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Preface

This service and reference manual contains the technical information necessary to set up, maintain, troubleshoot, and repair the Versa S series sub-notebooks. It also provides hardware and interface information for users who need an overview of the computer system 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 computer features, hardware design, interface ports and internal devices.

Section 2, Setup and Operation, takes the user from unpacking to setup and operation. Included is a description of the operating controls, System Configuration Utility, and system password.

Section 3, Power Management, describes how to use power management options to conserve energy and save battery power.

Section 4, Options, provides the user with installation information for options such as PCMCIA cards, memory upgrade, hard disk upgrade, and connecting external devices.

Section 5, Troubleshooting and Repair, includes a list of NEC service information and telephone numbers that provide access to the NEC Bulletin Board System (BBS), FastFacts, and Technical Information Bulletins. Included are desktop disassembly and reassembly procedures along with an illustrated parts breakdown. NEC service and spare parts ordering information is also provided.

Appendix A, Connector Pin Assignments, provides a list of the system board connector pin assignments.

An **Index** is included for convenience.

Abbreviations

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

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

Contents

Section 3 Power Management

Section 4 Options

Section 5 Troubleshooting and Repair

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Section 1

Technical Information

The NEC Versa™ S series sub-notebooks integrate Intel's SL Enhanced 486 microprocessor. The systems offer a unique transportable unit in the following models:

- Versa S/50C — 486DX2-50 CPU, thin-film-transistor (TFT) color LCD, 4-MB standard RAM, 8 KB cache RAM, 128-KB ROM, 260-MB hard disk
- Versa S/33C — 486SX-33 CPU, TFT color LCD, 4-MB standard RAM, 8 KB cache RAM, 128-KB ROM, 210-MB hard disk
- Versa S/33D — 486SX-33 CPU, double-scan super-twist nematic (DSTN) color LCD, 4-MB standard RAM, 8 KB cache RAM, 128-KB ROM, 210-MB hard disk
- Versa S/33M — 486SX-33 CPU, monochrome LCD, 4-MB standard RAM, 8 KB cache RAM, 128-KB ROM, 210-MB hard disk (125-MB – international models).

Figure Section 1-1 shows the components on the front and side views of the Versa S.

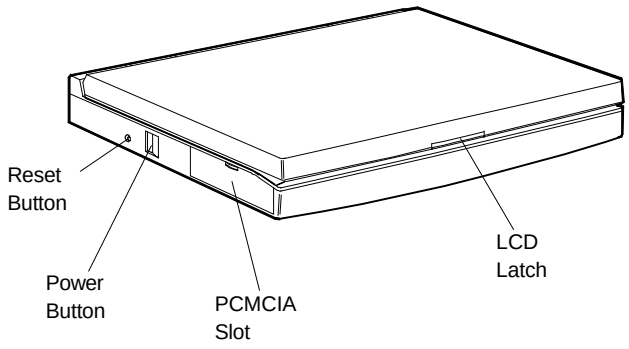

Figure Section 1-1 Versa S Components

The following system upgrades must be completed by authorized customer engineers or an authorized service center:

- additional memory (up to 12 MB)
- 260-MB hard disk.

System upgrade procedures are described in Section 4, Options.

HARDWARE OVERVIEW

The base unit includes a monochrome or color LCD panel, a 210- or 260-MB hard disk, an external 1.44-MB diskette drive, a battery pack, and a PS/2 compatible 80-key keyboard. A 81-key keyboard is used for U.K. and Germany.

One memory card slot is available for the addition of a 4- or 8-MB memory card. Two Personal Computer Memory Card International Association (PCMCIA) card slots, supported by the Cirrus Logic CL-PD6720 PCMCIA chip set, allow for the addition of either two Type 2 PCMCIA cards or one Type 3 PCMCIA card.

Figure Section 1-2 shows the I/O interface ports on the system's rear panel. These include one combined 6-pin PS/2-style keyboard and mouse port, one 15-pin Super VGA port, one 9-pin (RS-232C) serial port, one 25-pin enhanced printer (parallel) port, and one 3-pin power connector port.

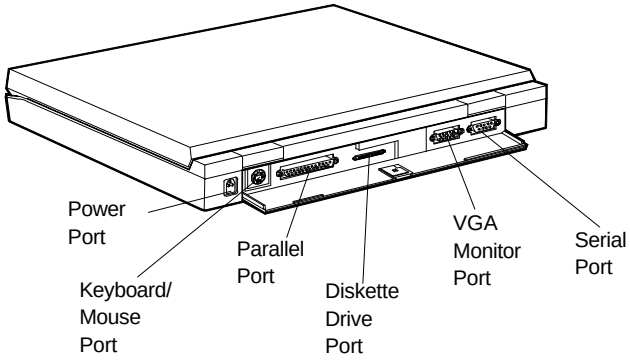

Figure Section 1-2 Versa S Series (Rear View)

Liquid Crystal Display (LCD)

The Versa S comes with one of three different LCD panels. Each panel provides a 9.5-inch viewing area.

