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Preface

This service and reference manual contains the technical information necessary to set up, and maintain the NEC Versa® 6000 Series notebook computer. It also provides hardware and interface information for users who need an overview of the system's design. The manual is written for NEC-trained customer engineers, system analysts, service center personnel, and dealers.

The manual is organized as follows:

Section 1 — Technical Information, provides an overview of the hardware and interface components. System specifications are listed including computer dimensions, weight, environment, safety compliance, power consumption, and system memory specifications.

Section 2 — Setup and Operation, takes the authorized service technician or dealer from unpacking to setup and operation. The section includes a description of operating controls, setting parameters and accessing the NEC bulletin board system (BBS).

Section 3 — Troubleshooting and Repair, includes troubleshooting procedures.

Section 4 — Field Service Guidelines, provides disassembly and assembly procedures, and an exploded-view diagram of the NEC Versa 6000 series system with part numbers.

Appendix A — Connector Locations and Pin Assignments, provides a list of the main board internal connector pin assignments and a list of external pin assignments.

Appendix B — Video Modes, lists NEC Versa 6000 supported video modes.

An **Index** is included for convenience.

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Abbreviations

A	ampere	DOS	disk operating system
AC	alternating current	DRAM	dynamic RAM
AT	advanced technology (IBM PC)	DTE	data terminal equipment
BBS	Bulletin Board System	ECC	error checking and correction
BCD	binary-coded decimal	EDS	error detecting system
BCU	BIOS Customized Utility	EGA	Enhanced Graphics Adapter
BIOS	basic input/output system	EMS	Expanded Memory Specification
bit	binary digit	EPP	enhanced parallel port
bpi	bits per inch	EPROM	erasable and programmable ROM
bps	bits per second	EVGA	Enhanced Video Graphics Array
BUU	BIOS Upgrade Utility	F	Fahrenheit
C	centigrade	FAX	facsimile transmission
Cache	high-speed buffer storage	FCC	Federal Communications Commission
CAM	constantly addressable memory	FG	frame ground
CAS	column address strobe	FM	frequency modulation
CD-ROM	compact disk-ROM	Fn	Function
CGA	Color Graphics Adapter	FRU	field-replaceable unit
CGB	Color Graphics Board	GB	gigabyte
CH	channel	GND	ground
clk	clock	HDD	hard diskdrive
cm	centimeter	HEX	hexadecimal
CMOS	complementary metal oxide semiconductor	HGA	Hercules Graphics Adapter
COM	communication	Hz	hertz
CONT	contrast	IC	integrated circuit
CPGA	ceramic pin grid array	ID	identification
CPU	central processing unit	IDE	intelligent device electronics
CRT	cathode-ray tube	IDTR	interrupt descriptor table register
DAC	digital-to-analog converter	IMR	Interrupt Mask register
DACK	DMA acknowledge	in.	inch
DC	direct current	INTA	interrupt acknowledge
DIP	dual in-line package	IPB	illustrated parts breakdown
DLAB	Divisor Latch Address bit		
DMA	direct memory access		
DMAC	DMA controller		

IRR	Interrupt Request register	PCB	printed circuit board
ISA	Industry Standard Architecture	PFP	plastic flat package
ISR	In Service register	PIO	parallel input/output
I/O	input/output	pixel	picture element
IPC	integrated peripheral controller	PJQFP	plastic J-lead quad flat pack
ips	inches per second	PLCC	plastic lead chip carrier
IRQ	interrupt request	PLL	phase lock loop
K	kilo (1024)	p-p	peak-to-peak
k	kilo (1000)	PPI	programmable peripheral interface
KB	kilobyte	PROM	programmable ROM
kg	kilogram	QFP	quad flat pack
kHz	kilohertz	RAM	random-access memory
kV	kilovolt	RAMDAC	RAM digital-to-analog
lb	pound	RAS	row address strobe
LDTR	local descriptor table register	RGB	red green blue
LED	light-emitting diode	RGBI	red green blue intensity
LSB	least-significant bit	ROM	read-only memory
LSI	large-scale integration	rpm	revolutions per minute
M	mega	R	read
mA	milliamps	RTC	real-time clock
max	maximum	R/W	read/write
MB	megabyte	S	slave
MDA	Monochrome Display Adapter	SCSI	Small Computer System Interface
MFM	modified frequency modulation	SDLC	Synchronous Data Link Control
Mhz	megahertz	SG	signal ground
mm	millimeter	SIMM	single inline memory module
ms	millisecond	SOIC	small outline integrated circuit
MSB	most-significant bit	SQFP	silver quad flat package
NASC	National Authorized Service Center	SVGA	Super Video Graphics Array
NC	not connected	SW	switch
NDP	numeric data processor	TAC	Technical Assistance Center
NMI	Non-maskable Interrupt	TCP	Thin chip package
ns	nanosecond	TQFP	Thin-quad flat package
NSRC	National Service Response Center	TSC	Technical Support Center
PAL	programmable array logic	TTL	transistor/transistor logic
PC	personal computer		

tpi	tracks per inch
UART	universal asynchronous receiver/transmitter
V	volt
Vdc	volts, direct current
VESA	video electronics standards association
VFO	variable frequency oscillator
VGA	Video Graphics Array
VLSI	very large-scale integration
VRAM	virtual RAM
W	watt
μf	microfarad
μPD	microprocessor
μs	microsecond
Ω	ohm

Section 1

Technical Information

The NEC Versa 6000 Series notebook computers are lightweight, compact, and fully IBM compatible. This section focuses on system features. Refer to the *NEC Versa 6000 Series User's Guide* for additional user information.

The NEC Versa 6000 Series notebook computers are available in the following models:

Table 1-1 Model Configurations

Configuration	NEC Versa 6000H	NEC Versa 6030H	NEC Versa 6030X
CPU	Pentium P54LM, 100 MHz	Pentium P54CSLM, 133 MHz	Pentium P54CSLM, 133 MHz
On-Board DRAM	16 MB	16 MB	16 MB
Video Memory	2 MB	2 MB	2 MB
Hard Disk Drive	1.08 GB	1.35 GB	1.44 GB
Color LCD	11.3" SVGA TFT Color Display	12.1" SVGA TFT Color Display	12.1" XGA TFT Color Display



Figure 1-1 NEC Versa 6000 Series Notebook

HARDWARE OVERVIEW—FRONT

Take a moment to become familiar with the location and function of controls located on the front of the system.

Liquid Crystal Display (LCD)

The LCD operates with the Chips & Technologies 65550 VGA controller. The controller supports Super VGA, uses a 64 bit accelerator and a PCI interface. The LCD also supports VESA timing.

Additional LCD panel features include built-in stereo speakers and a slide switch that adjusts screen brightness.

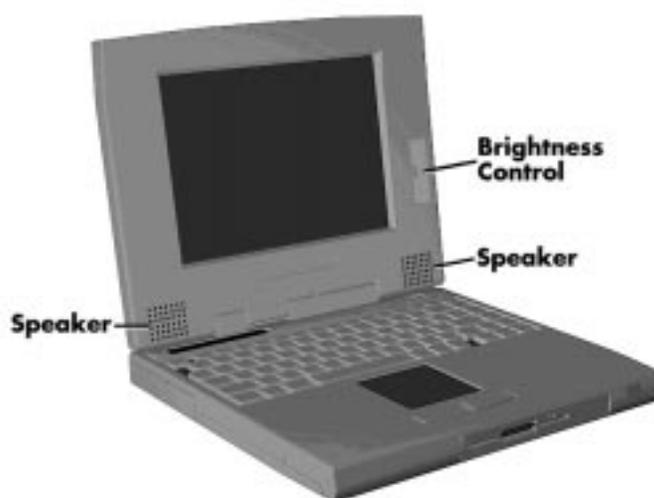


Figure 1-2 LCD Panel

The NEC Versa 6000 series computer features the following LCD types.

- 11.3-inch SVGA TFT — active matrix Thin Film Transistor (TFT), Cold Cathode Fluorescent Tube (CCFT), Super VGA (SVGA) backlit color LCD, 0.29 mm dot pitch, 18-bit digital interface, 800 x 600 resolution and 256,000 colors.
- 12.1-inch SVGA TFT — high resolution active matrix TFT, CCFT, SVGA, backlit color LCD, 0.306 mm dot pitch, 18-bit digital interface, 800 x 600 resolution, 256,000 colors.
- 12.1-inch Extended Graphics Array (XGA) TFT — high resolution active matrix XGA color LCD, 0.24 mm dot pitch, 18-bit digital interface, 1024 x 768 resolution, 256,000 colors.

In addition, the CRT port on the system's rear panel allows the user to connect an optional monochrome or color external display to the system. The computer supports the LCD and external display simultaneously.

Power-saving features for controlling the LCD's backlighting include the ROM-based hot key Fn F5, and Auto Setup power management settings. See Section 2, Setup and Operation, for information on using these settings. In addition, the automatic LCD status sense feature conserves the backlight. When the LCD is closed the backlight shuts off, saving battery power.

Power Button

Slide the power button to the right to power on and power off the computer. The power button is a "smart" switch, meaning that it recognizes when the system is in Suspend mode. If in Suspend mode, you cannot power off until you press the suspend button again to bring it out of Suspend mode.



Figure 1-3 Power Button Location

Status Bar and Power Indicator

The status bar is situated right below the LCD. It provides an easy way to detect system status. Different graphic icons will appear on the LCD bar indicating that a device is accessed, an operation performed, or a power mode is activated. The graphic icons displayed on the LCD bar resembles either their physical characteristics or their primary function.

Also found just on the upper rightmost of the LCD Status Bar is the Power LED Indicator which activates (green color) whenever the computer's power is on.

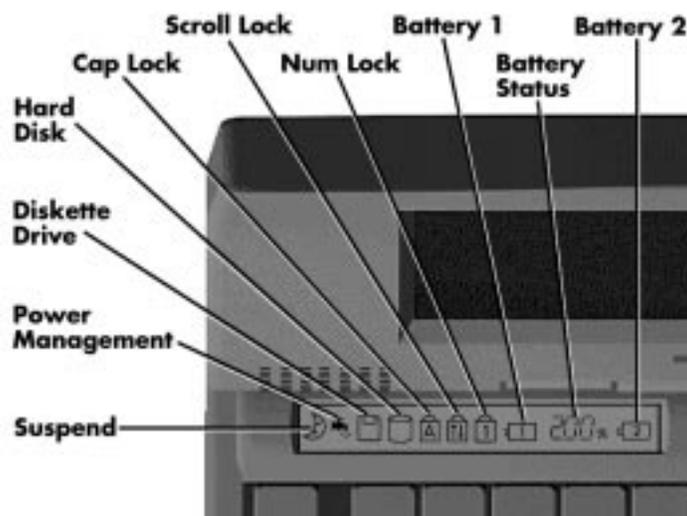


Figure 1-4 LCD Status Bar

Status Icons

The following list defines the status icons displayed in the system status bar.

- Suspend — appears when the system is in Suspend mode. Suspend mode conserves system power by shutting down devices in the system while retaining data and system status.
- Power Management — shows the current power management mode in use, including Off, Low, High or Custom.
- Diskette — appears when the NEC Versa writes data to or retrieves data from a diskette.
- Hard Disk — shows when the NEC Versa writes data to or retrieves data.
- Caps Lock — appears when caps lock is in effect.
- Scroll Lock — shows that scroll lock is in effect.
- Num Lock — appears when Num Lock mode is active.

- **Battery Status** — displays the percentage of battery power available.
 - Battery 1 appears when you have one or more batteries installed.
 - Battery 2 appears when you have an optional battery installed in the VersaBay II.

Keyboard

The built-in, 83-key keyboard (U.S) or 79-key keyboard (UK and Germany) uses the standard QWERTY format. The keyboard provides 12 function keys and 8 cursor control keys, with an Fn key for ROM-based key functions. The numeric keypad is embedded in the standard key layout.

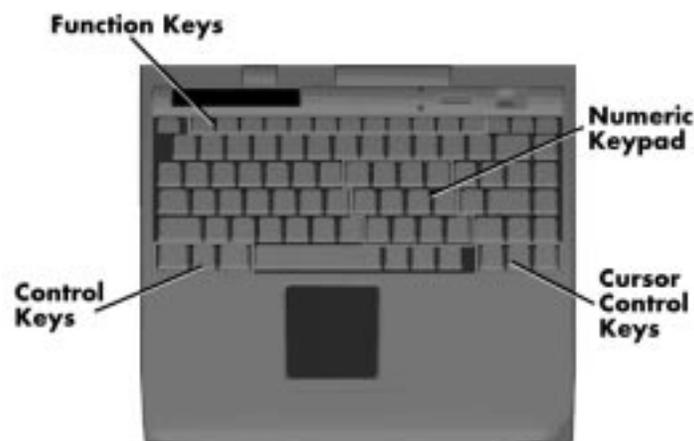


Figure 1-5 Keyboard Layout

NEC VersaGlide

The NEC VersaGlide is a built-in mechanism that functions as the system's mouse. It controls the on-screen pointer (cursor). To use the VersaGlide, move your finger across the NEC VersaGlide pad, and the cursor follows. The buttons on either side of the NEC VersaGlide allow the user to select or deselect menu items. Tap and double-tap are supported on the VersaGlide pad.

The NEC VersaGlide is the system's default pointing device unless a PS/2 mouse is installed. If an external mouse is installed, then the NEC VersaGlide is deactivated. A serial mouse is not supported.



Figure 1-6 VersaGlide Location

Diskette Drive and the NEC VersaBay II

A standard 1.44-MB diskette drive comes installed in the VersaBay II slot on the front of the system. The VersaBay II expansion slot allows the user to replace the standard diskette drive with a number of different NEC options including a CD-ROM reader, a second battery pack, or an additional hard disk drive using the release latches on the bottom of the unit.



Figure 1-7 NEC VersaBay II Location

Infrared (IR) Front Assembly

The front IR assembly is connected to the I/O board via connectors P7. The rear IR assembly is discussed later in this section.

The front IR assembly consists of a small board with infrared LEDs. The board allows the NEC Versa 6000 series computer to communicate with other infrared-ready computers. For example, the infrared ports allow the user to transfer files between the NEC Versa and an IR-equipped desktop, or print to an IR-equipped printer without using cables.

The computer ships with the rear IR assembly selected in Setup. If you need to use the front IR assembly, go into Setup to change the default setting to the front IR assembly. When the NEC Versa 6000 is docked to the optional NEC Versa Docking Station 6000, the rear IR assembly is automatically disabled, and the front enabled.



Figure 1-8 Front IR Assembly Location



Figure 1-9 Rear IR Assembly Location

HARDWARE OVERVIEW—RIGHT SIDE

Review the following section for a description of the hardware on the right side of the NEC Versa 6000.

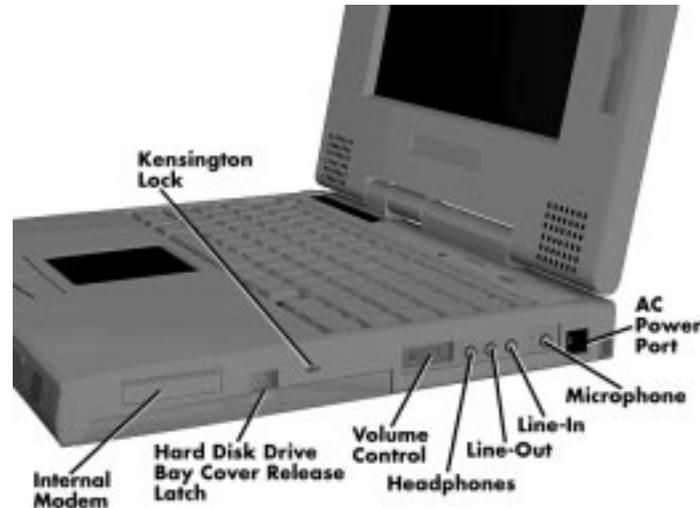


Figure 1-10 Right Side Features

- Modem — NEC includes a 28.8 Kbps fax/voice/data modem with speakerphone and answering machine support. Modem specifications are provided in the Specifications table at the end of this section.
- Hard Disk Drive Bay and Cover Release Latch — The hard disk drive bay contains the removable hard disk drive. Depending on the model, the system contains a 1-gigabyte (GB), 1.3-GB or 1.44-GB hard disk drive.

To access the hard disk drive, simply turn the system over and lift up the hard disk drive bay cover release latch while pushing the cover away from the system.

- Kensington Lock — Gives the user the option to add an optional Kensington Lock.
- Volume Control — Controls speaker volume.
- Headphones — Connects external headphones or speakers to the NEC Versa 6000. Plugging in headphones disables the built-in system speakers.
- Line-Out — Lets the NEC Versa 6000 act as an input source for another audio system. Connect this port to a Line-In port on another audio system to play or record.
- Line-In — Use a cable to connect to the Line-Out port on the other audio system to record or play.

- Microphone (MIC) — Connects an external microphone for monophonic recording or amplification through the unit. Plugging in an external microphone disables the built-in microphone.
- AC Power Port — Use the power jack to attach the NEC Versa to a DC power source, such as the AC adapter or the optional DC car adapter.

HARDWARE OVERVIEW—LEFT SIDE

Review the following section for a description of the hardware on the left side of the NEC Versa 6000.



Figure 1-11 Left Side Features

PC Card Slots

The PCMCIA slot compartment houses two card slots that support two PCMCIA Type II devices or one Type III device. For Type III cards, insert into the upper slot. Insert the card with the pin sockets facing towards the drive and the label facing up. To remove the PCMCIA card, push on the eject button to release the pin connections and slowly pull out the card.

The NEC Versa 6000 Series also comes with DOS/Windows PCMCIA drivers for supporting various PCMCIA cards like modem cards, network cards.

Battery Compartment

The battery compartment houses the rechargeable Lithium Ion (Li-Ion) battery pack. The battery pack instantly charges whenever you connect the AC adapter to the notebook. It is very important to always have the battery installed in the notebook to insure that it is continuously charged. If the battery pack is uninstalled for a long period of time, the battery cells are drained, causing battery pack to deteriorate.

HARDWARE OVERVIEW—REAR SIDE

Review the following section for a description of the hardware on the rear of the NEC Versa 6000.

