** – VersaGlide Connector P20
**L** – AGP Heat Sensor Connector P25
**M** – Speaker Cable Connector P22
**N** – LED Connector P26
**O** – CMOS Battery Connector P18
**P** – Sound Board Connector P12 (on side 2)
**Q** – Hard Disk Drive Connector P13

## Main Board, Side 2

The main board (G1ABN) is located on the bottom of the unit frame. The following figure shows the back side of the main board and its connectors.
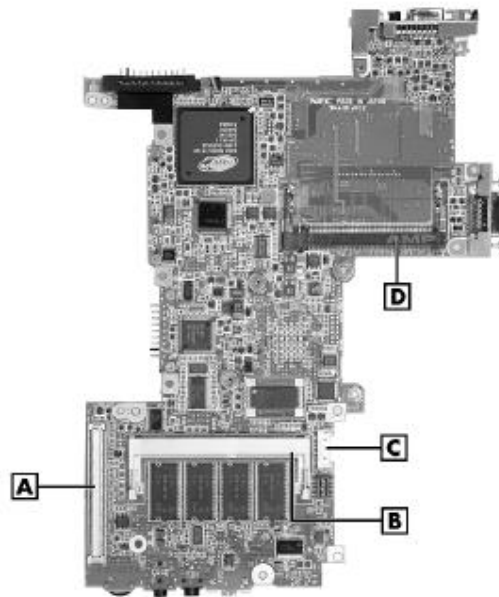


**A** – Sound Board Connector P12
**B** – SO-DIMM Memory Connector P1
**C** – Bluetooth Board Connector P28
**D** – Mini PCI Board Connector P3

## Mini PCI Board

Some systems come with a Mini PCI modem/network board or Mini PCI modem board located on the underside of the main board. The following figure shows the modem/network board and its connectors.
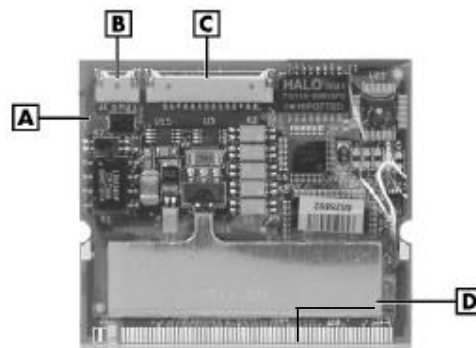


**A** – Modem/Network Board
**B** – RJ11 Connector J2
**C** – RJ45 Connector
**D** – Main Board Connector J1

# 5

# Preventive Maintenance

- Cleaning the Exterior
- Cleaning the Interior
- Protecting the Hard Disk Drive
- Maintaining the Primary Battery

This section contains general preventive maintenance information for cleaning the notebook case, LCD, and keyboard.

**⚠ WARNING** Unplug the AC adapter and remove the primary battery (and secondary battery, if installed) before performing maintenance. Voltage is present inside the notebook and LCD even after it is turned off.

## Cleaning the Exterior

Clean the exterior of the notebook as follows.

1. Power off the notebook, unplug all cables and peripherals connected to the notebook, and remove the primary battery and secondary battery (if installed).

**⚠ CAUTION** Never use harsh solutions, household cleaners, or spray cleaners that contain caustic materials. These cleaners are usually high in alkalinity which can cause the magnesium case to crack or discolour.

2. Wipe the outside of the notebook with a slightly damp, almost dry soft, clean cloth. Never use solvents or strong, abrasive cleaners on any part of the notebook.

3. Clean the LCD screen with a soft lint-free cloth or a screen wipe designed for that purpose.

4. Clean the keyboard with a slightly damp, almost dry soft, clean cloth. If necessary, use a small, soft-bristle brush to clean between the keys.

5. Periodically use a head-cleaning diskette in the USB diskette drive to prolong the life of the drive and to help maintain data integrity. Do not use abrasive head cleaning kits (kits without cleaning solution).

## Cleaning the Interior

Clean the interior of the notebook as follows.

1. Remove the front cover and VersaGlide assembly, keyboard, and top cover to access the interior of the notebook (see Chapter 3, "Disassembly and Reassembly" for procedures).

2. Dust or use a vacuum specifically designed for computer use (with a rubber-tipped nozzle) to clean inside the notebook, particularly the main board surface. Use care to avoid damaging or dislodging any components or cables.

3. Inspect all cables connectors for damage. Ensure that connectors are seated properly before replacing the removed assemblies.

## Protecting the Hard Disk Drive

To protect the hard drive and data, back up the drive periodically on diskettes, CD-RW discs, or a network drive.

Here are some maintenance procedures to use when servicing a hard drive.

■ Always back up the data files on the hard drive.

■ Run a virus detecting program to check for possible virus infected areas on the hard drive.

- Use the Microsoft Windows operating system ScanDisk program to correct any errors found in the directory and File Allocation Table (FAT). This also frees up space from any unused sectors.

- Never turn the notebook off when the hard drive is being accessed.

- Use a hard drive maintenance program like the Microsoft Windows operating system DEFRAG program to eliminate fragmentation and improve the hard drive access time.

## *Maintaining the Primary Battery*

Periodically inspect the primary battery terminals and the battery for evidence of corrosion and oxide build-up.

Observe the following precautions when handling the primary battery (and optional secondary battery, if used).

- Do not drop the battery or subject it to excessive shock and vibration.

- Do not expose the battery to direct sunlight, moisture, chemical compounds, or extreme heat.

- Do not disassemble the battery.

- Do not use the battery to power other devices.

- Never attempt to charge the battery in any way other than as described in this manual and the user's guide.