- The thin-film transistor (TFT) color LCD has a 640 x 480 resolution, is backlit, and supports up to 4096 colors.
- The Dualscan Super-Twisted Nematic (DSTN) color LCD has a 640 x 480 resolution, is backlit, and supports up to 256 colors.
- The DSTN monochrome LCD (outside of the U.S. only) has a 640 x 480 resolution, is backlit, and supports 64 shades of gray.

A VGA 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 when using a resolution of 640 x 480 or lower.

Power-saving features for controlling the LCD's backlighting include the ROM-based hot key Fn F5, Fn F6, 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.

Keyboard

The built-in, 80-key keyboard (U.S.) or 81-key keyboard (UK and Germany) uses the standard QWERTY-key layout. 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.

Versa SurePoint

The Versa SurePoint™ pointing device performs the functions of a mouse. It is located between the G, H, and B keys. Pressing the Versa SurePoint in a specific direction moves the cursor in that direction. The two selection buttons below the keyboard act like the left and right mouse buttons on a two-button mouse.

The Versa SurePoint is the system's default pointing device unless a PS/2 mouse is installed. If an external mouse is installed, then the Versa SurePoint is deactivated.

LED Status Bar

The LED status bar contains eight light emitting diodes (LEDs) that light or blink to show the status of Versa S components. Figure Section 1-3 shows the locations of the LEDs on the status bar. A description of the LEDs follow.

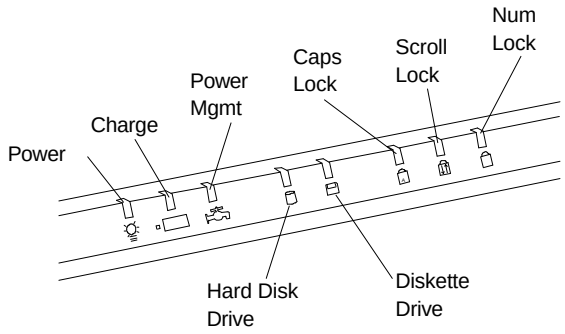

Figure Section 1-3 LED Status Bar

- Power LED — lights yellow or green.

— When steady green, the computer is running on AC power.

  — When steady yellow, the computer is running on battery power and battery power is sufficient.

  — When blinking yellow, the computer is running on battery power and battery power is low.

  — When off, the computer is in Suspend mode or the computer power is off.

- Charge LED — lights orange.

  — When lit continuously, the battery is charging.

  — When blinking orange, the battery has malfunctioned.

  — When off, no battery is installed, the AC adapter is not attached, or the battery is fully charged.

- Power Management LED — lights green

  — When lit continuously, Power Management features are enabled.

  — When blinking, the system is in Suspend mode.

  — When off, Power Management features are disabled.

- Hard Disk LED — lights green when the hard disk is being accessed. Avoid turning off the Versa S when this LED is lit.

- Diskette Drive LED — lights green when a diskette is being accessed.

- Caps Lock LED — lights green when the Caps Lock is in effect.

- Scroll Lock LED — lights green when the scroll lock key is active.

- Num Lock LED — lights green when Num Lock mode is in effect.

Battery

The system uses a nickel metal hydride (NiMH) battery as its transient power source. The battery pack installs in the compartment at the bottom of the base unit. The battery pack lasts approximately 2.0 hours under typical operating conditions and recharges in approximately 1.5 hours. A bridge battery is provided as an emergency backup. It backs up memory and system status for up to 5 minutes under Suspend mode.

System Board

The system board is inside the base unit. It contains system components including the CPU, system memory, and I/O subsystems.

Refer to Table Section 1-1 for a summary of the chipsets supported by the Versa S. For a list of system board connector descriptions, see Appendix A. System board specifications are listed in at the end of this section.

Table Section 1-1 Versa S Supported Chipsets

Chip	Manufacturer	Description	Technology
i486SX-33	Intel	33 MHz CPU	208-pin QFP*
i486DX2-50	Intel	50 MHz CPU	208-pin QFP*
PT86C368	PicoPower	System Controller	208-pin QFP*
FDC37C665	Standard MicroSystem Corporation	Peripheral Controller	100-pin QFP*
28F010	Intel	128-KB Flash ROM	32-pin PLCC**
CL-GD6235	Cirrus Logic	VGA Controller	208-pin QFP*
80C51SL	Intel	Keyboard Controller	44-pin QFP*
CL-PD6720-B	Cirrus Logic	PCMCIA Controller	208-pin QFP*

*QFP: quad flat package
**PLCC: plastic lead chip carrier

CPU

The CPU is an Intel SL Enhanced i486 chip (DX2-50 or SX-33). The CPU controls important functions including power management, direct drive bus interface, and memory management. It has a 32-bit internal data bus and requires an operating voltage of 3.3 volts.