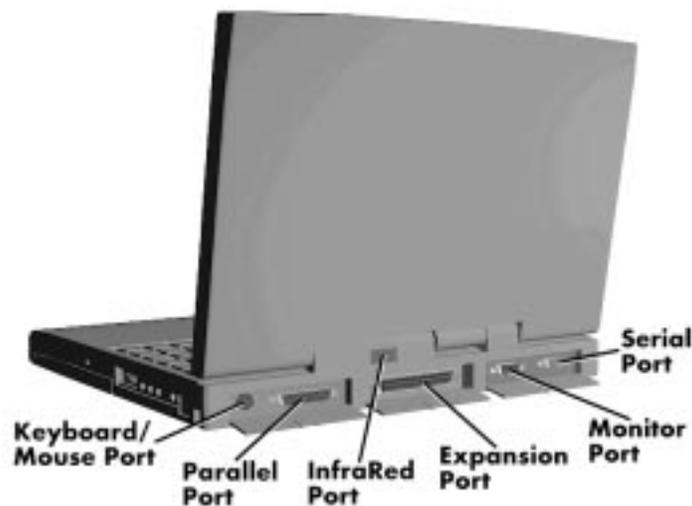


Figure 1-12 Rear Features

Keyboard/Mouse Port

Use the standard PS/2 port to connect an external PS/2-style mouse or a PS/2-style keyboard to the system. With an optional Y-cable adapter, you can connect both a mouse and a keyboard at the same time.

Parallel Port (LPT1)

The 25-pin printer port provides a parallel interface to which you can connect a parallel printer or pocket network adapter. Use this port to connect a parallel printer or other parallel device. The port is an Enhanced Parallel Port (EPP). The EPP standard provides you with a greater processing speed than the conventional parallel port. It also supports bi-directional and uni-directional protocols.

Rear Infrared Port

This port lets you transfer files between your NEC Versa and an IR-equipped desktop or notebook computer. You can also print to an IR-equipped printer without using cables.

The computer ships with the rear IR assembly selected in Setup. If you need to use the front IR assembly, go into Setup to change the default setting to the front IR assembly. When the NEC Versa 6000 is docked to the optional NEC Versa Docking Station 6000, the rear IR assembly is automatically disabled, and the front enabled.

Expansion Port

This port provides a connection for NEC Versa 6000 options including the NEC PortBar 6000 and NEC Versa Docking Station 6000.

Monitor (Video) Port

Use this 15-pin port to attach an external monitor to your NEC Versa. You can run the LCD display and the external monitor simultaneously or run either alone.

Serial Port (COM 1)

The 9-pin serial port provides a serial interface to which you can connect an RS-232C device such as external serial pointing device or modem.

HARDWARE OVERVIEW—INTERNAL COMPONENTS

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

Battery Pack

The system uses a rechargeable lithium-ion (Li-Ion) battery as its transient power source. The battery pack installs in the compartment next to the standard diskette drive on the bottom of the Versa 6000. The battery uses 14.4 volts with a 2600 mAh capacity.

The battery pack powers the NEC Versa 6000 for approximately 2 to 4 hours. In addition, the user detects how much battery power is available via the percentage displayed on the status bar.

When battery power is getting low, connect the AC adapter to a wall outlet and recharge the battery. It takes 2.5 to 7 hours to recharge the battery.

Hard Disk Drive

A standard 2.5-inch 1 GB, 1.35 GB or 1.44 GB hard disk drive ships with the system, (depending on the model). The drive is user-upgradeable to 1.44 GB. Or, using the Versa-Bay II slot, the system is upgradeable to 2.88 GB.

Diskette Drive

The interchangeable 3.5-inch 1.44 MB diskette drive installs in the front of the system in the VersaBay II slot.

6x CD-ROM Reader

The interchangeable six-speed CD-ROM reader features the latest in CD-ROM technology. It installs in the front of the system in the VersaBay II slot. The CD-ROM reader is assigned to the next available drive letter. The CD-ROM reader operates at different speeds depending on whether the CD in use contains data or music. This improves video and sound quality.

CPU Board

The (100 MHz or 133 MHz) CPU board (G8UUR, G8UURB) is an L-shaped board situated next to the audio ports. In addition to the CPU, this board houses the front and rear IR assemblies. It controls important functions including power management.

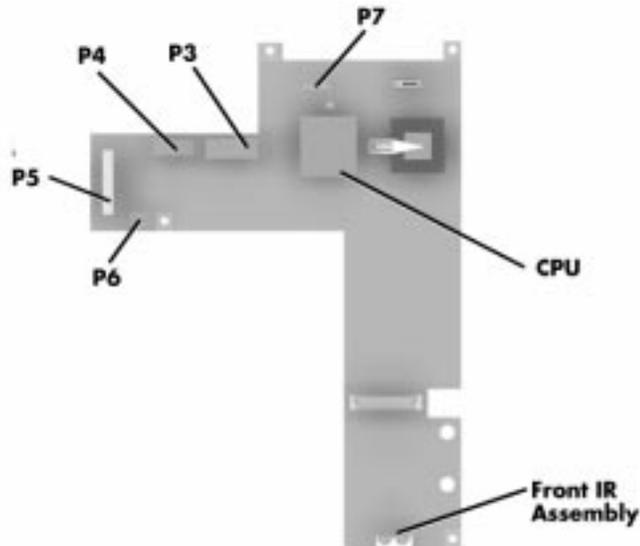


Figure 1-13 CPU Board Layout

Sound Board

The sound board (G8UUT) provides the NEC Versa 6000 series system with its audio capabilities via line-in/line-out jacks, and headphone/microphone jacks. It is situated on top of the I/O board.

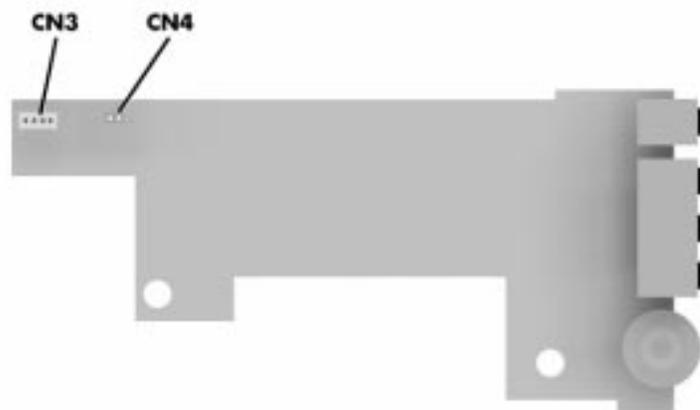


Figure 1-14 Sound Board Layout

I/O Board

The I/O board (G8WKP) contains peripheral subsystems including serial, parallel and video ports. It is located underneath the sound board.

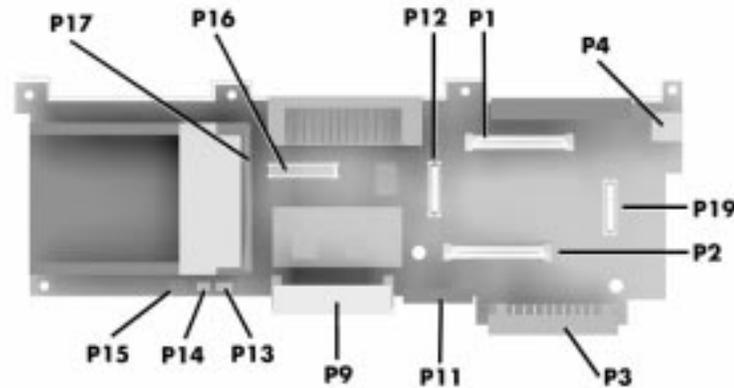


Figure 1-15 I/O Board layout

Modem Board

The 28.8 kilobytes per second (Kbps) data/fax/voice modem board attaches to the bottom of the CPU board via connectors P1 and P2. The internal modem transmits data at a rate of 28,000 bits-per-second, integrating built-in error control.

The modem provides one standard phone connector, and one cellular phone connector for transforming the notebook into a speakerphone. NEC provides two analog phone cables (one is a spare) for convenience.

The built-in modem is also cellular-capable. To use the computer's cellular phone connector, the user needs to purchase a cellular phone cable from a computer store. Supported cellular phones include:

- NEC P100 Series
- NEC P700 Series
- Motorola MicroTAC
- AT&T 3610.

1-16 Technical Information

CMOS Battery

The lithium battery (3.0 Volts, 280 mAh capacity) is attached to P13 on the CPU board. It provides battery backup and prevents data loss in the system's complementary metal oxide semiconductor (CMOS) RAM. This memory area contains information on the system's configuration like date, time, drives, and memory. The CMOS battery lasts approximately two years.

Bridge Battery

The bridge battery saves the memory contents and system status for up to 5 minutes while in Suspend mode. It is connected to the CPU board via connector P15. The AC adapter maintains voltage in the bridge battery when the system is powered on or off. The bridge battery provides 6 Volts, 60 mAh.

System Memory

The system board provides 16-MB of standard random access memory (RAM).

Optional memory boards with a value of 8-, 16-, 32- or 64MB can be added to increase system memory up to a maximum of 80-MB (70 ns Fast Page access). In addition, 256 KB of read-only memory (ROM), 1 x 28F020, enables the system BIOS to be flashed.

The system provides 2 MB of video RAM (60 ns HyperPage mode, self-refresh).

Cache RAM is available with L1 write-back access support providing 8 KB for code, 8 KB for data. L2 write-back access support providing 256 KB.

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. Table 1-2 lists the system's memory map.

Table 1-2 Memory Map

Memory Space	Size	Function
00000000h-0009FFFFh	640 KB	Base Memory
000A0000h-000AFFFFh	64 KB	Video Memory (graphics)
000B0000h-000B7FFFh	32 KB	Upper Memory Block (UMB)
000B8000h-000BFFFFh	32 KB	Video Memory (text)
000C0000h-000C9FFFh	40 KB	Video BIOS
000CA000h-000CFFFFh	24 KB	Upper Memory Block (UMB)
000D0000h-000DFFFFh	64 KB	PCMCIA Window (available as UMB in Windows '95)
000E0000h-000E7FFFh	32 KB	Upper Memory Block (option cards or UMB)
000E8000h-000EFFFFh	32 KB	Upper Memory Block (UMB only)
000F0000h-000FFFFFFh	64 KB	System BIOS ROM
00100000h-02FFFFFFh	47 MB	Extended Memory

SYSTEM VIDEO

The system's LCD operates using the Chips and Technologies 65550 VGA Controller. Video signals travel from the controller through the system's 15-pin D-SUB connector using 5 volts.

System video integrates a PCI-bus interface. The system ships with 2 MB Video RAM (VRAM). It also supports video modes up to 1024 x 768 with 256 colors in CRT mode.

See Appendix B for a list of Video modes.

PARALLEL INTERFACE

The system's parallel interface integrates National Semiconductor's PC87338 chip. It uses a 25-pin D-subconnector. The port is located on the system's rear panel.

The modes of operation available for a PC87338 chip are

- compatibility mode
- nibble mode
- byte mode

- Enhanced Capabilitied Port (ECP)
- Enhanced Parallel Port (EPP).

The user selects between three parallel interface modes using Auto Setup. These include unidirectional, bidirectional or enhanced. Unidirectional mode sends data output from the standard ISA port only. Bidirectional mode sends data using the standard ISA port or PS/2 technology. Enhanced mode enables high speed data transmission to occur using either the unidirectional or bidirectional modes.

The parallel port address is 378h and the interrupt level is IRQ07. Pin locations for the parallel interface are listed in Appendix A.

SERIAL INTERFACE

The RS-232C serial port is a 9-pin connector on the system's rear panel. The serial port consists of a 16550 compatible serial port controller with a programmable baud rate up to 115,200 bps. The serial port connects an RS-232C device or an external modem. The serial port address is 3F8h and the interrupt level is IRQ04.

NEC VERSA 6000 SERIES CHIP SET

Refer to Table 1-3 for a quick summary of the chip types used in the system. See the Abbreviations section at the beginning of this manual for a translation of chip technologies.

Table 1-3 NEC Versa 6000 Series Chip Types and Technologies

Chip	Manufacturer	Description	Technology
Intel Pentium P54LM	Intel	100-MHz CPU	320-pin TCP
Intel Pentium P54CSLM	Intel	133 MHz CPU	320-pin TCP
82438MX (MTDP)	Intel	M-Triton Data Path Controller	100-pin QFP
82437MX (MTSC)	Intel	M-Triton System Controller	208-pin SQFP
82371MX (MPIIX)	Intel	M-PCI IDE ISA Xcelerator	176-pin TQFP
N28F020-150	Intel	256k x 8 Flash ROM	32-pin PLCC
C&T 65550	Chips & Technologies	VGA Controller	208-pin FQFP
PC87338VLJ	National Semiconductor	Diskette Controller, IDE, Parallel Interface	100-pin QFP
M38813E4HP	Mitsubishi	Keyboard Controller	64-pin TQFP
PCI1130	Texas Instruments	PCMCIA Controller	208-pin VQFP
ViBRA 16S CT2504TCQ	Creative Technology	Sound Integrated Circuit	100-pin PQFP

Intel Pentium P54LM or P54CSLM

The 100 MHz, or 133 MHz Intel Pentium microprocessor used in the NEC Versa 6000 series computer is built on Intel's advanced 3.3V BiCMOS silicon technology. The CPU has on-chip dual-processing, a local multiprocessor interrupt controller, and power management features. NEC adopted the chip specifically for its pipelined Floating Point Unit (FPU), and local interrupt management.

M-Triton System Controller

NEC implements Intel's Mobile Triton technology for several of the notebook's subsystems including the DRAM controller, Second Level Cache Controller and PCI Bus interface. The Mobile Triton PCiset features include:

- hyper page mode DRAM support (7-3-3-3 Reads @ 66 Mhz, 32 MB expansion memory board only)
- direct mapped organization-write back policy
- fully synchronous 33 Mhz PCI bus interface.

256K X Flash ROM

The N28F020 flash ROM is a 32-pin, plastic lead chip carrier (PLCC). The chip allows easy updates to the system's BIOS if needed. More specifically, the ROM is flashed electronically, installing the latest BIOS revisions to the system. It is possible to reprogram the BIOS up to 100,000 times. See Section 2, Setup and Operation, for BIOS update procedures.

The N28F020 provides the system upgrade capability as well as the following:

- 256 KB memory
- Quick-Pulse Programming Algorithm
- 150 nanoseconds (ns) maximum access time
- ETOX Nonvolatile flash technology
- CMOS low power consumption

ROM BIOS

The system uses a Flash ROM known as the system's ROM BIOS to store machine language programs. The BIOS size is 256 KB, consisting of the system utility (PCMCIA, Auto Setup), system BIOS, video BIOS, and power management.

The BIOS programs execute the power-on self-test (POST), initialize CPU controllers, and interact with the LCD indicator panel, diskette drive, hard drive, communication devices and peripherals. The system BIOS also contains Auto Setup and provides VGA controller support. The ROM BIOS is copied into RAM (shadowing) for optimum performance.

The ROM BIOS contains both the system and video BIOS. The system BIOS is located in the upper portion of the device, video BIOS is located in the lower portion. System BIOS is located between F000h-FFFFh.

The BIOS often changes after the product release to provide enhanced features or bug fixes. To acquire the latest BIOS release, the ROM is flashed electronically allowing the BIOS update to occur without removing the ROM. See Section 2, Setup and Operation, for BIOS upgrade procedures.

VGA Controller

The Chips and Technologies 65550 integrates a flat panel CRT GUI accelerator and multimedia engine. The controller provides advanced power management that helps to minimize power usage in:

- normal operation
- Suspend mode
- panel off power saving modes.

Parallel Interface

The PC87338VLJ chip is a 100-pin Thin Quad Flat Plastic (TQFP) chip. The controller changes 8-bit parallel data into serial data and writes the data to the diskette. Conversely, the serial data is transmitted from the diskette into parallel data, where it remains until the read operation takes place.

Additional PC87338VLJ chip operations include:

- ISA compatibility
- low-power CMOS with enhanced power-down mode

Keyboard Controller

The keyboard controller (M38813E4HP) supports a PS/2-style keyboard, mouse and security features such as keyboard hot keys and password. Refer to Appendix A for keyboard interface connector pin assignments.

When data is written to the output buffer, the controller generates an interrupt, and requests the CPU to receive the data. The controller automatically adds an even parity bit to the data sent and waits for a response. The device must acknowledge that the data was successfully received by sending a response to the controller for each byte of data received.

PCMCIA Controller

The Texas Instruments PCI1130 controller interfaces with the PCI bus, PCMCIA card socket and configuration registers to provide:

- CardBus slots with hot insertion and removal
- independent Read and Write buffers for each direction
- burst transfers to maximize data throughput on the PCI CardBus bus.

Sound Integrated Circuit

The Creative Vibra™ 16S VLSI chip is a single combo chip. This dynamic audio circuitry provides the following:

- ISA 16-bit bus interface chip
- audio digital processor
- high performance 16-bit Sigma Delta Stereo Codec
- Sound Blaster™ 16 register compatible mixer with AGC
- built-in analog joystick quad timer.

Interrupt Controllers

Using interrupts, it is possible to change the system's code sequence. To change the sequence, reassign the interrupt-levels. Fifteen interrupts can be used with a cascade connection of 8259INTC x 2.

Interrupt-level assignments 0 through 15 are listed in Table 1-4, in order of decreasing priority.

Table 1-4 Interrupt Controllers

Controller Master/Slave	Priority	Name	Device
Master	1	IRQ00	Counter 0/Timer 1
Master	2	IRQ01	Keyboard
Master	3–10	IRQ02	INT output from controller 2
Slave	4	IRQ09	Infrared Port
Slave	5	IRQ10	Reserved
Slave	6	IRQ11	Reserved (PCMCIA)
Slave	7	IRQ12	PS/2 Mouse
Slave	8	IRQ13	Math Coprocessor (built into CPU)
Slave	9	IRQ14	Hard Disk Controller 1

Table 1-4 Interrupt Controllers

Controller Master/Slave	Priority	Name	Device
Slave	10	IRQ15	Reserved (2nd IDE on Docking Station or CardBus card)
Master	11	IRQ03	Internal Modem
Master	12	IRQ04	Serial Port 1
Master	13	IRQ05	Sound
Master	14	IRQ06	Diskette Drive Controller
Master	15	IRQ07	Parallel Port 1

POWER MANAGEMENT OVERVIEW

Power Management in the NEC Versa 6000 lets you conserve energy, save battery power, extend the life of your LCD backlight, and protect against data loss due to low battery power.

Set some features to function automatically or activate them manually with the keyboard or a button. It is wise to keep Power Management features enabled, even when using AC power.

The system arrives set up with many power-saving features already enabled. See the following table.

Table 1-5 Automatic Power-Saving Features

Device	Default Timeout	Comment
LCD backlight	2 minutes	Backlight turns off after there is no keyboard or VersaGlide input for the specified timeout.
Hard disk	30 seconds	Hard disk motor stops when hard disk is not accessed for specified timeout.
Standby	4 minutes	System enters Standby mode after total system inactivity.

You can change the timeout period for any of the devices using Setup. See Section 2 for Setup utility procedures.

The NEC PowerPanel Utility icon also allows you to change the timeout period for some of these devices. See Section 2, Setup and Operation for an overview of PowerPanel.