- Always charge the battery as soon as possible after a low battery indication.

# 6

# Troubleshooting

- Problem Checklist
- Startup Problems
- Diagnostics

This chapter provides information to help isolate and repair notebook computer malfunctions at the field level. The notebook computer has a built-in program that automatically checks its components when the notebook is powered on. If there is a problem, the notebook displays an error message. If this happens, follow any instructions on the screen.

If screen messages do not help or an error message does not appear, refer to the information in this section to help determine and correct the problem. For the more common problems, refer to "Problem Checklist" for assistance. If the information in the checklist does not help, refer to "Startup Problems" for additional help. See "Diagnostics" for more detailed problem solving.

If disassembly is required, see Section 3, "Disassembly and Reassembly." Jumper setting information is given in Section 2, "System Configuration."

## *Problem Checklist*

Check the items in the following list. If these items don't help, see the "Troubleshooting" table that follows the list.

**1.** Power is on to the notebook computer.

**2.** The electrical outlet to which the AC adapter is connected is working. Test the outlet by plugging in a lamp or other electrical device.

**3.** All cables are tightly connected.

**4.** The display setting is configured correctly.

**5.** The display's brightness control is adjusted properly.

**6.** If using battery power, check that the primary battery is properly inserted and fully charged.

### *Troubleshooting*

| Problem | What to Do |
| --- | --- |
| The notebook does not power on. | If you are operating the notebook with battery power, check that the primary battery is correctly inserted. Attach the AC adapter to recharge the battery. |
| | If you have the AC adapter attached, check that the electrical outlet you are using works. |
| LCD screen is dark and blank. | Power-saving mode has shut off the backlight. Recover by pressing any keyboard key. |
| | The built-in LCD may not be selected. Press **Fn-F3** once or twice. |
| | Screen brightness needs adjustment. Use the **Fn-F8** and **Fn-F9** keys. |
| | The notebook entered Standby mode due to low battery power. Use the power meter to check battery status. Plug in the AC adapter or replace the battery, and then press the power button to resume operation. |
| Battery power does not last long. | Use power-saving modes. |
| | Fully charge and fully discharge the battery several times to recondition it. |
| | Replace the battery. |

| Problem | What to Do |
|---|---|
| Information on the LCD screen is difficult to see. | Use the **Fn-F8** and **Fn-F**9 function keys to adjust the brightness control. |
| An optional component does not work. | Make sure the component is securely installed or connected. Verify that the parameter for the I/O port configuration is set correctly in Setup. |
| The power button does not resume the notebook from Standby mode. | If the notebook does not resume, it may have auto suspend suspended (Standby) on a low battery. Attach the AC adapter and try again. |
| | Check that the "System Switch" BIOS parameter is set to "Sleep." |
| The notebook does not auto-suspend (Standby). | A disk drive might be busy. Wait until the disk drive stops and try again. |
| | Check that Auto Play is disabled. |
| Upon resuming from a manual STF, the notebook displays the message "Following system component(s) changed since last suspend – Do you want to (B)oot or (P)ower down? | Power down the notebook and reseat the memory. If new memory was installed prior to manual STF, remove the new memory before resuming. |

# Startup Problems

The notebook displays an invalid configuration error message at power on and when there are the following conditions:

■   current configuration information doesn't match configuration information stored in Setup, such as when an internal option is added.

■   notebook loses configuration information.

If either condition is true, the notebook displays an invalid configuration information message.

To continue start-up procedures, press **F2** (or **F1** when prompted) and run the Setup utility to set current notebook parameters.

*Note*    When the notebook detects an error related to display devices, it cannot display on either the LCD or a CRT. The notebook computer warns you by beeping.

## POST Error Messages

The notebook computer has a built-in Power-On Self-Test (POST) checking program that automatically tests its components when you turn power on. If the notebook finds a problem during the POST, it displays an error message or emits a series of beep signals. If this happens, follow the instructions in the "POST Error Messages" table or the "Beep Code" table, as appropriate.

If an error message appears before the operating system starts, look up the error message in the following table and follow the instructions. If you see other error messages, the hardware might need repair.

## *Post Error Messages*

| Message | Resolution |
| --- | --- |
| Address line is short | Error in the address decoding circuitry on the main board. |
| C: Drive Error | Hard disk drive C: does not respond. Confirm that C: hard disk type in Setup is correct. |
| C: Drive Failure | Hard disk drive C: does not respond. Replace the hard disk drive. |
| Cache Memory Bad, Do Not Enable Cache | Cache memory is defective. It must be replaced. |
| CH-2 Timer Error | Most ISA computers include two timers. There is an error in timer 2. |
| CMOS Battery State Low | CMOS RAM is powered by a battery. The battery power is low. Connect the system to AC power to charge the CMOS battery. If the battery does not charge, replace the CMOS battery. |
| CMOS Checksum Failure | After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run Setup to reset the value. |
| CMOS System Options Not Set | The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup to reset the value. |
| CMOS Display Type Mismatch | The amount of memory on the main board is different than the amount in CMOS RAM. Run Setup to reset the value. |
| CMOS Time and Date Not Set | Run Setup to set the time and date. |
| Diskette Boot Failure | The boot diskette is corrupt. It cannot be used to boot the notebook. Use another boot disk and follow the on-screen instructions. |
| DMA Error | Error in the DMA controller. Replace the CMOS battery. |
| DMA#1 Error | Error in the first DMA channel. |
| DMA#2 Error | Error in the second DMA channel. |
| FDD Controller Failure | The BIOS cannot communicate with the floppy disk controller. Check all appropriate connections. |
| HDD Controller Failure | The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections. |
| INTR #1 Error | Interrupt channel 1 failed POST. |
| INTR #2 Error | Interrupt channel 2 failed POST. |
| Invalid Boot Diskette | The BIOS can read the diskette in the disk drive, but cannot boot the notebook computer. Use another boot diskette. |
| Keyboard is Locked Unlock It | The keyboard lock on the notebook is engaged. The notebook must be unlocked to continue. |
| Keyboard Error | There is a timing problem with the keyboard. Set the keyboard option in Setup to "Not Installed" to skip the keyboard POST routines. |
| KB/interface Error | There is an error in the keyboard connector. |