Use the **Fn F7** key combination to set the power management level. The faucet icon changes when the power management setting changes. You can toggle between Highest Performance, Longest Battery Life, Custom Power Management, and Off. Default values change depending on the type of power management you use.

NOTE: Some power management features are unavailable when an NEC docking station is connected.

System Power Management

The system power management consists of the following operation modes. These modes are:

- **Active Mode** — In active mode, the system uses maximum power. It operates with the default clock speed. The system continues to run at this speeds unless overwritten by the power management features.
- **Suspend Mode** — Suspend mode causes the CPU power down, local devices to shut down, and register values to be stored in RAM. System RAM is put into a slow refresh state.

The system resumes Active mode when you press the Suspend button, the system detects a modem ring, or the system is set to resume at a certain time of day. (The system will *not* resume Active mode if a PCMCIA modem detects a ring.) Suspend mode lets you save power without first saving the working data.

Press the Suspend button to enter Suspend 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** — The system switches automatically to Standby mode. This eliminates unnecessary power consumption when you operate the system on battery power or AC. Standby mode shuts down the LCD panel, providing privacy as well as power savings.

Local Power Management

Use Auto Setup to select one of four power management settings for local devices. These include Longest Battery Life, Highest Performance, Custom Setup, and Power Management Off. The power management levels are also available during AC operation. The NEC Versa 6000 computer ships with Longest Battery Life as the default power management setting. See Section 2 for specific procedures on using Auto Setup to select the power management settings.

When set to Longest Battery Life, CMOS will set local device timeout values, a local stand-by timeout value, and a suspend timeout value to ensure the longest battery life. The Highest Performance setting selects CMOS values that will provide minimal energy savings and a shorter battery life. The custom settings enable end-users to set the timeout values of their choice. The Power Management Off selection terminates all power management timers.

Local device timers in the system control power consumption in the LCD and Hard Disk Drive. Table 1-6 shows NEC Versa 6000 series Maximum Performance default power management timers.

Table 1-6 Maximum Performance Default Settings

Power Management Mode	Automatic Suspend	Hard Disk Timer	LCD Panel Timer
Longest Battery Life	10 minutes	30 seconds	2 minutes
Highest Performance	30 minutes	10 minutes	10 minutes
Custom	10 minutes	30 seconds	2 minutes

PLUG AND PLAY

The NEC Versa 6000 has a Plug and Play functionality. This means you can suspend the system, add an external keyboard, mouse, or monitor, and when you resume working, the NEC Versa 6000 recognizes the devices that have been connected to it. Similarly, you can remove external devices in Suspend mode and the NEC Versa 6000 detects the status when resumed.

SPECIFICATIONS

Table 1-7 provides a complete list of NEC Versa 6000 series system specifications.

Table 1-7 Specifications

Item	Specification
Chassis Configuration	
Size	Width: 11.69 in. (297 mm) Depth: 9.49 in. (240.5 mm) Height: 11.3-inch model, 2.17 in. (53.5 mm) 12.1-inch model, 2.23 in. (55.0 mm) Weight: 7.27 lb (3.30 kg) (Exact weight depends on options)
Keyboard	PS/2 compatible, 83-key standard (79-key for UK and Germany) (includes Fn Key for ROM-based functions)
Device Slots	Two PCMCIA slots that support up to two optional cards-oriented one on top of the other One 3 1/2-inch x 0.75-inch high slot, side access for standard hard disk drive One 3 1/2-inch x 0.75-inch high slot, front access, for standard 1.44 diskette drive One memory slot for optional memory card, located on bottom of system, in the hard disk drive bay
Power	100 to 240 Vac at 50 or 60 Hz Output Voltage — 18.5 V DC, 2.45 A (45.5 W)
Battery Pack	Weight — 0.86 lb (390 g) Voltage — 14.4 V Capacity — 2600 mA ^H Battery Life — Approximately 2 to 4 hours (depending on model and power management settings) Bridge Battery — Backs up memory contents up to 0.5 hour in Suspend mode

Table 1-7 Specifications

Item	Specification
Front Panel Controls	Power Button Suspend Button Brightness Control
LEDs	Power LED Battery Status LEDs
System Board	
CPU	Intel Pentium 100 MHz or 133 MHz with 256 KB L2 cache (write back, 8 nanoseconds (ns), 64-bit Peripheral Component Interconnect (PCI) bus architecture and built-in numeric coprocessor.
Clock Speed	100 MHz or 133 MHz
CPU Bus Speed	66 MHz
Flash ROM	256 KB: N28F020
Connector Support	Serial — 1 port, 9-pin D-sub Infrared — 2 ports, 1 on front of system; 1 on back, IrDA-1 compatible VGA — 1 port, 15-pin high-density D-sub External Keyboard/External Mouse — 1 port, PS/2, 6-pin MiniDin; exclusionary use or both supported with optional Y-adapter Expansion — 1 port, for optional NEC Docking Station 6000, optional PortBar 6000 Modem — 2-pin tip/ring connector, 9-pin cellular phone connector Mono MIC IN — 1 port, 3-pin, Mini Pin Jack Stereo Headphones — 1 port, 3-pin, Mini Pin Jack, .5 watts per channel Stereo Line-In — 1 port, 3-pin, Mini Pin Jack Stereo Line-Out — 1 port, 3-pin, Mini Pin Jack DC In — 1 port, for AC adapter cable PS/2 External Keyboard/Mouse Connector

Table 1-7 Specifications

Item	Specification
Memory	
System Memory	16 MB high-speed interleaved access, 70 ns
Optional	One memory slot in the hard disk drive bay, available for one additional memory card. Expandable in 8-MB, 16-MB, 32-MB, 64-MB Maximum 80 MB
Video RAM	2 MB
Video Interface (VGA)	
	11.3-inch active matrix Thin Film Transistor (TFT) CCFT Super VGA (SVGA) single-backlit color, 800 x 600 pixels resolution, 0.29 mm dot pitch, 256,000/18 bits colors NEC Versa 6030H
	12.1-inch high resolution active matrix Thin Film Transistor (TFT) CCFT Super VGA (SVGA) single-backlit color, 800 x 600 pixels resolution, 0.306 mm dot pitch, 256,000/18 bits colors NEC Versa 6030X
	12.1-inch high resolution active matrix Extended Graphics Array (XGA) color display, 1024 x 768 pixels, 0.24 mm dot pitch, 256,000/18 bits colors
Internal Device Support	
Diskette Drive	3 1/2-inch, 1.44-MB (thin-height)
Hard Disk Drives	IDE interface (built-in), 2 1/2-inch x 1-inch high (thin-height) System ships with the 1 GB, 1.35 GB or 1.44 GB hard disk drive
6x CD-ROM Reader	User-removable six speed CD-ROM reader, installs in VersaBay II slot.
Modem	V.34 internal 28.8 Kbps data/fax/voice modem, 28,000 bits per second transmission rate.
External Device Support	
CRT	Displays up to 1024 x 768 resolution x 256 colors
Mouse	PS/2-compatible mouse
Keyboard	Built-in 85/86-key keyboard with 12 programmable function keys, embedded numeric keypad and special function control keys, dedicated screen control keys, and inverted "T" cursor keys / IBM enhanced 101/102-key compatible keyboard

Table 1-7 Specifications

Item	Specification
Software	
Standard	MS-DOS® version 6.22 (also provided on diskette) Windows® for Workgroups version 3.11, or Window 95 WebScan VirusScan Official Airline Guide (OAG®) FaxWorks™ with Voice and Data Communications Netscape Navigator LapLink™ Traveling Software CompuServe, America Online (free trial access) VideoSaver MPEG Presentation Software SystemSoft PCMCIA Drivers with CardWizard
Recommended Environment	
Operation	Temperature: 41° to 104°F (5° to 35°C) Relative Humidity: 20% to 80% (No condensation)
Storage	Temperature: -4° to 104°F (-20° to 40°C) Relative Humidity: 20% to 80% (No condensation)
Administrative Compliance	U.S.: FCC, UL Canada: CSA, DOC Germany: VDE, TUV, CE Australia: AS for AC adapter only
Other Compliance	PC95 Compliance Energy Star VESA & PnP VESA PnP ISA

Section 2

Setup and Operation

This section provides setup and operation information for the NEC Versa 6000 series system (including cabling, power-on verification and using Auto Setup).

UNPACKING THE SYSTEM

Find an area away from devices that generate strong magnetic fields (electric motors, transformers, etc.). Place the shipping carton on a sturdy surface and carefully unpack the system. The carton contents include the system, AC adapter, AC power cord, battery, software diskettes, and user documentation.

HARDWARE SETUP

When connecting power and signal cables, do the following.

1. The power switch turns the system on or off. Slide the switch right to turn it on, slide the switch again to turn it off.
2. Connect the AC adapter cable to the power port on right side of your NEC Versa 6000.
3. Plug one end of the AC power cable into the AC adapter and the other end into a properly grounded 120- or 240-volt wall outlet.

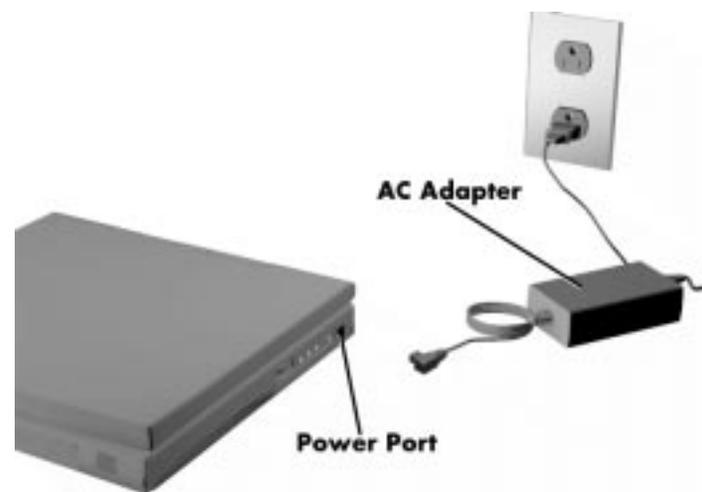


Figure 2-1 Connecting the AC Adapter

NOTE: Do not cover or place objects on the AC adapter. This will allow heat to dissipate properly.

4. Ensure that all connections are properly seated and secure.
5. Slide the power button to the right to power on the computer.



Figure 2-2 *Powering on the System*

NOTE: If operating the system on DC power, verify that the system has a charged battery pack installed.

Cable Connections

Figure 2-3 shows the external connectors for the system. Where appropriate, secure cables by tightening the cable holding screws.

Table 2-1 describes the I/O connectors on the rear of the system. For pin assignments, see Appendix A.

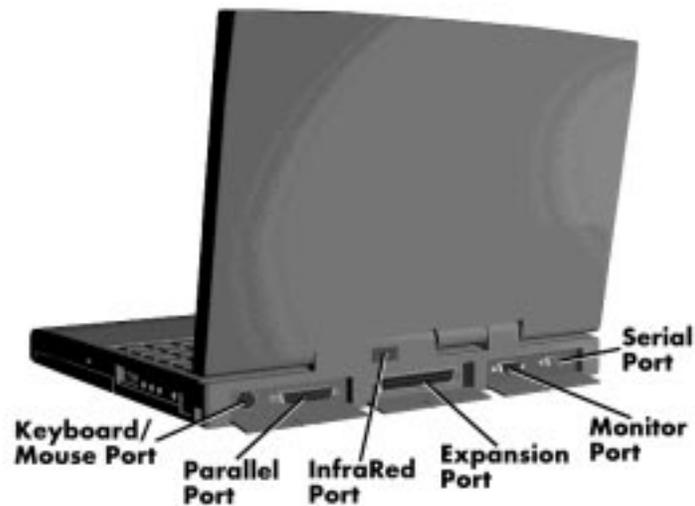


Figure 2-3 Power and I/O Connector Locations

Table 2-1 I/O Connector Descriptions

I/O Connector	Function
Keyboard/Mouse Port	Connects to a PS/2-style mouse, or a 101-key, external PS/2-style keyboard.
Enhanced Parallel Port	Connects to a 25-pin parallel printer.
IR Port	The infrared port allows the user to transfer files between the NEC Versa and an IR-equipped desktop, or print to an IR-equipped printer without using cables.
Expansion Connector	Provides a 75-pin connector to attach the optional NEC Docking Station 6000.
Monitor Port	Connects to a 15-pin external CRT.
Serial Port	Connects to an RS-232C device.

POWER SOURCES

The NEC Versa 6000 can be powered using three different sources, as follows:

- the AC adapter connected to an electrical wall outlet (using AC power)
- the battery pack or an optional second battery pack
- the optional DC adapter connected to a car cigarette lighter.

The following sections summarize the three different ways to power the computer.

Using the AC Adapter

Use the AC adapter and power cable that came with the NEC Versa 6000 to run the computer on alternating current (AC) power, or to recharge the battery pack. Use the AC adapter whenever a wall outlet is nearby.

Keep the adapter connected whenever possible. The AC adapter charges the battery whether or not you are using the NEC Versa.



Figure 2-4 NEC Versa 6000 AC Adapter

See the “Hardware Setup” earlier in this section for steps on connecting the AC adapter.

Using the Main Battery Pack

The NEC Versa 6000 comes with a rechargeable Lithium Ion (Li-Ion) battery pack. Battery power lasts for approximately two to four hours with power management features enabled. The battery pack is easy to install and remove.

The NEC Versa 6000 system integrates two tools to help the user keep track of the main (or an optional) battery's power level. These include the percentage LEDs described earlier, and the battery gauge in PowerPanel. Both detect how much battery power remains. See a discussion of PowerPanel at the end of this section.

When battery power is very low, the power LED flashes amber.

When battery power gets low, do either of the following:

- Press the suspend button to put the system in Suspend mode, remove the battery pack, and replace it with a fully charged Li-Ion battery.

- Leave the battery pack in the system and connect your NEC Versa to the AC adapter and a wall outlet. If you connect the system to AC power and continue to use it, the battery recharges in approximately 2.5 to 7 hours. If you connect the system to AC power and do not use it, the battery recharges in about 2 hours.

Customers can also buy an optional NEC Versa 6000 battery charger to quickly charge the battery. See the online *Options Catalog* for more information.

 **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 terminals to prevent causing a short circuit.
- Make sure the battery is properly installed in the battery bay.
- Read the precautions printed on the battery and in the online *Basics*.

Determining Battery Status

You can determine battery status via the battery icon in the status bar discussed earlier. If you have one battery pack installed, one battery icon appears. If you have two battery icons, two battery packs appear.

A blinking battery icon indicates that the battery is charging. A fast blinking battery icon occurs:

- when installing a new battery
- during unknown battery status
- when there is a problem with the battery.

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

- remove and then reinstall the battery.
- reinstall the battery in the NEC Versa and fully recharge the battery (to 100%).

The battery percentage icon blinks under the following conditions:

- when battery power is low, the number icon blinks.
- if battery power is extremely low, the number icon blinks rapidly.
- if the battery has been in storage for a long period of time.

When to Change 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 odor.

Battery Handling

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

- Use Li-Ion batteries only in the NEC Versa computer for which they are designed.
- Turn off power to the system after use. Keeping system 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 Pack

Replace the battery pack installed in your NEC Versa system as follows.

NOTE: Use Li-Ion batteries in the NEC Versa computer for which they are designed. Also, installing another manufacturer's battery, or using a combination of very old and new batteries can deteriorate battery and equipment performance.

1. Save your files, exit Windows, and press the Suspend button or turn off system power.
2. Close the LCD and turn the system over.
3. Release the battery cover latch and slide the battery bay cover away from the system.

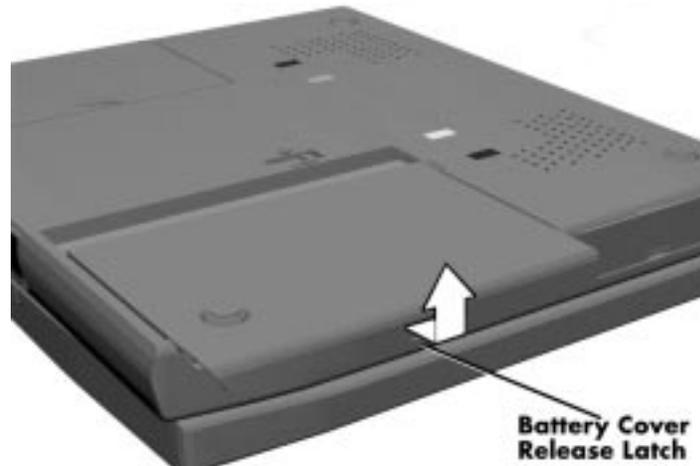


Figure 2-5 Removing the Cover

4. Place a finger in the notch on the battery and lift the battery out of the system.

WARNING: Always lift the battery out of the system by the notch. Failure to do so can damage the battery terminals.

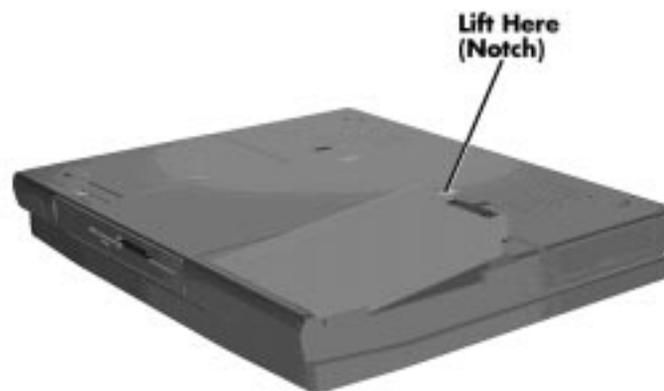


Figure 2-6 Removing the Battery

5. Insert the new battery as follows:

- Locate the grooves on the end of the battery.
- Lower the notched end of the battery into the battery compartment.

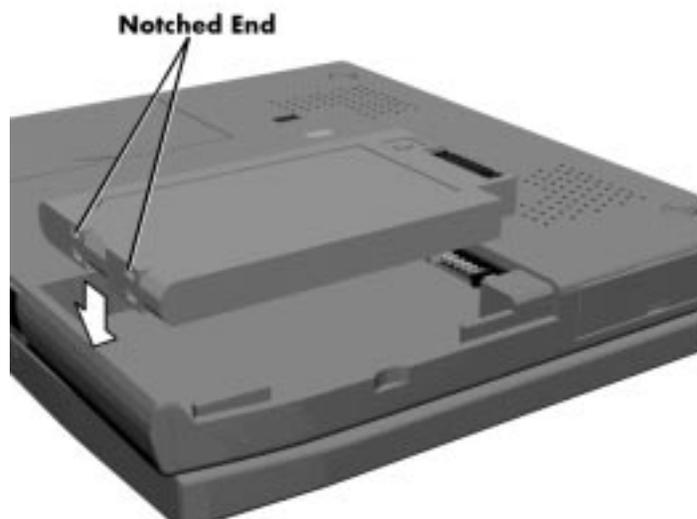


Figure 2-7 *Inserting the Battery Pack*

6. Replace the battery bay cover as follows:

- Align the tabs on the bay cover with the grooves on the system chassis.
- Lower the cover onto the bay and slide it into place.



Figure 2-8 *Replacing the Cover*

Battery Precautions

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

NOTE: 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 140° F (60°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 discolored, overheats, or emits a foul odor.
- Keep the battery dry and away from water.
- Keep metal objects away from battery terminals. Metal objects in contact with the terminals 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.

Recharging Battery Precautions

Adhere to the following precautions when recharging the Li-Ion battery.

- Use only the NEC battery charger designed for your NEC Versa battery type. Different NEC Versa models require different batteries and battery chargers.
- 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).

- Read the instructions that came with the battery charger before charging the battery.

NEC VersaBay II Battery and Adapter Kit

The NEC VersaBay II Battery and Adapter Kit provides a second lithium ion (Li-ION) battery and adapter to use in your NEC Versa 6000 computer. Inserting a second fully charged battery increases battery life approximately 4 to 8 hours.

See the online *Options Catalog* in the NEC Versa 6000 InfoCenter, for more information.

Extending Battery Life

While on the road, it is important to be aware of the simple things you can do to extend the life of the system's main battery. One way is to keep the LCD backlight setting to Standard instead of Full. You can toggle between these two settings by pressing the function keys, (Fn+F5). Or, slide the backlight control to a dimmer level.

Using the DC Car Adapter

Another way to power the NEC Versa 6000 is via car battery power using the optional DC car adapter. Connect the system to the optional DC car adapter as follows.

1. Disconnect the AC adapter from the system if connected.
2. Plug the appropriate end of the car DC adapter into the power port on the system.
3. Connect the plug of the DC car adapter to a car cigarette lighter.

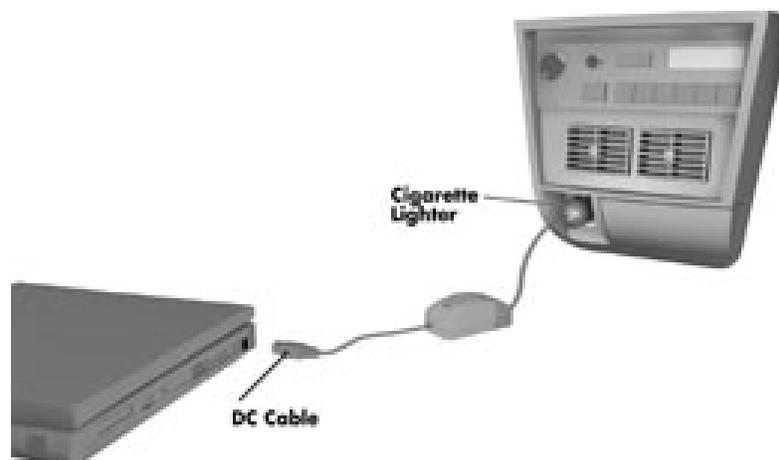


Figure 2-9 *Connecting the Car DC Adapter*

OPERATING CONTROLS

The following section describes system controls, the LEDs, and function keys.

Refer to Figure 2-10 and Figure 2-11 to locate system controls and switches. Table 2-2 describes the controls.

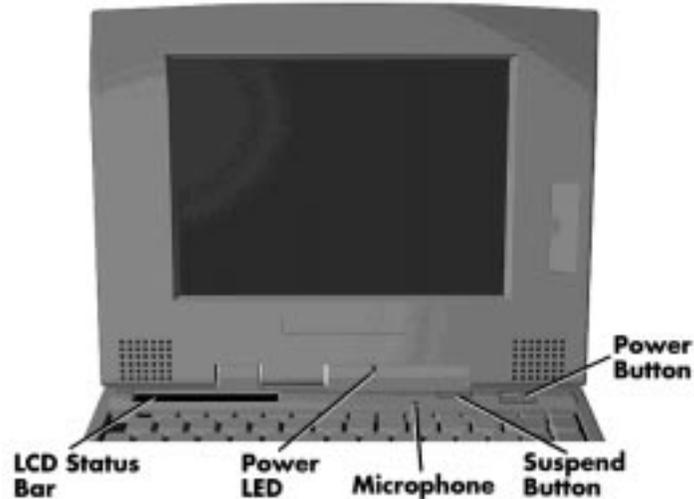


Figure 2-10 Keyboard Panel LEDs and Controls

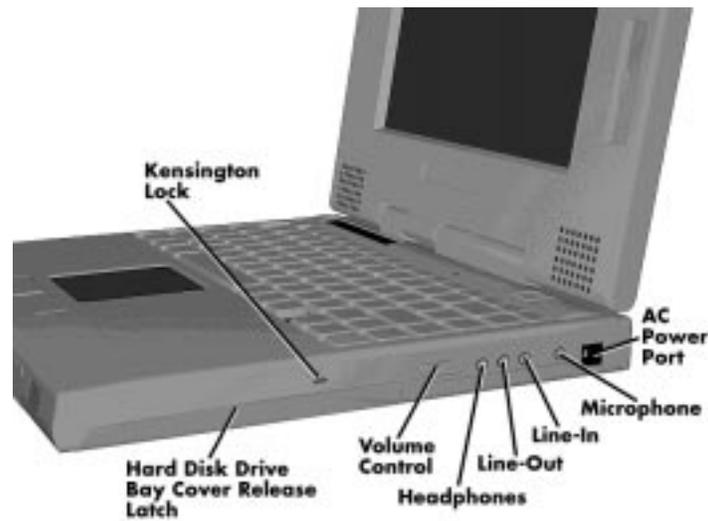


Figure 2-11 Right Side Panel Controls/Ports

Table 2-2 Control and Switch Functions

Control	Function
Status Bar	The status bar provides an easy way to detect system status. Different graphic icons appear on the LCD bar indicating that a device is accessed, an operation performed, or a power mode is activated.
Power LED	Lights green when the computer is accessed.
Suspend/Resume Button	Press the button for Suspend mode, press again to resume active mode.
Power Button	Turns the system on when pushed to the right. Turns the system off when pushed to the right again.
Hard Disk Drive Bay Release Latch	Lift latch to remove the hard disk drive installed in the system.
Kensington Lock	Enables the user to add an optional Kensington Lock to prevent unauthorized use of the computer.
Volume Control	Controls the speaker volume.
Headphones	Connects external headphones or speakers to the NEC Versa 6000. Plugging in headphones disables the built-in system speakers.
Line-Out	Connect this port to a Line-In port on another audio system to play or record.
Line-In	Use a cable to connect to the Line-Out port on the other audio system to record or play.
Microphone	Allows the user to record monophonic sound directly into the NEC Versa 6000 system.
AC Port	Use the power jack to attach the NEC Versa to a DC power source, such as the AC adapter or the optional DC car adapter.

Status Bar

The NEC Versa 6000 status bar is located in the upper left corner of the keyboard panel. Figure 2-12 shows the status bar.

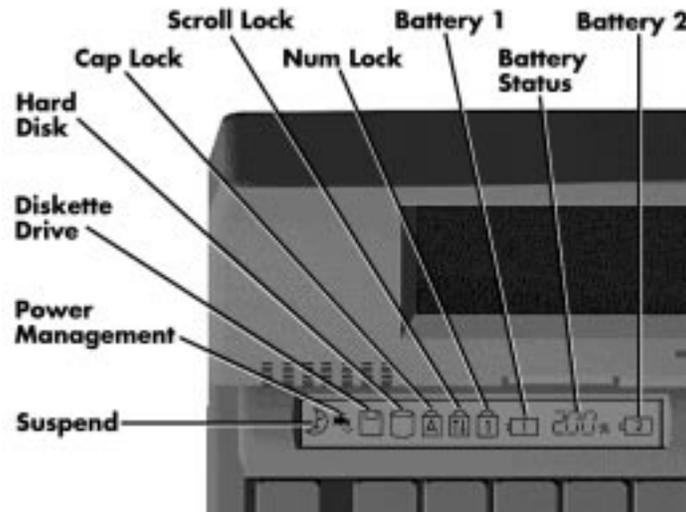


Figure 2-12 Status Bar Location

Status Icons

The NEC Versa 6000 uses eight icons to let the user determine system status, as follows.

- Suspend — appears when the system is in Suspend mode.
- Power Management — shows current power management mode.
- Diskette Drive — appears when the NEC Versa writes data to, or retrieves data from a diskette.
- Hard Disk — shows when the NEC Versa writes data to, or retrieves data from the system's hard disk.
- Caps Lock — appears when caps lock is used.
- Scroll Lock — indicates that scroll lock is used.
- Num Lock — indicates that Num lock is used.
- Battery Status — displays the percentage of battery power available.
 - Battery 1 appears when you have one or more batteries installed.
 - Battery 2 appears when you have an optional battery installed in the VersaBay II.

Function Keys (Fn Keys)

Function keys set specific system parameters and are built into the ROM. When using these keys, simultaneously press **Fn** and the corresponding function key. See Table 2-3 for a list of ROM-based hot keys. ROM-based hot keys change system parameters temporarily. Hot Key functions operate until the system is turned off or reset.

Table 2-3 FnKey Operations

Key	Function
Fn F2	Highlight, toggles the contrast between standard and full.
Fn F3	LCD/CRT, toggles between LCD and CRT modes.
Fn F5	Backlight, toggles the backlight between standard and full
Fn F6	Speaker Volume, turns speaker volume on/off.
Fn F7	Power Management (P/M), sets P/M levels to highest performance, longest battery life, custom values, or off.
Fn F12	Scroll/Lock On/Off

Smart Power Switch

Provides an automatic feature that prevents you from accidentally powering off the NEC Versa 6000, and losing your data while your system is in Suspend mode. The smart power switch senses that the system is in Suspend mode and prevents you from directly powering off the system when you press the power switch.

To power off the system from Suspend mode,

1. Press the Suspend/Resume button to make the system active.
2. Press the power button to turn off the system.

Dip Switch

A four-position dip switch is located next to the hard disk drive connector in the hard disk drive bay. The following lists each switch setting and its special function.

NOTE: Switch settings 3 and 4 are reserved for NEC factory use only.

- Switch 1, BIOS Flash Protection Switch — The default setting is “ON.” Change the setting to “OFF” when you update the system’s basic input/output system (or BIOS) flash memory. See “Updating the BIOS” next, to complete this procedure.

- Switch 2, Password Override Switch — The default setting is “OFF.” For example, if the customer forgets their password and cannot access data, change the setting to “ON” and your current password dissolves.

To enter a new password, reset the switch to “OFF,” and follow the instructions listed later in this section under “Setting an Initial Password.” You may want to keep this password in a special place so that you don’t forget it again!

- Switch 3 — Reserved for factory use.
- Switch 4 — Reserved for factory use.

Updating the System BIOS

Use the following steps to update the NEC Versa 6000 system BIOS with the BIOS Update diskette (BUD). Specifically, the BIOS is the code transmitted onto your system’s micro-processor, or central processing unit (CPU).

NOTE: You only need to update the BIOS if NEC makes significant improvements or fixes to the current system BIOS.

If you determine that the default BIOS needs an upgrade, to receive a copy of the BUD contact the NEC Versa Diskette Fulfillment Center at (800) 842-6446, or NEC Customer Service and Support (800) 632-4525, Fax (508) 635-4666, or the NEC Bulletin Board (508) 635-4706.

You should only use the BIOS upgrade diskette for the specific model.

1. Check that computer power is off. Turn the NEC Versa 6000 upside down with the front of the unit facing you.
2. Remove the hard disk drive.
3. Locate switch 1 on the four-position dip switch in the hard disk drive bay.



Figure 2-13 *Locating the Switch Settings*

4. Set the switch to “off” to enable BIOS reprogramming.
5. Replace the hard disk drive and the compartment cover.

Now you are ready to begin the actual update procedure using the following steps.

6. Make sure that power is off, and not docked. Insert the BIOS Update diskette into diskette drive A.
7. Power on the computer with the diskette in drive A. The computer boots and automatically loads the utility. A message similar to the following appears:

FLASH ROM EQUIPPED

WARNING: The BIOS Update Procedure
is about to begin, press ENTER to continue.
To abort, remove the diskette and reset the unit.

8. Press **Enter** to continue.

The utility checks the currently installed BIOS version and the diskette's BIOS version. The Main Menu appears.

9. Use the arrow keys to highlight the "Display BIOS Version" option on the Main Menu. Use this option to check the currently installed BIOS version and the version of the new replacement BIOS.

Press any key to return to the Main Menu.

10. Highlight the "Install New BIOS" option and press **Enter**.
11. Press **Y**, then press **Enter**. After a brief pause, a message appears telling you to remove the diskette in drive A.
12. Remove the diskette and press any key to continue. The utility updates the BIOS.

Power off your computer.

13. When the update is complete, reset the dip switch to the "on" position, and enter Setup to restore the default parameter settings.

POWER-ON SELF-TEST (POST)

Each time the system is powered on, the system checks the working status of components through an automatic power-on self-test (POST). The test checks the system configuration for any discrepancies. One beep means that POST is successful. If any problems in data transfer or hardware exist, an error message appears.

If the message is an Invalid Configuration message, press **F2** to enter the Setup utility. The system collects Setup data and lists the changes detected in the current parameter settings. Press **Enter** to review the settings, and make any necessary corrections. For more complete information, see "Using Setup to Select Parameters."

If no error messages appear but the system still malfunctions, check the items in the list below.

- The power switch for each peripheral is on.
- All cables and power cords are tightly connected.
- The electrical outlet is working.
- The brightness and contrast controls for the display are adjusted properly.
- All options have been properly installed.

NOTE: If the system parameters (date, time, options, etc.) have not been entered for the present configuration, enter them when you complete the setup procedures (see “System Parameters” in this section).

POST Errors

Error messages will appear during POST when configuration information does not match the settings stored in memory. Error message will also appear if the system loses the configuration information due to hardware failure.

Refer to Table 2-4 for a description of POST error messages.

Table 2-4 POST Error Messages

Message	Action
Diskette drive n failure	Drive n does not work or is improperly connected (drive n meaning either drive A or B). Check that drive n is securely connected and power is on. Press F2 to start Setup to check the diskette drive parameters. If a problem still exists, drive n might need repair.
Diskette read failure - press F2 to run Setup. Press any other key to retry boot.	Remove the diskette from drive A and press F2 to start the system from the hard disk. Or, insert a bootable disk in drive A and press F2 .
Non-system disk or disk error; replace and press any key when ready.	Remove the diskette from drive A and press any key to start the system from the hard disk.
No boot device available - press F2 to run Setup.	Press F2 , start Auto Setup and change the hard disk type to the correct setting. Exit and save Auto Setup.
Invalid configuration information - run Setup	One or more system configuration parameters are not properly set. Use Setup to set them correctly. Exit and save to update the parameters. Connect the AC adapter to charge the battery.
Real-time clock failure	Set time and date using Setup. Exit and save to update the parameters. Connect the AC adapter to charge the CMOS battery.
Time-of day not set - run Setup	Set time and date using Setup. Exit and save to update the parameters.
Fixed disk failure	Press F2 to start Setup. Exit and save to update the parameters. If a problem still exists, check if the drive is installed properly.
Fixed disk controller failure	Press F2 . Start Setup. Exit and save to update the parameters. The hard disk controller is inoperable and requires repair.
Keyboard clock line failure	The keyboard requires repair.

Table 4-2 POST Error Messages

Message	Action
Keyboard data line failure	The keyboard requires repair.
Keyboard controller failure	The keyboard requires repair.
Keyboard stuck key failure	A key is jammed. Remove any objects interfering with data entry. If the message remains, the keyboard requires repair.

NOTE: If a display related error occurs it is indicated by beeps. Display related errors usually require a system board replacement.

SETUP UTILITY

The Setup utility is a ROM-based program. It is functional when enabled (factory default). Setup automatically detects current system parameters during the power-on self-test (POST), described in the previous section. It also provides the following functions:

- sets date and time
- signals any hardware discrepancies during POST via error messages
- verifies that any optional memory that you installed was installed correctly
- integrates security features.

Setup also includes security features that protect your system from unauthorized use.

Accessing Setup

To access Setup, press **F2** at the power-on prompt

With an Error at POST

You will need to use the Setup utility if the system detects an error during POST, it prompts you with double beep sound and a message: "Press <F2> to resume, <F2> for Setup". If you press F2, POST continues. If you want to fix the error, carefully read the error message that appears above the prompt, and press **F2**. After you press **F2**, the system displays the Setup Main menu.

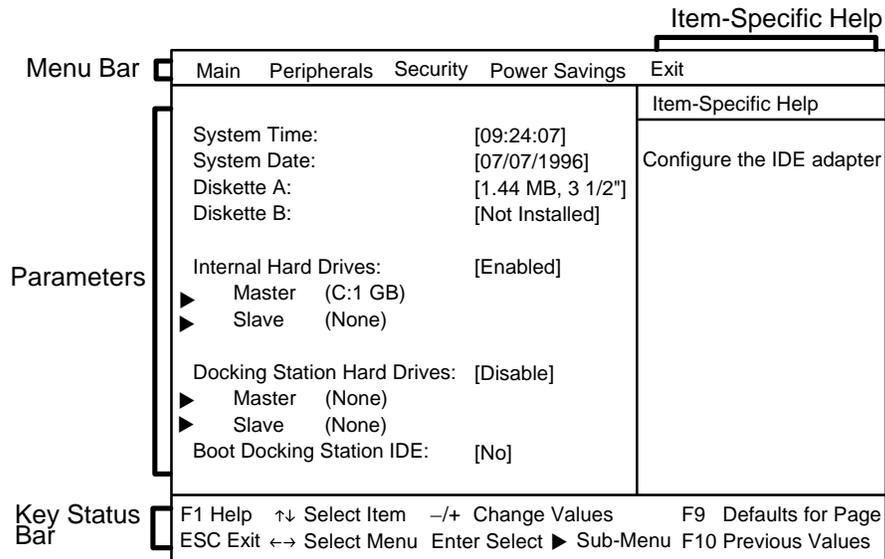
With No Errors at POST

To enter Setup when no error message is displayed during POST, press **F2** when the prompt appears.

After you press **F2**, the system displays the Setup Main screen. The main screen displays the current hardware parameters of your computer.

Setup Screen

The Setup menu has four areas as shown next.



- **Menu Bar**
The top line of the screen. Each of the five selections displays its own screen.
- **Parameters**
The left part of the screen. This area lists parameters and their current settings
- **Item-Specific Help**
The right part of the screen. This area describes each parameter and its available settings.
- **Key Status Bar**
The bottom part of the screen. These lines display the keys available to move the cursor, select a particular function, and so forth.

Setup Keys

Refer to Table 2-5 for a description of Setup Key functions.