### Post Error Messages

| Message | Resolution |
|---|---|
| Off Board Parity Error | Parity error in an expansion slot. Check that the memory module is installed correctly.<br><br>The error format is:<br>OFF BOARD PARITY ERROR<br>ADDR(HEX) = (XXXX)<br>XXXX is the hex address where the error occurred. |
| On Board Parity Error | Parity error in main board memory. |
| Parity Error | Parity error in system memory at an unknown address. |

## Beep Codes

Fatal errors that occur during POST are communicated through a series of beeps. All beep code errors, except beep code 8, are fatal errors and do not allow the notebook to continue to boot.

If beep codes occur during POST, check the items in the Problem Checklist (at the start of this chapter), verify that all the hardware is set up properly and securely connected, and try rebooting. If you still get a beep code, go to the section "If You Need Assistance" at the end of this chapter.

Beep Codes are listed in the following table.

### Beep Codes

| Number of Beeps | Error | Description |
|---|---|---|
| 1 | Refresh Failure | The memory refresh circuitry on the main board is faulty. |
| 2 | Parity Error | Parity error in the first 64 KB of memory. |
| 3 | Base 64 KB Memory Failure | Memory failure in the first 64 KB. |
| 4 | Timer Not Operational | Memory failure in the first 64 KB of memory or Timer 1 on the main board is not functioning. |
| 5 | Processor Failure | The CPU on the main board generated an error. |
| 6 | Gate A20 Failure | The keyboard controller may be bad. The BIOS cannot switch to protected mode. |
| 7 | Processor Exception Interrupt Error | The CPU generated an exception interrupt. |
| 8 | Display Memory Read/Write Error | The system video adapter is either missing or its memory is faulty. (This is not a fatal error.) |
| 9 | ROM Checksum Error | The ROM checksum value does not match the value encoded in the BIOS. |

## Beep Codes

| Number of Beeps | Error | Description |
|---|---|---|
| 10 | CMOS Shutdown Register Read/Write Error | The shutdown register for CMOS RAM failed. |
| 11 | Cache Error/External Cache Bad | The external cache is faulty. |

# Diagnostics

This section summarizes problems that may develop during notebook operation and lists suggested corrective actions.

## Diagnostics

| Problem or Symptoms | Corrective Actions |
|---|---|
| No power | Check that the AC adapter is plugged into the power port of the notebook. Also, check that the AC adapter is plugged into a properly grounded AC power outlet. |
| | If using the main battery as the main power source, check if the battery is the correct type, charged properly, and is inserted correctly. |
| | Check that the power port cable is plugged into connector P4 on the main board. Otherwise, replace the main board. |
| Power LED is on but no display and notebook does not turn on | Check if the memory module is inserted properly. Also insert the module into the other slot. |
| | Check that the CPU is inserted properly. |
| | Replace the memory module, CPU, or main board. |
| Display on the LCD is unreadable | Adjust the brightness. |
| | Check if the installed driver is correct and resolution is set according to the LCD size and type. |
| | Check if the LCD panel is connected properly. |
| | Replace the main board. |
| LCD screen does not show display | Check if the power saving mode is activated. Press any key or press the power button to resume operation and display. |
| | Check if the display output is switched to the external monitor. |
| | Check if there is power. |
| | Check if the LCD panel is disconnected or loose. |
| | Replace the LCD panel. |

## Diagnostics

| Problem or Symptoms | Corrective Actions |
|---|---|
| Battery power does not last long | Make sure that the power management options under BIOS Setup are enabled and set properly. |
| | Recharge the battery pack for at 3 least hours before using. |
| | Discharge and recharge the battery twice. |
| | Replace the battery. |
| Notebook computer halts during boot sequence | Check condition of the selected bootload device (diskette or hard disk) for bad boot track or incorrect O/S files. |
| | Try booting from a new boot diskette and recopy or repartition the hard disk. |
| | Check for any BIOS error messages on the display. |
| | Replace the main board. |
| I/O processing malfunctions | Check the connections of all internal devices. |
| | Replace the main board. |
| USB diskette drive does not work | Check if the diskette drive option is set properly in BIOS Setup. |
| | Check if the diskette USB cable is connected properly. |
| | Check that the diskette is not faulty. |
| | Replace the USB diskette drive. |
| | Replace the USB board. |
| Hard disk drive malfunction | Check if the hard disk drive is set properly in BIOS Setup. |
| | Check that the hard disk drive interface cable is firmly connected to P13 on the main board and that the cable is firmly connected to the hard disk drive. |
| | Try reseating the interface cable to the main board and to the hard disk drive. |
| | Replace the hard drive. |
| | Replace the main board. |
| CD-ROM drive malfunction | Check if the drive is set properly in BIOS Setup. |
| | Check if the drive has the latest software driver (check the internet for the vendor's latest driver). |
| | Check the drive's jumper settings. |
| | Check if the drive power cable and signal cable are firmly plugged in. Try reseating the cables. |
| | Replace the drive. |
| | Replace the main board. |