Table 2-5 Setup Key Functions

Key	Function
Tab	Moves cursor to another field in the menu. For example, pressing Tab moves the cursor up or down a list of current parameters.
Up or down arrow	Moves the cursor between the displayed parameters.
Pg Up/Pg Down	Moves to previous/next page on scrollable menus.
--/+	Selects lower/higher value.
F9	Loads factory-installed Setup default values for the displayed parameters only.
F10	Restores previous values from CMOS.
Esc	Displays the Exit screen
Enter	Selects the parameter sub menu.

CHANGING/SETTING PARAMETER SETTINGS

Use the following steps to set or change parameter settings:

NOTE: Selecting incorrect values may cause a system boot failure. Load Setup default values to recover.

1. Select a parameter menu from the menu bar by moving the cursor to the word that represents the screen you want to display.

For example, to select "Peripherals," press the arrow key until the word Peripherals is highlighted. A screen appears with the current setting for each peripheral device.
2. View the parameter settings by pressing the space bar or the **+** key. The choices appear, toggling from one to another as you press.
3. When you reach the setting you want, leave it and move to the next parameter to be changed.
4. When you are through viewing or changing parameters, press **ESC** to move to the Exit screen.
5. The Exit screen displays a list of options. Press **Enter** to select "Save Changes and Exit". The screen displays a prompt confirming that the changes were made.

6. Press **Continue**. The system reboots with the saved changes.

PARAMETER OPTIONS

Refer to Table 2-6 for a complete list of the parameters selectable through Setup. It also lists factory default settings in the mobile mode. Parameter descriptions follow the table. Menu selections for Setup are the same except where noted.

Table 2-6 Setup Parameters

PARAMETER	DEFAULT SETTING	ALTERNATE SETTINGS
Main		
System Time	HR:MIN:SEC	
System Date	MO/DAY/YEAR	
Diskette Drive A	1.44MB, 3.5"	1.2MB, 5.25"/Not Installed
Diskette Drive B	Not Installed	1.44MB, 3.5"/1.2MB, 5.25"
Internal Hard Drives		
Master	Enable Auto	Disable BIOS Defined/None/CD/ User
Slave	None	BIOS Defined/Auto/CD/ User
Docking Station Hard Drives*		
Docking Station Master*	Disable None	Enable BIOS Defined/Auto/CD/ User
Docking Station Slave*	None	BIOS Defined/Auto/CD/ User
Boot Docking Station IDE*	No	Yes
System Memory	640K	
Extended Memory	15360KB	19456KB (w/4MB card) 23552KB (w/8MB card) 39936KB (w/16MB card) 47004KB (+32MB card)
Peripherals		
IR Location	Front	Front (Defaults to front when docked, rear when mobile.)
IR Serial Port	COM3 IRQ9**	Reconfigurable/Disabled
IR Serial Mode	FIR	MIR/SIR
Serial Port	COM1**	Reconfigurable/Disabled
Parallel Port	LPT1**	Reconfigurable/LPT1/LPT2/Disabled

Table 2-6 Setup Parameters

PARAMETER	DEFAULT SETTING	ALTERNATE SETTINGS
Parallel Mode	Unidirectional	Unidirectional/Enhanced (EPP) Bi-directional
Modem Port	COM2**	Reconfigurable/ Disabled
Docking Station SCSI*	Enabled	Disabled
NumLock	Off	On
Keyboard auto-repeat rate	30 per sec	2/6/10/13/19/22/27 per sec
Keyboard auto-repeat	½ sec	¼, ¾, 1 sec
Sound	Enabled**	Reconfigurable/User-Specified/Disabled – Advanced Sound Setup is only available when User-Specified is selected. – When Disabled is selected, Sound Power is Off.
Sound IRQ	5	7/10
Low 8-bit DMA	1	3
High 16-bit DMA	5	7
Docking Station MPU-401*	Reconfigurable (Disabled when mobile.)	Disabled I/O address 300 I/O address 330
Docking Station Joy Stick*	Enabled (Disabled when mobile.)	Disabled
Security		
User Password	Disabled	Enabled
Set Password	Press Enter.	
Password on boot	Disabled	Enabled
Password on resume	Disabled	Enabled
Power Savings		
Power Management under AC	Off	On
Power Savings	Longest Battery Life	Highest Performance
Hard Disk Timeout	30 sec.	Custom /Off 1/2/4/6/8/10/15 min/Off
Panel Backlight		15/30/45 sec
Video Highlight	Standard	Full
Video Timeout	Standard 2 min.	Full 1/2/4/6/8/10/15 min/Off 15/30/45 sec

Table 2-6 Setup Parameters

PARAMETER	DEFAULT SETTING	ALTERNATE SETTINGS
Serial Timeout	On	Off
Standby Timeout	4 min.	1/2/4/6/8/12/15 min/Off
Suspend Mode	Suspend	Save to File/Suspend Only
Auto Suspend	10 min.	5/10/15/20/25/30/34 min/Off
Timeout	On	Off
Auto Save to File	On	Off
Suspend Warning	On	Off
Tone	Standard	Full
PCMCIA Power	Off	On
Video Highlight	0:00:00	
Modem Ring Resume		
Wake from Suspend at:		

* Visible only when notebook is docked.

** For Windows 95, the initial setting is "Reconfigurable." Selecting "Select Default Values" in the Exit menu sets these settings to the defaults listed here. Do not use "Reconfigurable" with non-plug and play systems, (such as Windows for Workgroups or DOS). Doing so disables the device.

+ Can be in the docking station or VersaBay II.

Parameter Descriptions

Read the following for an understanding of each parameter's function.

Time/Date

Use this option to set the time and date. The settings remain in memory even after you turn off system power.

To set the time, enter the current hour, minute, and second in hh:mm:ss, 24-hour format. Use the Tab key to move from field to field. For example, type 13:30:00, tabbing from field to field for 1:30 p.m.

To set the date, enter the current day, month, and year in mm/dd/yyyy format.

NOTE: When setting the time and date, enter preceding zeroes. For example, to enter 9:20 a.m. and February 4, 1996, type **09:20:00** and **02/04/1996**.

Drives

The Drives option lets you check or change parameters for your diskette drive, hard disk drive, the CD-ROM reader and docking station hard drives.

One drive option you may have to change is Boot Docking Station IDE. When set to Yes, it will boot the operating system from the optional Docking Station 6000 hard drive. Otherwise, the system will boot from either the internal IDE hard drive or the CD-ROM reader, if installed in the VersaBay II.

Peripherals

The Peripherals screen displays the location of the connection between the system and the Input/Output (I/O) ports.

Power Savings

The Power Savings screen lets you select the level of power management, suspend mode, and suspend/resume options.

NOTE: Some operating systems such as Windows for Workgroups and Windows 95 have their own power management software which overrides CMOS settings. In this case, be sure to set your desired power management settings accordingly.

- **Power Management Under AC** — Normally, whenever AC power is connected to the NEC Versa 6000, power management is disabled. If you enable this option, the system uses the power management mode (on or off) you set using the Power Management option.
 - **Power Savings** — A "Highest Performance" setting provides the greatest system performance. "Longest Battery Life" provides maximum power saving, and "Off" disables all power management timers. You can also customize the system's power management by selecting "Custom Settings" and entering values for system timeouts.
 - **Suspend Mode** — Suspend mode has a method of operation called Suspend/Resume that stores information in RAM and maintains RAM contents after shutting down all local devices. You also have the option to select Save to File. This saves all your open data files to a special file on the hard disk whenever the system goes into Suspend mode. All your data is automatically recovered from where you left off when you Resume.
 - **Suspend Warning Tone** — This option lets you enable or disable a warning tone when Suspend mode starts. It is best to keep this option enabled.
 - **PCMCIA Power** — This option allows you to turn off power to the PCMCIA slots in order to save system power. The slot's power cannot be turned off if a card is installed in the slot.
-

Security

The Security screen lets you set a password to protect your data by allowing your system to boot only after you enter a password.

When a system password is set, you must enter the password before you can enter Setup. This feature allows only an authorized user to change system parameters.

You are not prompted to enter a password until you set an initial password. Your system is not protected until you enter the initial password.

See “Security Options” next, for instructions on setting and using the system password.

SECURITY OPTIONS

The system supports two types of passwords for system security:

- system password
- keyboard lock hotkey.

The following contains instructions for setting and using the password feature.

Setting an Initial Password

The system password is set using Setup. When a system password is set, the password must be entered before entering Auto Setup. This feature allows only authorized access to system parameters.

Use the following procedures to set an initial password.

1. Select the Security option in Setup.
2. Select "Set Password" by pressing Enter.
3. At the prompt, enter a password up to seven characters long. Another window appears with a prompt to reenter your password for verification. Write your password down and keep it in a secure place in case you forget it.
4. Press **Enter** to return to the Security screen.
5. Press **ESC** to save the changes and exit Setup.

This password can also be used to lock the system at power-on. When you select “Enable on Boot”, each time you start up the NEC Versa, you’ll be prompted for a password.

Using the System Password

After setting the initial password, a password prompt appears each time the system is powered on only if you select “Enable on Boot” in Setup. At the password prompt, enter your password and press **Enter** to load your operating system or to enter Setup. The characters entered do not appear on the screen.

NOTE: If a system password is set, you can't enter Setup until you enter the password.

If it takes more than three tries to enter the correct password, power off the system and try again. Repeat steps 1 and 2 above.

To remove a password, at the password prompt press **Enter**. Press **Enter** again when the re-enter prompt appears. Your password clears and you are no longer prompted to enter one when you power on the system.

Keyboard Lock

The system supports a keyboard lock feature for additional security. The lock option appears on the Setup screen only after you have enabled a password. At this point in Setup, the lock can be enabled or disabled.

To lock the keyboard, press **Ctrl + Alt + Back Space**. To unlock the keyboard, enter the password. If the password is removed, this option is no longer available.

POWERPANEL OVERVIEW

The NEC Versa 6000 system gives the user a tool that simplifies changing the system configuration settings discussed previously in this section, including power management.

PowerPanel appears in the system's Program Manager area. It is a toolbar comprised of system setting icons. For example, NEC provides a default PowerPanel toolbar. The first five icons represent power management settings. The next six icons represent system settings. The last icon, represented by the atom, is a permanent icon. Selecting the atom icon opens the PowerPanel menu. Use the PowerPanel menu to edit or create a customized version of PowerPanel.

AUTOMATIC POWER-SAVING FEATURES

Table 2-7 lists the NEC Versa 6000 series automatic power conserving features. These features work during battery and AC operation. The features listed below do not work when the optional docking station is connected.

The default timeouts listed below can be changed using Setup.

Use the **Fn F7** key combination to set the power management level. You can toggle between Highest Performance, Longest Battery Life, Custom Values, and Off. You can modify the custom level for your specific working environment using Custom Values. Default values change depending on the type of power management you use.

Table 2-7 Automatic Power-Saving Features

Device	Default (timeout)	Description
LCD backlight	2 min.	When no keyboard or NEC VersaGlide input occurs for the specified timeout, the LCD backlight shuts off.
Hard Disk	30 sec.	Hard disk motor stops when not accessed for specified timeout.
Suspend Mode	10 min.	The system enters Suspend mode after total system activity.

Section 3

Troubleshooting and Repair

This section focuses on providing you with some information on basic troubleshooting as well as the BIOS, POST Error codes and messages.

QUICK TROUBLESHOOTING

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

Table 3-1 Quick Troubleshooting

Problem	Corrective Actions
No power	<p>Check that the AC adapter is plugged into the power connector of the system. Also, that the AC adapter is plugged into a properly grounded AC power outlet.</p> <p>If using the battery as main power source, check if the battery pack is of the right type, charged and is inserted correctly.</p> <p>Check the powerboard of the system. Is it inserted into the main board connector properly? Otherwise, replace the powerboard.</p>
Data on the LCD is unreadable	<p>Adjust the brightness controls on the right side of the LCD panel.</p> <p>Check if the LCD cables are inserted properly. Check also connections inside the LCD panel.</p> <p>Check if installed VGA driver is correct.</p> <p>Check VGA controller chip on the main board if there is any cold or loosed soldering.</p> <p>Replace the main board.</p>

Table 3-1 Quick Troubleshooting

Problem	Corrective Actions
Battery power does not last	<p>Make sure that the power management features are enabled.</p> <p>Recharge the battery pack for 1½ hours before using again.</p> <p>Replace the battery pack.</p>
System halts during boot sequence	<p>Check condition of selected bootload device (diskette or hard disk) for bad boot track or incorrect OS files.</p> <p>Try booting from a new bootable diskette and recopy or repartition hard disk.</p> <p>Check for any BIOS error messages on the display screen.</p> <p>Replace main board.</p>
I/O processing malfunctions	<p>Check the connections of all internal devices.</p> <p>Replace main board.</p>
Diskette drive does not work	<p>Check if floppy drive cable is connected properly.</p> <p>Check diskette type if correct and not faulty.</p> <p>Replace diskette drive.</p> <p>Replace main board.</p>
Hard disk drive malfunction	<p>Check if hard disk drive is set properly on CMOS SETUP.</p> <p>Check drive cables and connections.</p> <p>Check if disk drive is good.</p> <p>Replace the main board.</p>
Memory malfunction	<p>Check if the memory module is inserted properly.</p> <p>Replace the memory card.</p> <p>Replace the main board.</p>
External keyboard or PS/2 mouse doesn't work	<p>Check if keyboard or mouse are connected properly. Check Y-cable if it is being used. Power off system first before plugging in the device.</p> <p>Replace the keyboard or mouse.</p> <p>Replace the main board.</p>

Table 3-1 Quick Troubleshooting

Problem	Corrective Actions
PCMCIA card does not work	<p>Check the PCMCIA driver installation for any IRQ or IO address conflict.</p> <p>Check if the PCMCIA card is inserted properly and all connections are set.</p> <p>Replace the PCMCIA card.</p> <p>Replace the main board.</p>
NEC VersaGlide doesn't work	<p>Check if PS/2 mouse driver is properly installed.</p> <p>Check VersaGlide cable inside the system if it is inserted properly.</p> <p>Remove VersaGlide and clean it.</p> <p>Check the keyboard controller chip for any cold or loosed soldering.</p> <p>Replace the main board.</p>
Serial device does not work	<p>If using serial mouse, check if VersaGlide is disabled under CMOS Setup.</p> <p>Check if mouse driver is installed properly.</p> <p>Check if serial device is connected properly.</p> <p>Replace serial device.</p> <p>Check the I/O controller chip on the main board for any cold or loosed soldering.</p> <p>Replace the main board.</p>
Parallel device does not work	<p>Check all connections.</p> <p>Check if external device is turned on.</p> <p>Check I/O controller chip on the main board for any cold or loosed soldering.</p> <p>Replace the main board.</p>

HELPFUL QUESTIONS

Here are some helpful questions to ask when troubleshooting the notebook:

- Is there any external power source connected to the computer?
- Is the battery fully charged?
- Is the computer turned on and the Power LED activated?
- Are the LCD display controls set to the minimum level?
- Is the LCD display switched to the external monitor?
- Are all cables and devices connected properly and securely?
- Are all needed device drivers installed properly?
- Have you checked the AUTOEXEC.BAT and CONFIG.SYS files for errors?
- Is the Suspend Mode activated on the LCD Status Bar? Press any key or press the power switch to power on the system.

INFORMATIONAL MESSAGES

This section lists the messages that provide information to the user but require no action.

Table 3-2 BIOS Informational Messages

Message	Meaning
<i>nnnK</i> System Memory	The amount of system memory that tested successfully.
<i>nnnK</i> Cache SRAM	Cache SRAM Memory
<i>nnnK</i> Extended	The amount of extended memory that tested successfully.
Memory tests terminated by keystroke	The message indicate that a user pressed the spacebar while memory tests were running and stopped the memory tests.
Press the F1 key to continue	This message indicates that an error was found during POST. Pressing the F1 key allows the system to attempt to reboot.
Beginning memory test Press the SPACEBAR to terminate the memory test	A user can stop the memory tests by pressing the spacebar.

BEEP CODES

Beep codes are used to identify a POST error that occurs when the screen is not available. Once the screen is operating, diagnostic messages are reported to the screen. There are beep codes for both fatal and non-fatal system board errors.

NOTE: No beep code is generated if a test is aborted while in progress. However, diagnostic cards can be installed in order to display the contents of the diagnostic port 80h and identify the area of failure.

Explanation of Test Terms for Beep Code Table

The following terms are used in the Test Performed column of the beep code table.

- 1. Pattern test** - One or more particular patterns are written to a location then read back from the same location. Examples of patterns used are 55h and AAh. If the value read does not match the value written, the test is considered a failure.
- 2. Rolling ones test** - Several patterns are constructed. These patterns represent a one rolling through the given location. For example, to roll a one through three bits, the following patterns would be constructed: 001, 010, 011, 100, 101, 110, and 111. The patterns are written to the location and then read back, one by one. If the value read does not match the value written, the test is considered a failure.
- 3. Rolling zeros test** - Several patterns are constructed. These patterns represent a zero rolling through the given location. For example, to roll a zero through three bits, the following patterns would be constructed: 011, 001, and 000. The patterns are written to the location and then read back, one by one. If the value read does not match the value written, the test is considered a failure.
- 4. Checksum test** - All of the values in a given range of locations are added together. The range includes a location which when added to sum of the ranges, will produce a known result, such as zero.

Beep Codes for System Board Errors

The following table provides system beep codes.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
none	01h	CPU registers test in progress or failure	Pattern test of most of the 16-bit CPU registers. Failure will result in a system halt.
1-1-3	02h	CMOS write/read test in progress or failure.	Rolling ones test in the shutdown byte (offset 0Eh) of the CMOS RAM. Failure will result in a system halt.
1-1-4	03h	ROM BIOS checksum test in progress or failure.	The range of ROM that includes the BIOS is checksummed. Failure will result in a system halt.
1-2-1	04h	Programmable interval timer 0 test in progress or failure.	Over a period of time, the current count values in timer 0 are read and accumulated by ORing them into the values read so far. It is expected that during the time period, all bits are set.
1-3-1	08h	RAM refresh verification test in progress or failure.	Over a period of time, the refresh bit (bit 4) in port 60h is read and tested. The refresh bit should toggle from 0 to 1, then 1 to 0 within the time period. Failure will result in system halt.
none	09h	First 64K RAM test in progress.	No specific test is performed - just indicates that the test is beginning .
1-3-3	0Ah	First 64K RAM chip or data line failure, multi-bit.	The first 64K of RAM is tested with a rolling ones test and a pattern test. If any of the pattern tests fail, then the BIOS reports that multiple data bits failure. Failure results in a system halt.
1-4-2	0Dh	Parity failure first 64K RAM	At the completion of the rolling ones and pattern tests of the first 64K, the BIOS checks the parity error bits (bits 7 and 6) of port 60h. Failure results in a system halt.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
2-1-1	10h-1Fh	First 64K RAM chip or data line failure on bit x	The first 64K of RAM is tested with a rolling ones test and a pattern test. If any of the rolling ones tests fail, then the BIOS reports the specific bit that failed. To determine the bit number from the diagnostic code, subtract 10h. For example, if 12h is displayed at the diagnostic port, bit 2 failed. Failure results in a system halt.
2-1-2			
2-1-3			
2-1-4			
2-2-1			
2-2-2			
2-2-3			
2-2-4			
2-3-1			
2-3-2			
2-3-3			
2-3-4			
2-4-1			
2-4-2			
2-4-3			
2-4-4			
3-3-1	20h	Slave DMA register test in progress or failure.	Pattern test of channels 1 through 3 of the slave controller (starting port address = 02h). Failure results in a system halt.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
3-1-2	21h	Master DMA register test in progress or failure.	Pattern test of channels 1 through 3 of the master DMA controller (starting port address = C4h). Failure results in a system halt.
3-1-3	22h	Master interrupt mask register test in progress or failure.	Rolling ones and zeros tests of the mask register of the master programmable interrupt controller (port 21h). Failure results in a system halt.
3-1-4	23h	Slave interrupt mask register test in progress or failure.	Rolling ones and zeros tests of the mask register of the master programmable interrupt controller (port A1h). Failure results in a system halt.
none	25h	Interrupt vector loading in progress.	No specific test is performed - just indicates that the Interrupt Vector table is being initialized.
3-2-4	27h	Keyboard controller test in progress or failure.	The self-test command (AAh) is issued to the 8042 (keyboard controller) and the results are monitored. Failure results in a system halt.
None	28h	CMOS RAM power failure and checksum calculation test in progress.	The power-fail bit in CMOS RAM is tested and the lower CMOS RAM area is being checksummed. A failure does not result in system halt.
None	29h	CMOS RAM configuration validation for video in progress.	No specific test is performed - just indicates that the configuration specified in CMOS for video is being matched against the actual installation. A failure does not result in a system halt.
3-3-4	2Bh	Screen memory test in progress or failure.	The video buffers (B000h and B800h) are tested with a pattern test and a rolling ones test. Failure will result in a beep code but not a system halt.
3-4-1	2Ch	Screen initialization in progress.	Until the video installation is confirmed, any calls to INT 10h Function 0 (set mode) will be prefaced with the diagnostic code. There is no expected failure from this.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
3-4-2	2Dh	Screen retrace test in progress or failure.	Over a period of time, the retrace bit (bit0) in the appropriate CRT controller status register (either port 3BAh or 3DAh) is read and tested. The retrace bit should toggle from 0 to 1, then 1 to 0 within the time period.
None	2Eh	Search for video ROM in progress.	No specific test is performed by the system BIOS - just indicates that the BIOS is about to jump to the initialization code in the video option ROM.
none	30h	Screen running with video ROM.	No specific test is performed - just indicates that a video option ROM was found and believed to be operating.
none	31h	Monochrome monitor operable.	No specific test is performed - just indicates that the BIOS believes a monochrome monitor is installed and is operating.
none	32h	Color monitor (40-column) operable.	No specific test is performed - just indicates that the BIOS believes a color monitor is installed and is operating. The mode has been set to 40-column as selected by the user in CMOS RAM.
none	33h	Color monitor (80-column) operable.	No specific test is performed - just indicates that the BIOS believes a color monitor is installed and is operating. The mode has been set to 80-column as selected by the user in CMOS RAM.
4-2-1	34h	Timer-tick interrupt test in progress or failure.	All interrupts expect the timer-tick interrupt are masked off at the interrupt controllers. If a timer-tick interrupt does not occur during a specific time period, an error message is displayed on the screen. The system does not halt.
4-2-2	35h	Shutdown test in progress or failure.	A return address is stored in 40:67h and the processor is reset via the keyboard controller. If a timer tick occurs during this time period, an error message is displayed on the screen. Other failures are hard to detect. If possible, the BIOS will continue with POST, skipping the memory tests.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
4-2-3	36h	Gate A20 failure.	To test extended memory, the processor must be placed in protected mode and the A20 line must be enabled. For the memory tests, the BIOS generally uses the keyboard controller to enable A20. If the A20 line is not properly set during the memory test, an error message is displayed on the screen and the memory test are suspended. The system does not halt.
4-2-4	37h	Unexpected interrupt in protected mode.	During the memory tests, the processor is placed in protected mode. All interrupts in the interrupt descriptor table are initialized to point to special handler that displays a message on the screen. All hardware interrupt are disabled. The system does not halt when an unexpected interrupt occurs.
4-3-1	38h	RAM test of memory above 64K in progress or failure.	The memory above the first 64K is tested with a rolling ones test and a pattern test. All success and failure messages are displayed on the screen and POST will continue.
4-3-2	3Ah	Programmable interval timer channel 2 test in progress or failure.	Over a period of time, the current count values in timer 2 are read and accumulated by ORing them into the values read so far. It is expected that during the time period, all bits will be set. If an error is detected, an error message will be displayed on the screen and POST will continue.
4-3-4	3Bh	Real-time clock test in progress or failure.	Over a period of time, the Update-In-Progress bit of Status Register A of the real-time clock is read and tested. The bit should toggle from 0 to 1 within the time period.
4-4-1	3Ch	Serial port test in progress or failure.	Pattern test of one or more of the installed serial ports. If a failure is detected, an error message will be displayed and POST will continue.
4-4-2	3Dh	Parallel port test in progress or failure.	Rolling ones test is done to one of the installed parallel ports. If a failure is detected, an error message displays.

Table 3-3 BIOS Beep Codes

Beep Code	Diagnostic Code	Description	Test Performed
4-4-3	3Eh	Math coprocessor test in progress or failure.	An integer load and store is performed with the math coprocessor. If the values do not match, an error message will be displayed and POST will continue.

Section 4

Field Service Guidelines

This section contains preventive and corrective maintenance procedures for the NEC Versa 6000 Series notebook computers. The first part of the section describes cleaning procedures and preferred handling procedures for sensitive components (for example disk drives, batteries).

The second part of the section identifies all field replaceable parts with the remainder of the section containing the removal and replacement procedures for the field replaceable parts.

PREVENTIVE MAINTENANCE

Preventive maintenance is limited to cleaning the plastic case, the keyboard, and the display screen and cleaning the diskette drive heads as required.

NOTE: Remove the battery and disconnect the AC adapter before performing any maintenance. Voltage is present inside the system unit and LCD even after the system is turned off.

Cleaning the Notebook's Exterior

Use the steps below to clean the outer surface of the system.

1. Power off the system and remove the primary battery pack. Unplug all cables connected to the system.
2. Wipe the outside of the system unit, keyboard, and display with a soft, clean cloth. Remove stains with a mild, liquid detergent like a common household cleaner. Use glass cleaner to clean the LCD indicator panel. Apply the glass cleaner directly to the cloth and then wipe the LCD indicator panel. Do not use solvents or strong, abrasive cleaners on any part of the system.
3. Clean the keys with a damp cloth. A small, soft-bristle brush may be used to clean between the keys. Make sure to use a damp cloth (not wet) to prevent moisture from seeping between the keyboard and the metal plate, possibly damaging the components under the keys. If the keyboard gets wet, thoroughly dry it before re-assembling the system unit.

Cleaning the Notebook's Interior

When servicing the inside of the notebook, remove dust and other foreign particles from inside the system unit as follows.

1. Remove the top cover and keyboard using the disassembly procedures discussed later in this section.
2. Dust or vacuum (with a rubber-tipped nozzle) the inside of the system unit particularly the motherboard 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 cover.

Protecting the Disk Drives

To protect the disk drives and data, back up the system disk periodically on floppy diskettes. Periodically use a head-cleaning diskette in the floppy diskette drive to prolong the life of the drive and to help maintain data integrity.

Here are some maintenance procedures to use when servicing a hard disk:

- Always back up the data files from the hard disk.
- Run a virus detecting program for possible virus infested area on the hard disk.
- Use SCANDISK to correct any errors found in the directory and File Allocation Table (FAT). This will also free up space from any unused sectors.
- Never turn the computer off when the hard disk is being accessed.
- Never move or raise the computer while the hard disk is being accessed, most especially don't jar the hard disk as this may cause a hard disk crash.
- Use hard disk maintenance programs like DEFRAG under DOS or Norton Utilities SPEEDISK programs. These programs reorganize your hard disk by eliminating fragmentation and improves the hard disk access time.

Handling the Battery Packs

The battery packs furnished with the computer require reasonable care and handling to ensure efficient operation and maximum life. Periodically inspect the battery terminals and the batteries for evidence of corrosion and oxide build-up.

To ensure that the battery packs endure normal life cycle, always observe the following precautions when handling the battery packs:

- Do not drop the battery packs or subject them to excessive shock and vibration.
- Do not expose the battery packs to direct sunlight, moisture, or chemical compounds.
- Do not disassemble the battery packs.
- Do not use the battery packs to power other devices.
- Do not short the battery leads or connect the battery with reversed polarity.
- Never attempt to charge the battery packs in any way other than as described in this manual and the User's Guide.
- Always charge the battery packs as soon as possible after a low battery indication.

Maintaining the LCD Quality

When it comes to screen problems, heat plays a big part. After a good working session, the typical routine is to shut the machine and close the cover. The display surface (no matter what type it is) radiates heat. When you close the cover, you trap the heat against the screen. Make sure to leave the computer's cover open for about ten minutes while the heat disperses, before closing the LCD.

REQUIRED TOOLS AND EQUIPMENT

All NEC Versa 6000 corrective maintenance procedures can be performed using the following tools:

- Tweezers
- Small flat-head screwdriver
- Small Phillips screwdriver
- Small Hex-bolt screwdriver

DISASSEMBLY AND REASSEMBLY

This subsection contains step-by-step disassembly procedures for the system. Reassembly is the reverse of disassembly. Each procedure is supported by a simplified disassembly illustration to facilitate removal. The Illustrated Parts Breakdown and parts lists for the system unit are shown later in this subsection.

For complete disassembly of the system unit, follow the disassembly order listed in Table 4-1 to reassemble, follow the table in reverse order.

Table 4-1 NEC Versa 6000 Series Disassembly Sequence

Sequence	Part	See Page
1	Hard Disk Drive	4-5
2	Diskette Drive (installed in VersaBay II)	4-7
3	Main Battery Pack (Li-ION type)	4-8
4	LCD and Top Cover	4-10
5	Power Button, IR Board, Keyboard	4-12
6	LCD Status Bar, VersaGlide Assembly, Metal Keyboard Support	4-14
7	Bridge Battery, CMOS Battery, Buzzer	4-15
8	CPU Board, Modem Board	4-16
9	Heat Shield, Sound Board, Microphone Assembly	4-17
10	I/O Board	4-18

When disassembling the system unit, follow these general rules.

- Turn off and disconnect all power and all options, including the AC adapter (if connected) and primary battery pack (see the procedures that follow).
- Do not disassemble the system into parts that are smaller than those specified in the procedure.
- Label all removed connectors. Note where the connector goes and in what position it was installed.

Hard Disk Drive

To disassemble the entire NEC Versa 6000 computer, start by removing the hard disk drive as follows.

NOTE: NEC Versa 6000 hard disk drives can be used in other NEC notebook computers such as the NEC Versa 2000 and 4000 Series systems. However, hard disk drives from earlier models can only be used in the VersaBay II. Check the top of the hard drive for a blue dot. If the drive case has the blue dot on it, you can use the drive in either the drive bay or the VersaBay II.

1. Check that the NEC Versa power is off.
2. Turn the NEC Versa 6000 upside down with the front of the unit facing you.
3. Remove the drive cover as follows:
 - Locate the drive cover release latch. Push the drive cover release latch up while using some pressure to slide the cover to the left.
 - Lift the cover up and off the system.

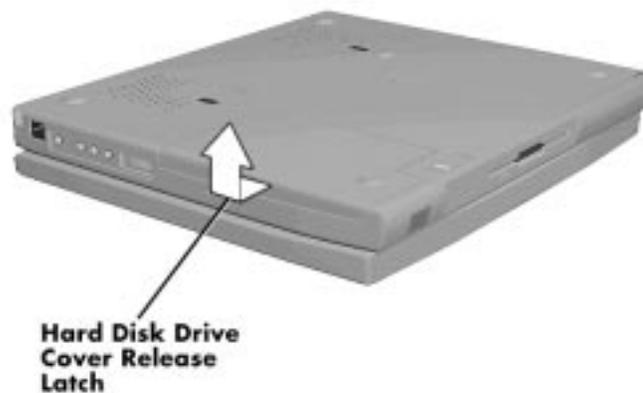


Figure 4-1 Removing the Drive Bay Cover

4. Remove the hard disk drive as follows:

- Using your fingers, press down on the hard disk drive at the end closest to the connector.
- While maintaining pressure, slide the drive towards the front of the system.

CAUTION: Do not lift the drive out of the system before releasing it from the system connector. Doing so can damage the connectors.

- Once the drive is disconnected, lift the drive up and out of the system.

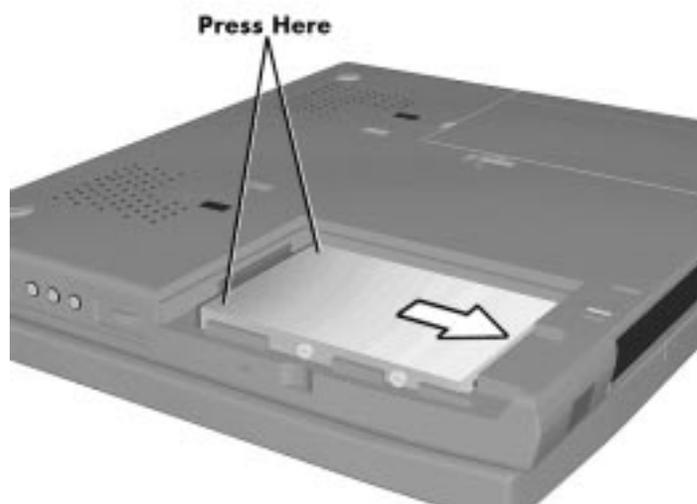


Figure 4-2 Removing the Hard Disk Drive

Diskette Drive

Remove the diskette drive as follows.

1. Make sure the NEC Versa 6000 is powered off, all options are disconnected, and the LCD panel is closed.
2. Turn the system upside down with the front facing you.
3. Locate the VersaBay II release latches on the bottom of the unit.

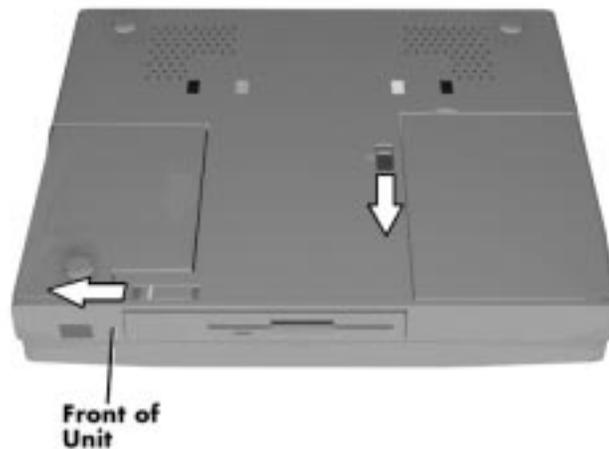


Figure 4-3 VersaBay II Release Latches

4. Slide the front latch towards the hard disk drive side of the system, and hold it.
5. Push the middle latch towards you until the diskette drive pops part way out of the unit.
6. Continue to hold the latch near the front of the system to the left, and pull the diskette drive the rest of the way out of the system.

NOTE: If you release the front latch before completely removing the device, the device casing catches on the inside of the latch.



Figure 4-4 *Removing the Standard Diskette Drive*

Main Battery Pack (Li-Ion Type)

Remove the main battery pack as follows.

NOTE: Use Li-Ion batteries in the NEC Versa computer for which they are designed. Also, installing another manufacturer's battery, or using a combination of very old and new batteries can deteriorate battery and equipment performance.

1. Save your files, exit Windows, and press the Suspend button or turn off system power.
2. Close the LCD and turn the system over.

3. Release the battery cover latch and slide the battery bay cover away from the system.

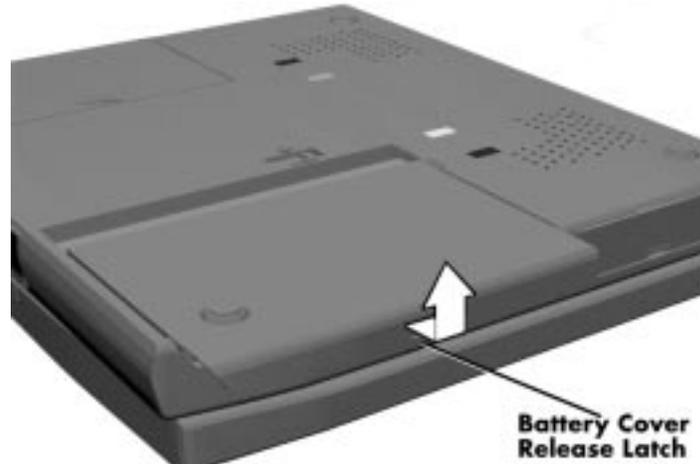


Figure 4-5 Removing the Battery Compartment Cover

4. Place a finger in the notch on the battery and lift the battery out of the system.

NOTE: Always lift the battery out of the system by the notch. Failure to do so can damage the battery terminals.

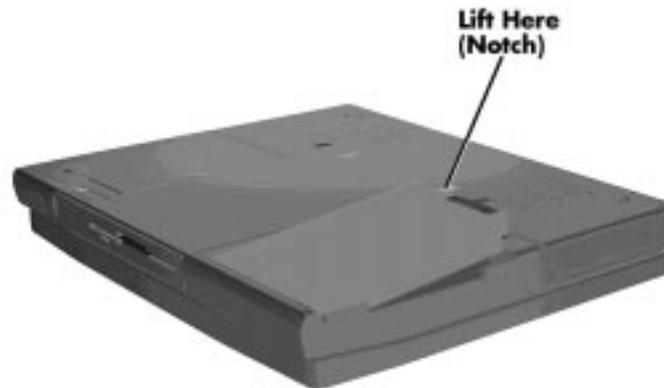


Figure 4-6 Removing the Battery

LCD and Top Cover

Remove the LCD and top cover as follows.

1. Power off the computer.
2. Remove the bottom base unit cover as follows.
 - Turn the computer over with the VersaBay II slot facing towards you.
 - Locate the 10 screws that secure the bottom base unit cover. In all, there are 2 long-type screws, 2 medium-type screws, and 6 short-type screws.