## *Diagnostics*

| Problem or Symptoms | Corrective Actions |
| --- | --- |
| Memory malfunction | Check if the memory module is seated properly. |
| | Reseat the module. |
| | Replace the memory module. |
| | Replace the main board. |
| External keyboard or PS/2 mouse does not work | Check if the keyboard or mouse is connected properly. Power off the system first before plugging in the device. |
| | Check if the PS/2 mouse driver is installed properly. |
| | Replace the keyboard or mouse. |
| | Replace the main board. |
| PC card does not work | Check if the PC card is correctly inserted. |
| | Check that the PC card is the correct type. |
| | If the PC card is not detected, insert it in the other PC slot. |
| | Replace the PC card. |
| | Check the PC card software for malfunctions. |
| | Check if the PC card assembly is firmly plugged into P2 on the main board. Otherwise, replace the PC card assembly. |
| | Replace the main board. |
| VersaGlide does not work | Check if the PS/2 or Alps mouse driver is properly installed. |
| | Check if the VersaGlide cable is firmly connected to P20 on the main board. |
| | Replace the front panel and VersaGlide assembly. |
| | Replace the main board. |
| Serial device does not work | Check if the serial port is set to "Auto" in BIOS Setup. |
| | Check if the serial device is connected properly. |
| | Check if the mouse driver is installed properly. |
| | Replace the serial device. |
| | Replace the main board. |
| Parallel device does not work | Check if the parallel port is set to "Auto" in BIOS Setup. |
| | Check if all connections are properly set. |
| | Check if the external device is turned on. |
| | Check if the printer mode is set properly. |
| | Replace the main board. |

## *Diagnostics*

| Problem or Symptoms | Corrective Actions |
| --- | --- |
| Bluetooth does not work. | Check if Bluetooth is enabled in the BIOS Setup Advanced menu. |
| | Check if the Bluetooth driver is installed. |
| | Check if the Bluetooth board cable is firmly plugged into its connector on the board and P28 on the main board. |
| | Check that the hardwired cable between the Bluetooth board and antenna board is not broken. |
| | Replace the Bluetooth board and antenna board assembly. |
| | Replace the main board. |
| USB port does not work | Check if the USB controller in BIOS Setup is enabled. |
| | Check the USB device connection. Unplug and reseat the device. |
| | Check if the USB port driver and the USB device driver are installed. |
| | Replace the USB device or contact the USB device manufacturer for support. |
| | Replace the USB board. |
| Audio components do not work | Check that the external connections and the volume mixer are set properly. |
| | Check if the audio source (CD, tape, etc.) is faulty. |
| | Check if the audio driver is installed. |
| | Check if the internal connections for speaker and microphone are working. |
| | Check the sound board, cables, and connections. |
| | Replace the main board. |

# 7

# Specifications

- System Components
- Memory Map
- Interrupt Controllers

# System Components

The following system component specifications are standard except where noted.

## System Processor

Depending on the model:

Intel Celeron processor — 500-MHz

Intel Pentium III processor — 750-MHz, 700-MHz, 650-MHz, or 600-MHz (with Intel SpeedStep)

## Architecture

64-bit Peripheral Component Interconnect (PCI)

## Random Access Memory

■ Standard Main Memory

— Standard 64-MB RAM on the system board

— System supports a 64-MB, 128-MB, or 256-MB 144-pin, PC100 SO-DIMM in one SO-DIMM slot

— Supported configurations include

64-MB module plus the standard 64 MB, for a total of 128 MB

128-MB module plus the standard 64 MB, for a total of 192 MB

256-MB module plus the standard 64 MB, for a total of 320 MB

■ Video RAM — 8 MB SGRAM

■ Cache RAM —

— L1: 16KB code, 16KB data, 4 way set associate, write back (data)

— L2: 128KB built-in (Celeron) or 256KB built-in (Pentium III)

## Read-Only Memory

512 KB x 8 bit, Flash ROM

## Calendar Clock

Year/month/day/hour/minute/second maintained by internal back-up battery

## Input/Output (I/O) Facilities

Integrated industry-standard interfaces

■ Parallel/Serial — 1 dual-purpose port. 25-pin D-sub, IEEE 1284 compatible for printer support (ECP and EPP) via parallel transfer adapter cable. Serial device support via serial transfer adapter cable.

■ VGA — 1 port, 15-pin high-density D-sub

■ TV Out — 1 port, RCA x1 (via transfer cable)

■ USB — 3 ports, 4 pin  USB 1.1 standard

■ IEEE 1394 — 1 port, 1394 standard 6-pin 1394 bus

■ Dual Headphone and S/PDIF— 1 shared port

— 3-pin, Mini Pin Jack, .5 watts per channel

— S/PDIF fibre optic connection for input/output

- Microphone — 1 port, 3-pin, Mini Pin Jack
- DC In — 1 port, for AC adapter cable
- LAN — 1 port, for 10/100 Ethernet RJ-45 jack
- Modem — 1 port, 4-pin, RJ-11 modular jack

**PC Card Slots**
- Two 32-bit card slots for two Type II PC cards or one Type III PC card, 5 V or 3.3 V interface
- 32-bit CardBus support

**LCD Panel**
- 12.1-inch or high resolution active matrix Thin Film Transistor (TFT), Extended Graphics Array (XGA) colour display
- Resolution — 1024 x 768
- Colours — 16 million, max.