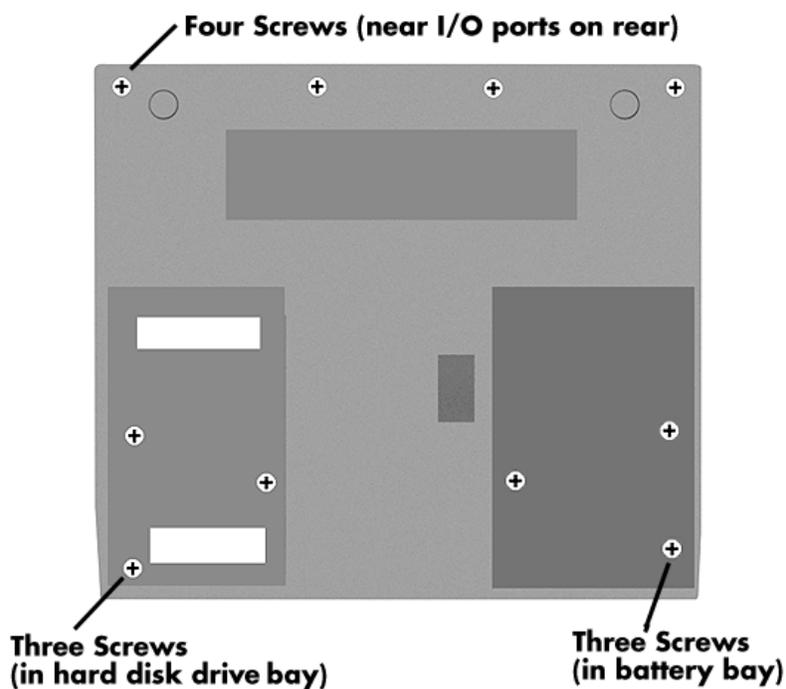


Figure 4-7 Removing the Bottom Base Screws

- Remove the ten screws.
- Using a flat-head screwdriver, carefully detach the bottom base unit cover from the top cover.

3. Disconnect the two LCD cables from connectors P16 and CN3 on the main board.

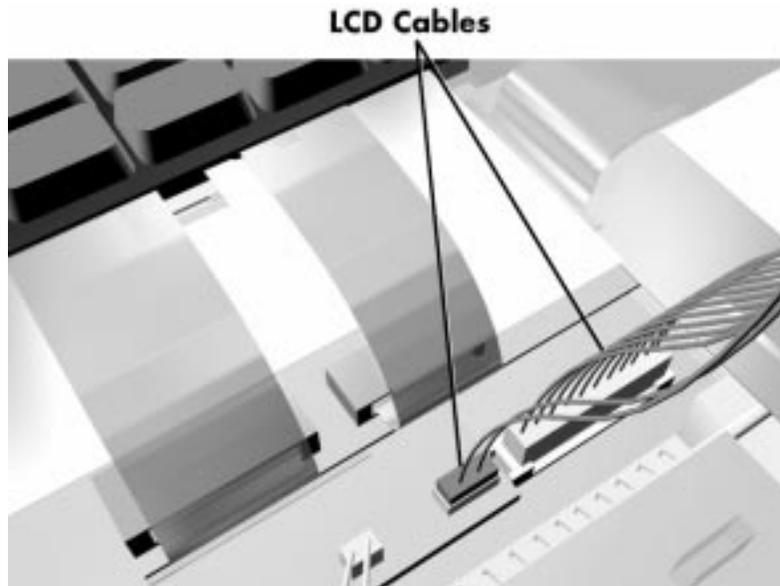


Figure 4-8 *Disconnecting the LCD Connectors*

4. Lift the top cover and LCD up and off of the base unit assembly.

NOTE: Remove the top cover carefully, so that you don't damage the plastic.

Power Button, IR Board, Keyboard

Remove the power button, IR board and/or keyboard as follows.

1. Remove the LCD and top cover as previously described.
2. The power button is held in place primarily by the computer's top cover. Once the top cover is removed, just lift the power button out of its retaining inserts.
3. Remove the IR board as follows.
 - Remove the screws securing it in place.
 - Locate the IR board cable that attaches to connector P7 on the CPU board. Use a flat-head screwdriver to push open the connector tabs.
 - Lift up the IR board.

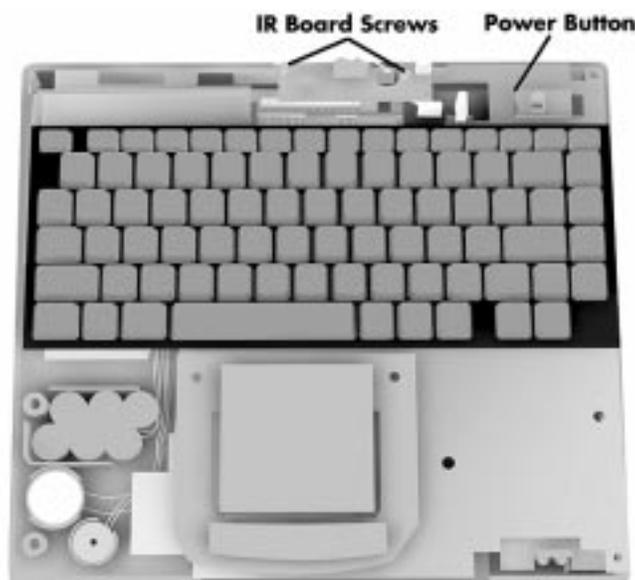


Figure 4-9 Removing the Power Button, IR Board

4. Remove the keyboard as follows.

- Locate the two ribbon cables that attach to the CPU board via connectors P3 and P4.

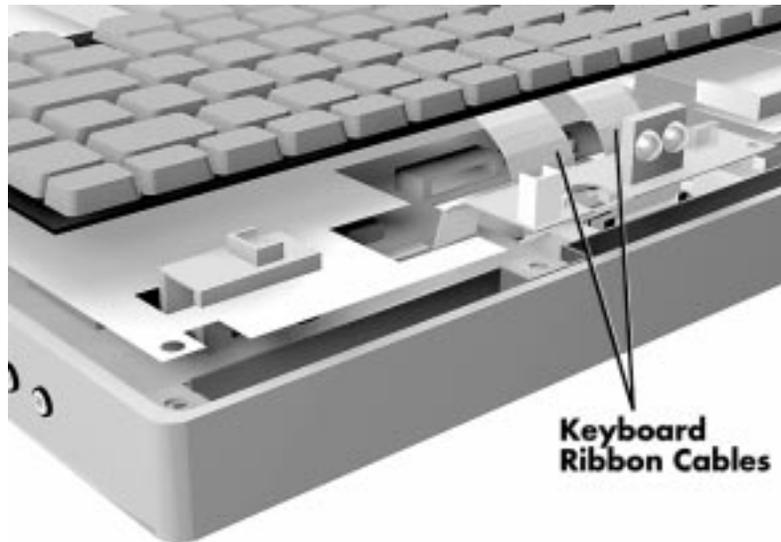


Figure 4-10 Disconnecting Keyboard Cables

- Use a flat-head screwdriver to push open the connector tabs.
- Lift the keyboard out of the base unit.

LCD Status Bar, VersaGlide Assembly, Metal Keyboard Support

Remove the LCD status bar, VersaGlide and/or metal keyboard support as follows.

1. Remove the LCD and top cover as previously described.
2. Remove the LCD status bar as follows.
 - Locate the ribbon cable that attaches to the CPU board via connector P5.
 - Use the tip of a screwdriver and carefully open the connector tabs.
 - Lift up the LCD status bar.
3. Remove the VersaGlide assembly as follows.
 - Locate the cable on the VersaGlide assembly.
 - Disconnect the cable from connector P6 on the CPU board.
 - Lift the VersaGlide out of the base unit.
4. After removing the LCD status bar and VersaGlide, lift the metal keyboard support.

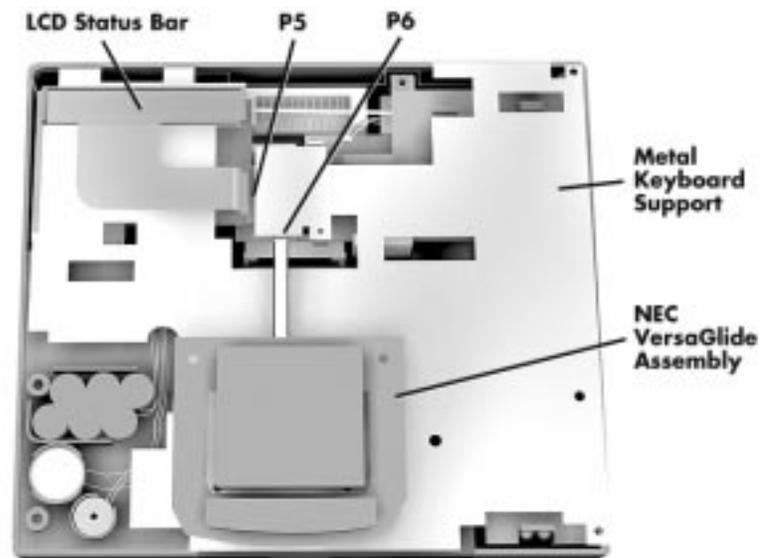


Figure 4-11 LCD Status Bar, VersaGlide Assembly, Metal Keyboard Support

Bridge Battery, CMOS Battery, Buzzer

Remove the bridge battery, CMOS battery, and/or buzzer (speaker) as follows.

1. Remove the following as previously described:
 - LCD
 - top cover
 - keyboard
 - LCD status bar
 - VersaGlide
 - metal keyboard support.
2. To remove the bridge battery disconnect the cable from connector P15 on the I/O board and remove the bridge battery.
3. Remove the CMOS battery as follows.
 - Locate the cable on the CMOS battery.
 - Disconnect the cable from connector P14 on the I/O board and lift the CMOS battery out of the base unit.

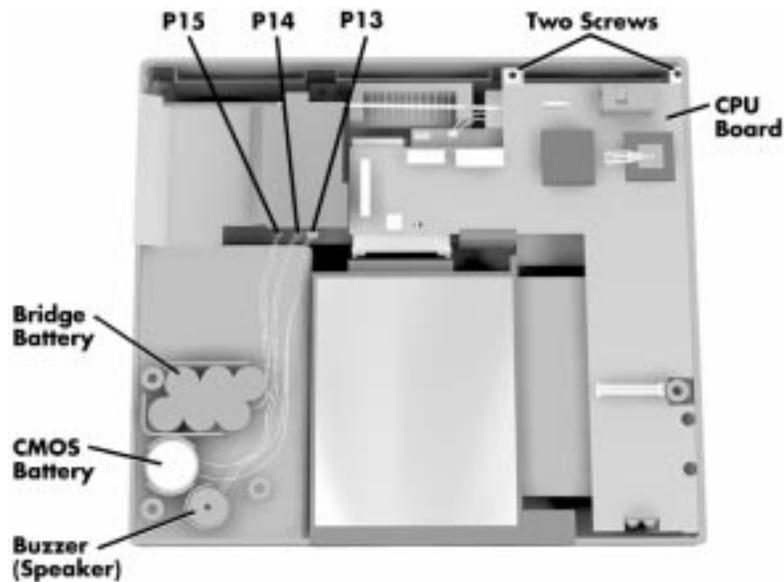


Figure 4-12 Removing Bridge Battery, CMOS Battery and Buzzer

4. To remove the buzzer, disconnect the buzzer cable from P13 on the I/O board and remove the buzzer.

CPU Board, Modem Board

Remove the CPU board and modem board as follows.

1. Remove the following as previously described:
 - LCD
 - top cover
 - keyboard
 - LCD status bar
 - VersaGlide
 - metal keyboard support.
2. Disconnect the bridge battery, CMOS battery and buzzer from the I/O board.
3. Remove the two screws that secure the CPU board to the base unit.
4. Gently lift the CPU board out of connectors P2 and P7 on the I/O board.

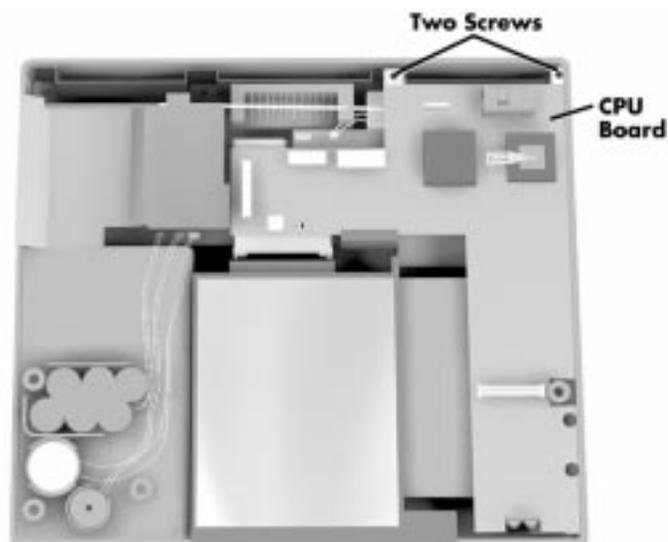


Figure 4-13 Removing the CPU Board

5. The system's modem board attaches to the back of the CPU board.

Now to remove the modem board, turn over the CPU board. Do not touch any of the chips or circuitry on the board.

6. Lift the modem board out of connectors P1 and P2

Heat Shield, Sound Board, Microphone Assembly

Remove the heat shield, sound board, and/or the microphone assembly as follows.

1. Remove the following as previously described:

- LCD
- top cover
- keyboard
- LCD status bar
- VersaGlide
- metal keyboard support
- bridge battery, CMOS battery, buzzer (speaker), and CPU board

2. Remove the two screws that secure the heat shield to the base unit and lift up the heat shield.
3. After removing the heat shield, lift the sound board from connectors P1 and P2 on the I/O board.
4. To remove the microphone assembly, locate the cable attached to the assembly.
5. Disconnect the cable from CN4 on the I/O board and lift the microphone assembly out of the base unit.

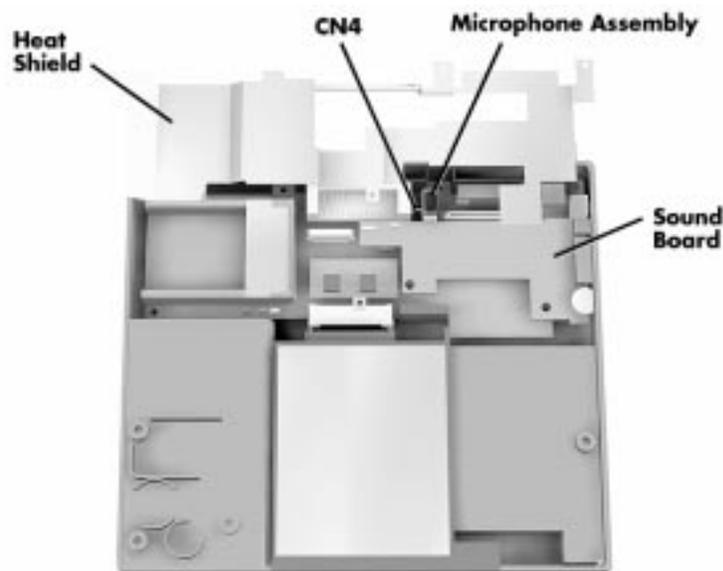


Figure 4-14 Heat Shield, Sound Board, Microphone Assembly

I/O Board

Remove the I/O board as follows.

1. Remove the following as previously described:
 - LCD
 - top cover
 - keyboard
 - LCD status bar
 - VersaGlide
 - metal keyboard support

- bridge battery, CMOS battery, buzzer (speaker), and CPU board
 - heat shield, sound board, and the microphone assembly
2. Remove the three screws securing the I/O board to the bottom base unit.
 3. Lift the I/O board up and out of the base unit.

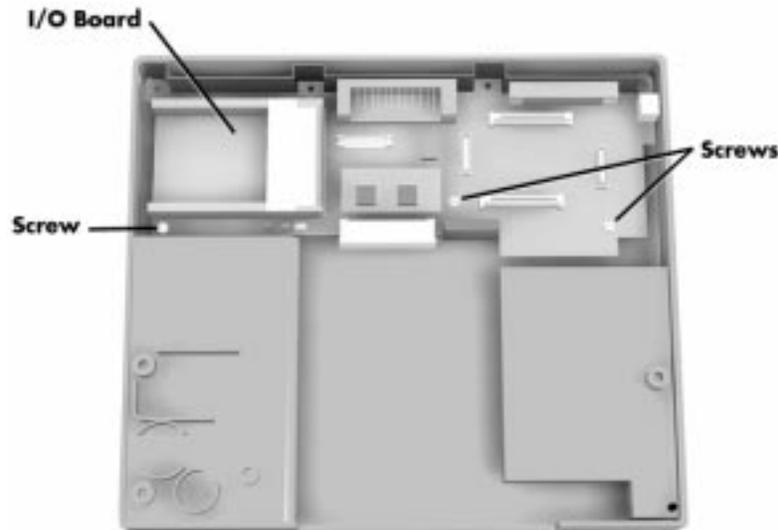


Figure 4-15 Removing the I/O Board

ILLUSTRATED PARTS BREAKDOWN

The next section contains the NEC part numbers and illustrated parts breakdown (IPB) figure for the NEC Versa Series 6000. Figure 4-16 shows the system exploded view diagram, or IPB. Table 4-2 lists field-replaceable parts and corresponding part numbers.

Review the entire exploded diagram to see how each part is connected or assembled. Try to sub-divide the entire diagram paying particular attention to the LCD Assembly, Top Unit Cover Assembly, and the Base Unit Assembly.