**Keyboard**

Membrane 83 keys (U.S. and International) with standard QWERTY-key layout (International keyboards are country-specific)
- Function keys — 12 keys
- Cursor Control keys — 8 keys; arrow keys arranged in inverted T layout
- Numeric keypad — Embedded
- Fn key — Function key for ROM-based key functions
- Stroke — 2.5 mm
- Height — 6 mm
- Pitch — 19 mm

**Speakers**

Two built-in, 1 watt (W) each with a maximum 3W output
- 16-bit stereo, 48 kHz
- Sound Blaster® PRO compatible
- MIDI Roland: MPU401, UART Mode compatible
- EV1983 Sound Blaster Audio PCI 64V or ESS Solo1 PCI AudioDrive™ + ESS 1946S

**External USB Floppy Diskette Drive**
- Standard USB interface including: USB-compatible protocol; support for standard USB operations such as configuration and reset
- Support for "hot-swapping" (connecting or disconnecting while system is powered on)
- Heads: 2
- Tracks: 80
- Encoding Method: MFM
- Size: 3.5-inch
- Capacity: 1.44 MB (formatted), 2 MB (unformatted)

*Specifications 7-3*

### Hard Disk Drive

Specifications vary depending upon model:

- Ultra DMA/66 support
- Capacity — Internal 10 or 20 GB
- Drive height — 9.5 mm
- Revolutions per minute — 4200

### 24X-speed CD-ROM Drive

- Type — 5-inch CD-ROM Pack
- Average Data Transfer Rates — 1545 KB/second to 3600 KB/second
- Burst Transfer Rate — 16.7 MB/sec, PIO mode4/DMA mode
- Average Access Time
  - 190 ms (Random)
  - 350 ms (Fullstroke)
- Interface — IDE (ATAPI)
- Photo CD™ Compatibility — Single Session/Multisession Photo CD, Video CD (CD-1, CD-I Ready, CD-G, CD-Plus, CD-DA, CD-EXTRN, and CD-ROM XA mode 2)

### CD Read/Write Drive

- Speed
  - Read, max 20X
  - CDRW, max 14X
  - Write, 8X (CD-R), 4X (CD-RW)
- Read Transfer Rate
  - 150 KB/s, normal speed
  - 3000 KB/s, 20X, maximum speed
  - 16.6 MB/s, Mode 4 PIO
  - 16.6 MB/s, Multi Mode 2 DMA mode (not Ultra DMA)
- Write Transfer Rate
  - 150 KB/s, normal speed
  - 300 KB/s, 2X speed
  - 600 KB/s, 4X speed
- Audio Out — 0.8 +/-0.25 Vrms
- Operating Conditions
  - Shock, 1G (11ms)/read, 0.5G (11ms)/write
  - Vibration, 0.2G/read, 0.1G/write

**8X DVD-ROM Drive**

- Burst Transfer Rate — 16.67 MB/sec, PIO/Multiword DMA

- Spin Up Time, 2.5s (DVD), 2.0s (CD)

- Read Rate

  — CD, 10.3X – 24X, approximately 5,100 rpm

  — DVD, 4X – 7.5X, approximately 1,200 – 2,000 rpm

- Access Time

  — Average random access, 100 ms (DVD), 95 ms (CD 24X)

  — Average random seek, 95 ms (DVD), 90 ms (CD 24X)

  — Full stroke, 160 ms (DVD), 160 ms (CD 24X)

- Data Buffer — 128 KB

- Interface — IDE (ATAPI)

- CD Compatibility — CD-DA, CD+G, CD MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I Bridge (Photo-CD, Video CD), CD-I, Multisession CD (Photo-CD, CD-Extra, CD-RW, CD-R), CD-R (read), CD-RW (read)

- DVD Compatibility — DVD-5, DVD-9, DVD-10, DVD-18, DVD-R (read, single border)

**DVD-ROM and CD Read/Write Combination Drive**

- Data capacity

  — DVD, 2,048 bytes/block

  — CD, 2048 bytes/block (mode 1), 2,336 bytes/block (mode 2)

- Rotational speed

  — DVD, 3,792 (2.5 – 6X CAV)

  — DVD-Video, 1,377-2,222 rpm (1.6X – 2.4X PCAV)

  — CD, 5,100 rpm (10.3 – 24X CAV)

  — CD-RW, 1,200 – 2000 rpm (4 – 5.7X PCAV)

  — Video-CD, 1,200 – 2000 rpm (4 – 5.7X PCAV)

  — CD-R/CD-RW (Write), 850 – 1,980 rpm (4X CLV)
  420 – 990 rpm (2X CLV)

- Sustained data transfer rate

  — DVD, 3,357 – 8,112 Kbytes/sec (2.5 – 6X CAV)

  — DVD-Video, 2,163 – 3,245 Kbytes/sec (1.6X – 2.4X PCAV)

  — CD, 1,552 – 3,600 Kbytes/sec, mode 1 (10.3X – 24X CAV)
  1,769 – 4,104 Kbytes/sec, mode 2 (10.3X – 24X CAV)

- Access time (typical)

  — Average random access, 120 ms (DVD), 110 ms (CD)

  — Average random seek, 115 ms (DVD), 105 ms (CD)

  — Average full stroke, 180 ms (DVD), 170 ms (CD)

- Spin up, 2.5s (DVD), 2.0s (CD)

- Data buffer, 2 MB

- Power Supply, +5V

- Dimensions (W x H x D)

  — 5.04 x .5 x 4.96 in.