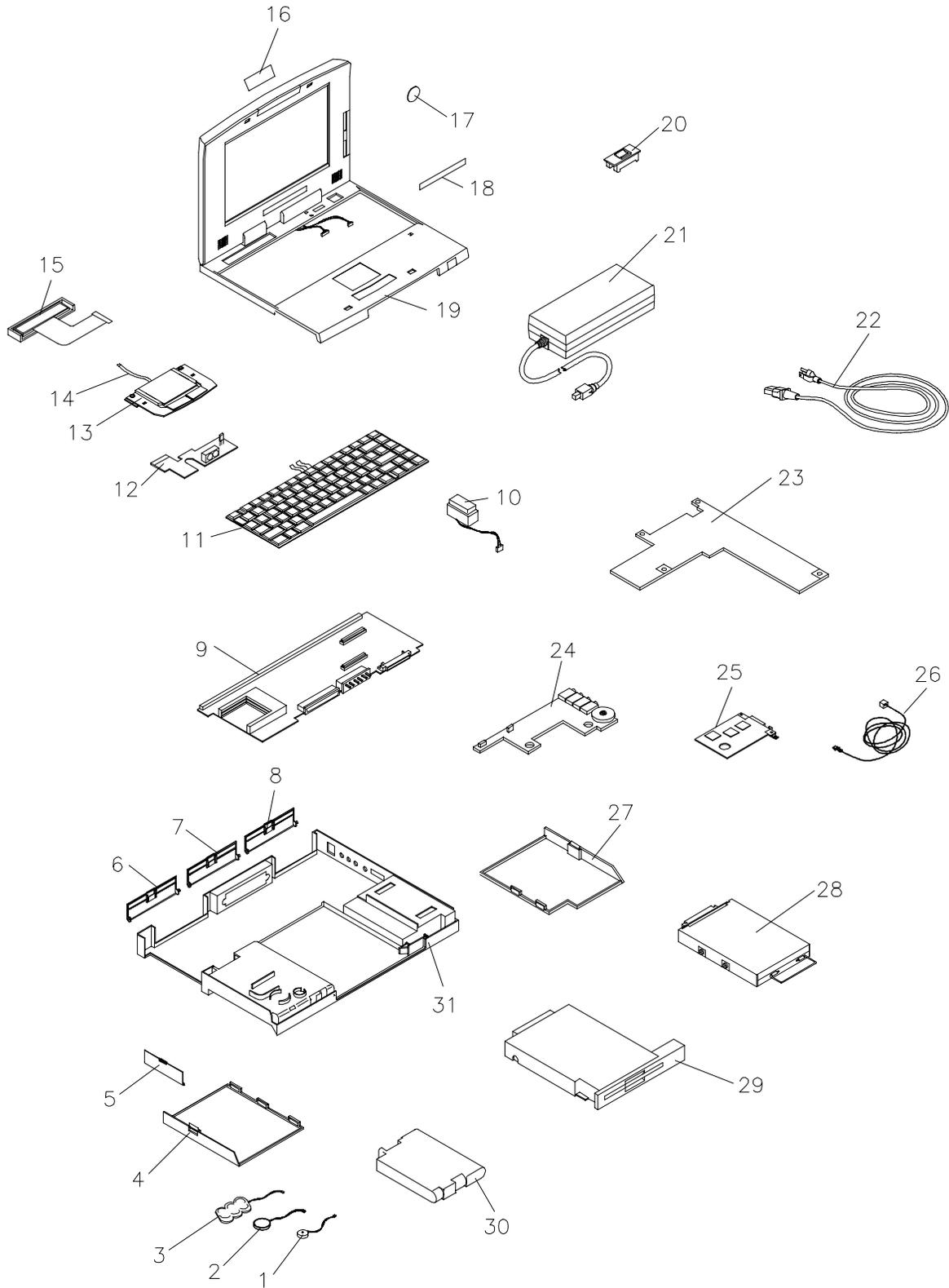


Figure 4-16 NEC Versa 6000 Illustrated Parts Breakdown

Table 4-2 NEC Versa 6000 Series Field-Replaceable Parts

Item	Part Number
1. Speaker with Cable (also called Buzzer)	802-870018-007A
2. CMOS Battery	804-021107-004A
3. Bridge Battery	804-021205-002A
4. Battery Compartment Cover (Cap)	136-238578-001A
5. PCMCIA Slot Cover (Cap)	136-238588-001A
6. Assembly Cap I/F (Serial/VGA Ports)	136-238586-001A
7. Assembly Cap, Docking Station	136-238587-001A
8. Assembly Cap I/F (PS/2/Parallel Port)	136-238589-001A
9. I/O Board, G8WKP, (SVGA model) I/O Board G8WZG, (XVGA model)	136-238565-001A 136-238565-002A
10. Microphone Assembly	808-875113-001A
11. U.S. Keyboard	808-897250-001A
12. Rear IR Board Assembly, G8UUU	808-875213-001A
13. VersaGlide Assembly	808-874649-002A
14. VersaGlide Cable	808-742261-001A
15. LCD Status Bar	158-057234-000
16. Logo, NEC	136-600325-A
17. Intel Inside Sticker	158-030621-001
18. Logo, P55,100 MHz, SVGA, 11.3" Logo, P55,100 MHz, SVGA 12.1" Logo, P55,100 MHz, XVGA, 12.1"	158-030781-006 158-030781-007 158-030781-008
19. LCD Top Cover Assembly (SVGA 11.3") LCD Top Cover Assembly (SVGA 12.1") LCD Top Cover Assembly (XVGA 12.1")	136-238581-001A 136-239710-001A 136-239710-002A
20. Power Button	136-620570-001A
21. AC Adapter (ADP 74)	808-891864-001A
22. AC Power Cable (U.S.)	808-741299-001A
23. CPU Board, 100 MHz (G8UUR) CPU Board, 133 MHz (G8UUR)	158-057235-000 158-057235-001
24. Sound Board (G8UUT)	158-057232-000
25. DataRace Modem Board (G8UUU)	158-057233-000
26. Modem/Phone Cables (2)	158-057077-002

Table 4-2 NEC Versa 6000 Series Field-Replaceable Parts

Item	Part Number
27. Hard Disk Compartment Cover	136-238579-001A
28. 1 GB Hard Disk Drive 1.35 GB Hard Disk Drive 1.44 GB Hard Disk Drive	OP-220-62005 OP-220-62006 OP-220-62007
29. 3.5-inch, 1.44-MB Diskette Drive	134-507049-0010
30. Main Battery (Li-Ion)	804-021248-001A
31. Bottom Base Assembly (Plastic)	136-238585-001A
32. 6x CD-ROM Reader*	136-269134-001A
33. Shipping Carton*	158-041004-000
34. Left Packaging Foam Cushion*	158-041007-000
35. Right Packaging Foam Cushion*	158-041007-001
36. NEC Versa 6000 Series User's Guide*	819-200069-000 Rev. 00
37. NEC Versa 6000 Series Service and Reference Manual (this guide)*	819-200072-000 Rev. 00

* Not Shown in IPB Figure

SERVICE INFORMATION

NEC service and information telephone numbers are listed in Table 4-3.

Table 4-3 NEC Service and Information Telephone Numbers

Service	Call
To order NEC spare parts	In the U.S., call 1(800) 632-4525
To order options in the U.S.	Local Sales Office
To access the NEC Electronic Bulletin Board System (BBS)	1(508) 635-4706
To download files - provides software drivers and the latest ROM BIOS	1(508) 635-4706
NEC Technical Service Center (TSC)	In the U.S., call 1-800-632-4525
Listen to the automated attendant and select the appropriate menu to reach one of the following departments:	
Information Center - literature, dealer locations, sales leads, response to ads	
NSRC (National Service Response Center) - questions other than products, spare parts or technical support	
Service Contracts	
TAC (Technical Assistance Center) - technical support for NASC and NEC sales representatives only	
TSC (Technical Support Center) - technical support for everyone else	
FastFacts™ - automated service that sends the latest information about NEC products to the fax machine 24 hours a day	In the U.S., call 1(800) 366-0476 Outside U.S., 1(708) 860-9550 Ext. 2621
Canadian Inquiries	1(416) 795-3554

TECHNICAL SUPPORT

NEC Technologies Technical Support Center (TSC) provides an E-mail service for Internet users besides the support listed in Table 5-1. Technical questions regarding NEC products can be sent over the Internet system to TSC. The Internet address is as follows:

tech-support@nectech.com

If it is more convenient, questions may also be faxed to TSC. TSC's fax number is:

(508) 635-4666

Along with the complete product name and question(s), be sure to include your name and fax number or Internet address, so that an expert can respond to the question.

It would also help to include your telephone number in case TSC can not get their answer to you. TSC will reply to all questions received by Internet or fax within one business day.

PRODUCT INFORMATION

NEC FastFacts is an automated electronic information service used to obtain up-to-date product application notes, installation procedures, troubleshooting tips, data sheets, technical information bulletins, price lists, and other information.

Information can be obtained from the FastFacts service 24 hours a day, 7 days a week. Using a touch-tone telephone, call the FastFacts number, order the desired information through the automated attendant, and FastFacts will automatically fax the information.

Catalogs that list the documents and the document numbers are available. Current catalogs include:

- Catalog 1 - Monitors, Graphics Boards, and Data Projector Products
- Catalog 2 - CD ROM Hardware and Software, Printers, and Disk Drive Products
- Catalog 3 - Laptop, Desktop, and Server Computer Products
- Catalog 9 - Price and Configuration Index

ORDERING INFORMATION FROM FASTFACTS

Order information from FastFacts as follows:

1. Check that the fax machine is on.
2. Locate the document part number.
3. Using a touch-tone telephone, call 1-800-366-0476 (U.S. and Canada only).

For international use, enter the international long distance access number, the U.S. telephone number, and the U.S. extension (01-708-860-9550 ext. 2621).

4. Listen to the instructions provided by the automated attendant.

Press **1** to skip the FastFacts introduction and jump to the automated instructions for ordering a document or catalog.

Press **2** for an introduction to FastFacts, followed by the automated instructions for ordering a document or catalog.

5. When asked by the automated attendant, enter your fax number and telephone number.

For international use, first enter the international long distance access number (011), your country code, area code or city code, then your fax number.

The information requested will be sent automatically to your fax machine. If FastFacts attempts to send the second order before the first order is completed, the order could be canceled. After three tries, FastFacts assumes that the line is busy and will not process the order.

Appendix A

Connector Locations and Pin Assignments

Figure A-1 and Table A-1 show CPU board connectors. The remaining tables provide pin assignments for additional system connectors.

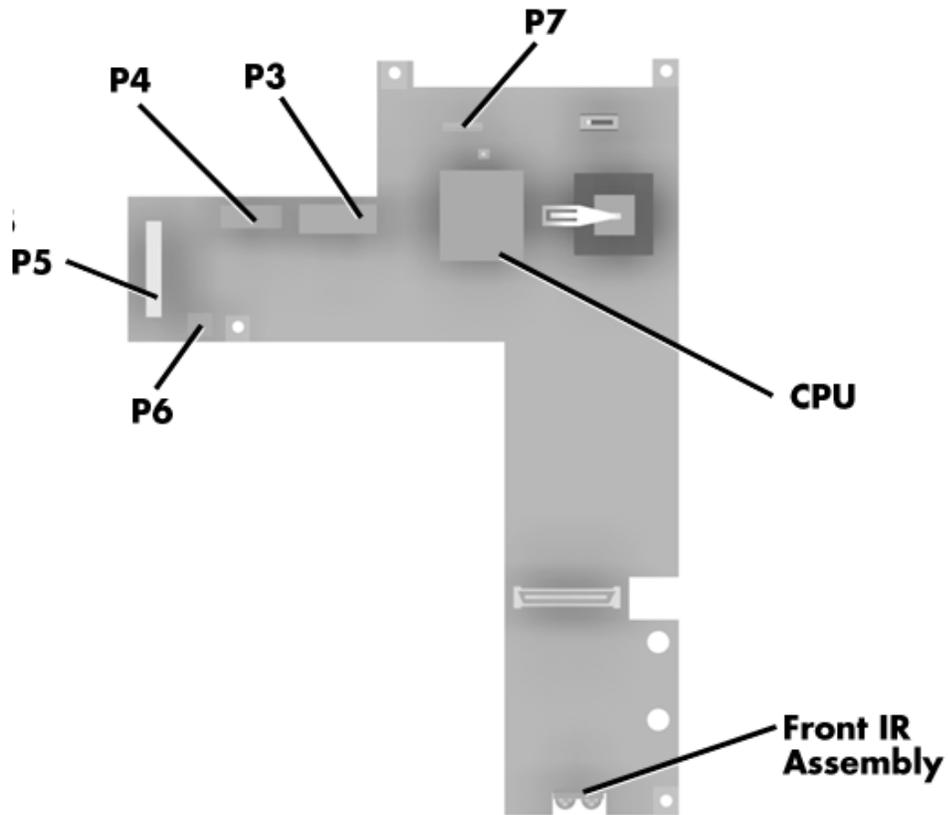


Figure A-1 CPU Board Layout

Table A-1 CPU Board Connectors

Connector	Description
P3 and P4	Keyboard Connectors
P5	LCD Status Bar
P6	VersaGlide Assembly Connector
P7	Rear Infrared Assembly Connector
P11 and P12	Front Infrared and LED Assembly

Table A-2 Keyboard/Mouse Connectors

Pin	Signal
1	KeyboardData
2	MouseData
3	Ground
4	+5V
5	Keyboard Clock
6	Mouse Clock

Table A-3 Serial Port Connector Pin Assignments

Pin	Signal
1	Data Carrier
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Ground
6	Data Set Ready
7	Request to Send
8	Clear to Send
9	Ring Indicator

Table A-4 CRT Connector Pin Assignments

Pin	Signal
1	Red
2	Green
3	Blue
4	OPT1
5	Ground
6	Ground
7	Ground
8	Ground
9	+5V PnP VESA Vcc
10	Ground
11	OPT2
12	PnP VESA Data
13	Horizontal Sync
14	Vertical Sync
15	PnP VESA Clock

Table A-5 Parallel Printer Pin Assignments

Pin	Signal
1	- Strobe
2	Data Bit 0
3	Data Bit 1
4	Data Bit 2
5	Data Bit 3
6	Data Bit 4
7	Data Bit 5
8	Data Bit 6
9	Data Bit 7
10	- Acknowledge
11	Busy
12	PE
13	Select
14	- Auto Feed XT
15	- Error
16	- Initialize
17	- Select In
18 -25	Ground

Table A-6 Power Connector

Pin	Signal
1	Ground
2	DCSYS
3	DCCHG
4	Type

Table A-7 Hard Disk Drive Connector

Pin	Signal
1	HDD Access LED
2	+5V
3	Chip Select 0
4	+5
5	Chip Select 1
6	+5V
7	Address 0
8	+5V
9	Address 2
10	+5V
11	Address 1
12	+5V
13	Diagnostic
14	Not Used
15	IRQ
16	Not Used
17	Not Used
18	IO Channel Ready
19	MS Select
20	IO Write
21	I/O Read
22	Not Used
23	Data 0
24	Data 1
25	Data 15
26	Data14
27	Data2
28	Data13
29	Data3
30	Not Used
31	Data12
32	Ground

Table A-7 Hard Disk Drive Connector

Pin	Signal
33	Data4
34	Ground
35	Data4
36	Ground
37	Data5
38	Ground
39	Data10
40	Ground
41	Data6
42	Ground
43	Data9
44	Ground
45	Data7
46	Not Used
47	Ground
48	Ground
49	RESET
50	Ground

Appendix B

Video Modes

The following tables list NEC Versa 6000 system video modes.

Table B-1 LCD Display Mode Setting (800x600 TFT Color LCD & Simultaneous CRT Display)

Mode (Hex)	Display Mode	Colors	Text Display	Resolution	Font	Refresh Rate
0*	Text	16 (gray)	40x25	320x200	8x8	70
0**	Text	16 (gray)	40x25	320x350	8x14	70
0***	Text	16	40x25	360x400	9x16	70
1*	Text	16	40x25	320x200	8x8	70
1**	Text	16	40x25	320x350	8x14	70
1***	Text	16	40x25	360x400	9x16	70
2*	Text	16 (gray)	80x25	640x200	8x8	70
2**	Text	16 (gray)	80x25	640x350	8x14	70
2***	Text	16	80x25	720x400	9x16	70
3*	Text	16	80x25	640x200	8x8	70
3**	Text	16	80x25	640x350	8x14	70
3***	Text	16	80x25	720x400	9x16	70
4	Graphics	4	40x25	320x200	8x8	70
5*	Graphics	4 (gray)	80x25	320x200	8x8	70
5**	Graphics	4 (gray)	80x30	320x200	8x8	70
5***	Graphics	4	80x30	320x200	8x8	70
6	Graphics	2	80x25	640x200	8x8	70

*CGA

**EGA

***VGA

Table B-1 LCD Display Mode Setting (800x600 TFT Color LCD & Simultaneous CRT Display)

Mode (Hex)	Display Mode	Colors	Text Display	Resolution	Font	Refresh Rate
7*	Text	Mono	80x25	720x350	9x14	70
7**	Text	Mono	80x25	720x350	9x14	70
7***	Text	Mono	80x25	720x400	9x16	70
D**/***	Graphics	16	40x25	320x200	8x8	70
E**/***	Graphics	16	80x25	640x200	8x8	70
F**/***	Graphics	Mono	80x25	640x350	8x14	70
10**/***	Graphics	16	80x25	640x350	8x14	70
11***	Graphics	2	80x30	640x480	8x16	70
12***	Graphics	16	80x30	640x480	8x16	70
13***	Graphics	256	40x25	320x200	8x8	60

* MDA

** EGA

*** VGA

Table B-2 CRT Display Mode (CRT only)

Mode (Hex)	Display Mode	Colors	Text Display	Resolution	Font	Refresh Rate
0, 1	Text	16	40x25	320x200	8x8	70
0*, 1*	Text	16	40x25	320x200	8x14	70
0**, 1**	Text	16	40x25	360x400	9x16	70
2, 3	Text	16	80x25	640x200	8x8	70
2*, 3*	Text	16	80x25	640x350	8x14	70
2**, 3**	Text	16	80x25	720x400	9x16	70
4,5*	Graphics	4	40x25	320x200	8x8	70
6	Graphics	2	80x25	640x200	8x8	70
7*	Text	Mono	80x25	720x350	9x14	70
7**	Text	Mono	80x25	720x400	9x16	70
D	Planar	16	40x25	320x200	8x8	70
E	Planar	16	80x25	640x200	8x8	70
F	Planar	Mono	80x25	640x350	8x14	70
10	Planar	16	80x25	640x350	8x14	70
11	Planar	2	80x30	640x480	8x16	60
12	Planar	16	80x30	640x480	8x16	60
12***	Planar	16	80x30	640x480	8x16	74
13	Packed Pixel	256	40x25	320x200	8x8	70

*EGA Extension

**VGA Extension

***High Refresh Modes

Table B-3 Panning Video Mode (800x600 TFT Color LCD and Simultaneous CRT Display)

Mode (Hex)	Display Mode	Colors	Text Display	Resolution	Font Size	Refresh Rate
34	Graphics(L)	256	100x37 (128x48)	800x600 (1024x768)	8x16	70
38	Graphics(L)	256	100x37 (160x64)	100x37 (160x64)	8x16	70
44	Graphics(L)	32K	100x37 (128x48)	100x37 (128x48)	9x16	70
45	Graphics(L)	64K	100x37 (128x48)	100x37 (128x48)	8x16	70
64	Graphics	16	100x37 (128x48)	100x37 (128x48)	8x16	70
68	Graphics	16	100x37 (160x64)	100x37 (160x64)	9x16	70
74	Graphics	256	100x37 (128x48)	100x37 (128x48)	8x16	70
78	Graphics	256	100x37 (160x64)	100x37 (160x64)	8x16	70

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(For United States Use Only)

**FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT**

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

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

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

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

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

(For Canadian Use Only)

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

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