  — 128 x 12.7 x 126.1 mm

- Weight .54 lbs. (0.246kg)

## Mini PCI LAN/Modem Card

- 10BASE-T and 100BASE-TX compatible

- IEEE 802.3 and IEEE 802.3u compliant

- 10/100 Mbps transmission rate

- 10/100M, LINK, and ACT diagnostic LEDs

- Some systems support Wake-On LAN

- V.90 data/V.17 fax soft, MMX optimized

- K56flex™ compatible

- SmartDAA™ technology

- V.80 synchronous access mode

## Power

AC Adapter

- Input Voltage — 100 to 240 volts (V) AC, 50 or 60 Hz, Maximum 2.8A

- Output Voltage — 15 V DC

- Australia, Europe and Asia use an AC power cable specific to each country's standards.

Batteries

- Primary battery

  — three-cell Li-Ion with output voltage of 11.1V, 1900 mAh

  — optional 15-cell extended life Li-Ion

- Secondary Battery — optional six-cell Li-Ion VersaBay IV with output voltage of 11.1V 3300mAh

- Battery life:

  — 10 hours at maximum configuration (15-cell extended life primary battery and six-cell secondary battery)

  — 3 days in Save-to-RAM mode.

Auto Adapter — Plug-in to automobile cigarette lighter (not available in U.S. and Canada)

**Dimensions**

- Width — 11.04 in. (283 mm)

- Depth — 9.3 in. (238.5 mm)

- Height

  — with standard primary battery 1.21 in. (31 mm)

  — with extended life battery 1.78 in. (45.6 mm)

**Weight**

3.64 lb to 4.03 lb. (1.65 kg to 1.83 kg) with the three-cell Li-Ion battery

**Recommended Environment**

Operation

- Temperature — 41°F to 95°F (5°C to 35°C)

- Relative Humidity — 20% to 80% (Noncondensing)

Storage

- Temperature — -4°F to 104°F (-20°C to 40°C)

- Relative Humidity — 20% to 80% (Noncondensing)

## Memory Map

The system supports system and video shadowing, both controlled through complementary metal oxide semiconductor (CMOS). The system supports BIOS as a cacheable area with write protection. The following table shows the system's memory map.

### System Memory Map

| Memory Space | Size | Function |
|---|---|---|
| 0000 0000h-0009 FFFFh | 640K | System/Application Memory |
| 000A 0000h-000B FFFFh | 128K | Video Buffer RAM |
| 000C 000h-000D FFFFh | 128K | Available for applications |
| 000E 0000h-000F FFFFh | 128K | Upper ROM, System and Video BIOS |
| 0010 0000h-09FF FFFFh | up to 160MB | Extended Memory |
| 000A 0000h-FFEF FFFFh | 128K | Video RAM Frame Buffer |
| FFF0 0000h-FFF7 FFFFh | 512K | 1MB Extended BIOS |
| FFF8 0000h-FFF9 FFFFh | 256K | New Extended BIOS |
| FFFA 0000h-FFFBFFFFh | 128K | Lower ROM, Power Management BIOS |
| FFFE 0000h-FFFF FFFFh | 128K | System BIOS (alias) |

## *Interrupt Controllers*

Using interrupts, hardware can request software services. If non-Plug and Play software is being used, the interrupt may need to be moved for software application or driver compatibility. Some interrupts cannot be moved. Fifteen interrupts can be used with a cascade connection of 8259INTC x 2. The table shows default interrupt level assignments 0 through 15, in order of decreasing priority.

| Priority | Name | Device |
|---|---|---|
| 0 | IRQ00 | Internal Timer 1 |
| 1 | IRQ01 | Keyboard |
| 2 | IRQ02 | INT from Controller 2 |
| 3 | IRQ08 | Real-time Clock |
| 4 | IRQ09 | Reserved for ACPI SCI |
| 5 | IRQ10 | PC Cardbus/LAN/Video/USB |
| 6 | IRQ11 | Available |
| 7 | IRQ12 | PS/2 Mouse/NEC VersaGlide |
| 8 | IRQ13 | Numeric Data Processor |
| 9 | IRQ14 | Hard Disk Controller 1 |
| 10 | IRQ15 | Not Used |
| 11 | IRQ03 or IRQ04 | |
| 12 | IRQ04 or IRQ03 | Available |
| 13 | IRQ05 or IRQ09 | Sound/Modem or PC CardBus |
| 14 | IRQ06 | Diskette Drive Controller |
| 15 | IRQ07 | Printer Port (LPT1) |

# Glossary

## A

**applications programs**
Software designed to perform specific functions, like solving business or mathematical problems.

**AC Adapter**
A device that connects an portable computer and an AC wall outlet to provide AC power for running the system or recharging the battery.

**AGP**
Advanced Graphics Port is an interface specification designed for the throughput demands of 3D graphics. AGP introduces a point-to-point channel allowing the graphics controller direct access to main memory, increases bandwidth to 266-MBps, and supports throughputs of 533-MBps and 1.07-GBps.

## B

**base RAM**
Area of system memory between 0 and 640 kilobytes available to the user for operating system and application programs.

**BIOS**
Basic Input Output System. A collection of primitive computer routines, usually burnt into ROM, that controls the real-time clock, keyboard, disk drives, video display, and other peripheral devices.

**bit**
Binary digit. The smallest unit of computer data.

**bits per second**
(bps) A unit of transmission. Also called baud rate.

**board**
Printed circuit board. Board onto which computer components are soldered and thin wires are printed to connect the components.

**boot**
To start up a computer. See cold boot and warm boot.

**bus**
An electronic circuit within a computer used for transmitting data or electrical power from one device to another.

**byte**
Group of eight contiguous bits.

## C

**clock**

Electronic timer used to synchronize computer operations.

**CMOS**

Complementary Metal Oxide Semiconductor. A chip that contains non-volatile memory in the . CMOS is backed up by an internal lithium battery that preserves clock/calendar data and system configuration parameters stored in CMOS.

**cold boot**

Process of starting up the computer by turning on the power. If power is already on, the process means to turn off the computer and turn it on again. A cold boot reinitializes all devices.

**crt**

Cathode-Ray Tube. A type of display screen used in desktop monitors. It forms the screen image using tiny dots called pixels. See also LCD.

**cursor**

A movable image on the display screen that indicates where the next entered data appears.

## D

**diskette**

A thin flexible platter coated with a magnetic material for storing information.

**diskette drive**

A magnetic drive that writes on and retrieves data from a diskette.

**DSTN**

Double-Scan Super-Twisted Nematic. A type of technology used in some LCD screen displays.

## E

**enhanced VGA**

A video interface that offers more colours or higher resolution than VGA.

**extended RAM**

The area of RAM above the first megabyte of memory in the system available for enhancing system performance.

## F

**function key**

The set of keys on the keyboard (usually F1 through F12) that let you get help and error message information or quickly select frequently used commands.

*2   Glossary*

## H

**hard disk**

A rigid magnetic storage device that provides fast access to stored data.

**hardware**

The electrical and mechanical parts from which a computer is made.

**hertz**

(Hz) A unit of frequency equal to one cycle per second.

**hot key**

Combination of two or three keys (such as **Ctrl-Alt-Del**) that you press simultaneously for a particular function.

## I

**input/output**

(I/O) The process of transferring data between the computer and external devices.

**IDE**

Intelligent Drive Electronics. A hard disk drive type that has controller electronics built into the drive and delivers high throughput.

**interface**

A connection that enables two devices to communicate.

**interrupt**

A special control signal from an I/O device that diverts the attention of the microprocessor from the program to a special address.

## K

**kilobyte**

(KB) 1024 bytes.

## L

**LAN**

Local Area Network.

**LCD**

Liquid Crystal Display. An LCD consists of a thin sandwich of two glass plates with sealed edges, containing nematic liquid-crystal material that forms the screen image.

**load**

To copy a program into the computer's memory from a storage device.

## M

**megabyte**
(MB) 1,048,576 bytes.

**memory**
Electronic storage area in a computer that retains information and programs. A computer has two types of memory — read-only memory (ROM) and random access memory (RAM).

**menu**
A video display of programs or options.

**microprocessor**
A semiconductor central processing unit that is the principal component of a microcomputer. Usually contained on a single chip that includes an arithmetic logic unit, control logic, and control-memory unit.

**mode**
A method of operation; for example, the system operates in either normal or power-saving modes.

**modem**
MOdulator-DEModulator. A device that links computers over a telephone line.

## N

**non-volatile memory**
Storage media that retains its data when system power is turned off. Non-volatile memory in the notebook is a complementary metal oxide semiconductor (CMOS) chip which is backed up by an internal battery. The backup battery preserves the clock/calendar data and system configuration parameters stored in CMOS. See volatile memory.

## O

**operating system**
Set of programs that manage the overall operation of the computer.

**overwrite**
Storing information at a location where information is already stored, thus destroying the original information.

## P

**page**
A type of message transmission in which a message is sent or received via modem to a paging device from a computer (with paging communications software) or telephone.

**parallel interface**
Interface that communicates eight bits at a time.

**parallel printer**
A printer with a parallel interface.

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**parameter**

A characteristic of a device or system.

**password**

A string of characters that the user must enter before the system allows access or system privileges.

**PCMCIA**

A credit card sized peripheral interface standard for portable devices. Types of PCMCIA cards currently offered by major vendors include fax/modems, LAN, storage cards, and wireless communications devices.

**peripheral**

Input or output device not under direct computer control. A printer is a peripheral device.

**pixels**

Picture elements. Tiny dots that make up a screen image.

**port**

Provides the means for an interface between the microprocessor and external devices. A cable connector is usually plugged into the port to attach the device to the computer.

**processor**

In a computer, a functional unit that interprets and executes instructions.

**prompt**

A special symbol indicating the beginning of an input line. Also a message that appears on the screen indicating that the user must take a certain action.


# Q

**QWERTY**

The QWERTY keyboard, designed in the 1800s for mechanical typewriters, refers to the first six keys (QWERTY) on the top row of letters on the standard keyboard.


# R

**RAM**

Random Access Memory. A storage device into which data is entered and from which data is retrieved in a nonsequential manner.

**read**

To extract data from a storage device such as a diskette.

**ROM**

Read-Only Memory. Memory in which stored data cannot be modified by the user except under special conditions.

**reset**

The process of returning a device to zero or to an initial or arbitrarily selected condition.

### resolution

The degree of screen image clarity. Video display resolution is determined by the number of pixels on the screen. Resolution is usually specified in pixels by scan lines, for example, 640 by 480. See pixels.

### RS-232C

Standard interface for serial devices.

## S

### scanner

An optical device that reads printed material and converts it to a computer screen image.

### serial interface

An interface that communicates information one bit at a time.

### serial printer

A printer with a serial interface.

### software

Programs that run on a computer, such as operating systems, word processors, and spreadsheets.

### super video graphics array (SVGA)

A colour bit-mapped graphics display standard, that provides a resolution of 1024x 768 with up to 256 colours displayed simultaneously.

### system board

The main printed circuit board inside the system unit into which other boards and major chip components, such as the system microprocessor, are connected.

## T

### TFT

Thin Film Transistor. A type of LCD colour screen that supports 256 colours and provides exceptional screen display.

## V

### VersaGlide

A small, touch-sensitive pad used as a pointing device on your notebook computer. With the VersaGlide, you can move your finger along the pad to move the cursor or simulate a mouse click by tapping the pad.

### VGA

Video Graphics Array. Graphics technology that supports up to 256 colours and a graphics resolution of 640 by 480 pixels.

### volatile memory

Storage media that loses its data when system power is turned off. Standard memory and memory that you add to the notebook are volatile memory. See non-volatile memory.

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## W

**warm boot**

Process of resetting the computer without turning off the power through keyboard input (pressing **Ctrl**, **Alt**, and **Del** keys simultaneously) or the reset button. The system returns to an initial or arbitrarily selected condition.

**write**

To record or store information to a storage device.

# Abbreviations

| | | | | |
|---|---|---|---|---|
| A | ampere | | EDO | extended data output |
| AC | alternating current | | EGA | Enhanced Graphics Adapter |
| AGP | Advanced Graphics Port | | EPP | enhanced parallel port |
| AT | advanced technology (IBM PC) | | EPROM | erasable and programmable ROM |
| BBS | Bulletin Board Service | | EVGA | Enhanced Video Graphics Array |
| BCD | binary-coded decimal | | F | Fahrenheit |
| BCU | BIOS Customized Utility | | FAX | facsimile transmission |
| BIOS | basic input/output system | | FCC | Federal Communications Commission |
| bit | binary digit | | FG | frame ground |
| BUU | BIOS Upgrade Utility | | FM | frequency modulation |
| bpi | bits per inch | | FP | fast page |
| bps | bits per second | | FRU | field-replaceable unit |
| C | capacitance | | GB | gigabyte |
| C | centigrade | | GND | ground |
| Cache | high-speed buffer storage | | HEX | hexadecimal |
| CAM | constantly addressable memory | | Hz | hertz |
| CAS | column address strobe | | IC | integrated circuit |
| CD-ROM | compact disk-ROM | | ID | identification |
| CG | character generator | | IDE | intelligent device electronics |
| CGA | Colour Graphics Adapter | | IDTR | interrupt descriptor table register |
| CGB | Colour Graphics Board | | in. | inch |
| CH | channel | | INTA | interrupt acknowledge |
| clk | clock | | IPB | illustrated parts breakdown |
| cm | centimetre | | IR | infrared |
| CMOS | complementary metal oxide semiconductor | | IRR | Interrupt Request register |
| | | | ISA | Industry Standard Architecture |
| COM | communication | | ISR | In Service register |
| CONT | contrast | | I/O | input/output |
| CPGA | ceramic pin grid array | | IPC | integrated peripheral controller |
| CPU | central processing unit | | ips | inches per second |
| DAC | digital-to-analogue converter | | IRQ | interrupt request |
| DACK | DMA acknowledge | | K | kilo (1024) |
| DC | direct current | | k | kilo (1000) |
| DIP | dual in-line package | | KB | kilobyte |
| DLAB | Divisor Latch Address bit | | kg | kilogram |
| DMA | direct memory access | | kHz | kilohertz |
| DMAC | DMA controller | | lb | pound |
| DOS | disk operating system | | LED | light-emitting diode |
| DRAM | dynamic RAM | | LCD | liquid crystal display |
| DVD | digital video disk | | LSB | least-significant bit |
| ECC | error checking and correction | | LSI | large-scale integration |
| ECP | enhanced capabilities port | | M | mega |

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| | | | | |
|---|---|---|---|---|
| mA | milliamps | | TTL | transistor/transistor logic |
| max | maximum | | tpi | tracks per inch |
| MB | megabyte | | USB | universal serial bus |
| MDA | Monochrome Display Adapter | | V | volt |
| MFM | modified frequency modulation | | Vac | volts, alternating current |
| MHz | megahertz | | Vdc | volts, direct current |
| mm | millimetre | | VESA | video electronics standards association |
| ms | millisecond | | VFC | VESA-compliant feature connector |
| MSB | most-significant bit | | VGA | Video Graphics Array |
| NC | not connected | | VRAM | video RAM |
| NMI | Non-maskable Interrupt | | W | watt |
| ns | nanosecond | | W | write |
| PAL | programmable array logic | | XGA | Extended Graphics Array |
| PCB | printed circuit board | | | |
| PCI | Peripheral Component Interconnect | | | |
| PDA | personal digital assistant | | | |
| PFP | plastic flat package | | | |
| PIO | parallel input/output | | | |
| pixel | picture element | | | |
| PLCC | plastic leaded chip carrier | | | |
| PLL | phase lock loop | | | |
| p-p | peak-to-peak | | | |
| PPI | programmable peripheral interface | | | |
| PROM | programmable ROM | | | |
| QFP | quad flat pack | | | |
| RAM | random-access memory | | | |
| RAMDAC | RAM digital-to-analogue converter | | | |
| RAS | row address strobe | | | |
| RGB | red green blue | | | |
| RGBI | red green blue intensity | | | |
| ROM | read-only memory | | | |
| rpm | revolutions per minute | | | |
| R | read | | | |
| RTC | real-time clock | | | |
| R/W | read/write | | | |
| S | slave | | | |
| SCSI | Small Computer System Interface | | | |
| SDRAM | synchronous dynamic random-access memory | | | |
| SG | signal ground | | | |
| SIMM | single inline memory module | | | |
| SPM | standard page mode | | | |
| SRS | Sound Retrieval System | | | |
| SVGA | Super Video Graphics Array | | | |
| SW | switch | | | |
| TFT | thin film transistor | | | |
| TSC | Technical Support Center | | | |

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