The CPU’s microprocessor has an internal on-chip cache controller with 8-KB cache memory. The DX2-50's floating point unit (FPU) provides an internal math coprocessor.

Memory

The system board provides 4 MB of standard random access memory (RAM). Optional memory cards with a value of 4- or 8-MB can be added to increase system memory up to 12 MB.

The system board also provides 128 KB of read-only memory (ROM). The 28F010 flash ROM contains the system, power management, and video BIOS.

The Versa S supports system and video BIOS shadowing. When shadowing is enabled (default settings), the BIOS is copied from ROM to RAM which speeds up system performance. These settings can be changed in the SCU (see Section 2, Setup and Operation). Table Section 1-2 shows the system's memory map.

Table Section 1-2 Versa S System Memory Map

Address	Function
FFFFF | F0000	System BIOS (shadow) (64 KB)
| E8000	MAXIMIZER (shadow) (32 KB)
| E0000	Video BIOS (shadow enabled) (32 KB)
| C8000	ISA space available
| C0000	Video BIOS (shadow enabled) (32 KB)

Video Controller

The Cirrus CL-GD6235 video controller integrates a 32-bit local bus video. The system ships with 512 KB VRAM supporting LCD video modes up to 640 x 480 resolution with 256 colors (color model) or 64 shades of gray (monochrome model).

The system provides a 15-pin D-SUB connector to allow connecting an external display to the system. The system supports external display video modes up to 1024 x 768 with 16 colors or 800 x 600 x 256 color (non-interlaced). System video also supports simultaneous external display and LCD viewing. Table Section 1-3 shows the supported Versa S video modes.

Table Section 1-3 Versa S Video Modes

Mode (Hex)	Pixel Resolution	Character Size	Columns /Rows	Colors (K)	Video Clock (MHz)	Horizontal Freq (kHz)	Vertical Freq (Hz)
12	640 x 480	8 x 16	30 x 30	16/256	25.0	31.5	60.0
58/6A *	800 x 600	8 x 16	100 x 37	16/256	40.0	37.8	60.0
5C *	800 x 600	8 x 16	100 x 37	256/256	40.0	37.9	60.0
5D *	1024 x 768	8 x 16	128 x 48	16	65.0	48.3	60.0

5F	640 x 480	8 x 16	80 x 30	256/256	25.0	31.5	60.0

NOTE: * External display only.

Input/Output Controller

The FDC37C665 input/output (I/O) controller provides the following interfaces:

- RS-232C serial port
- parallel (printer) port
- diskette drive
- IDE hard disk.

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.

Parallel port addresses and interrupts are listed in Table Section 1-4. Pin locations for the parallel interface are listed in Appendix A.

Table Section 1-4 Parallel Port Addresses and Interrupts

Starting I/O Address	Interrupt Level
378h (LPT 1) *	IRQ07
278h (LPT 2)	IRQ05
3BCh (LPT 3)	IRQ07

*Default

The serial port consists of a 16450 compatible serial port controller with a programmable baud rate within 50/115.2 K bps. See Table Section 1-5 for the available addresses and interrupts.

Table Section 1-5 Serial Port Addresses and Interrupts

Starting I/O Address	Interrupt Level
3F8h (COM 1) *	IRQ04
2F8h (COM 2)	IRQ03
3E8h (COM 3)	IRQ04
2E8h (COM 4)	IRQ03

*Default

Keyboard Controller

The keyboard controller (80C51SL) 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.

The input clock cycle is 12 MHz. Data transmits between the controller and the keyboard through a bidirectional serial interface. The controller receives serial data, checks for parity errors, converts scan codes, and writes the data to the output buffer.

When data is written to the output buffer, the controller generates an interrupt (IRQ01 or IRQ12) 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 (CL-PD6720)

The PCMCIA interface uses a standard Exchangeable Card Architecture (ExCA) connector allowing the user to choose from an array of optional modem or network cards. The controller interfaces with the ISA bus, PCMCIA card socket and configuration registers to provide:

- memory address mapping, I/O address mapping
- power management for each PCMCIA card socket, controlled through power and RESETDRV control registers
- the elimination of interrupt conflicts using interrupt steering.

I/O Addressing

The CPU works in conjunction with I/O devices using I/O mapping. Refer to Table Section 1-6 for hex addresses.

Table Section 1-6 Versa S I/O Address Map

Address (Hex)	I/O Device Name
000-00F	DMA Controller 1
020-03F	Interrupt Controller 1
040-043	Timer 1
048-04B	Timer 2
060-064	Keyboard Controller

Table Section 1-6 Versa S I/O Address Map

Address (Hex)	I/O Device Name
061	NMI Status
070	NMI Mask
070-076	Real-time Clock
081H-083H	DMA Page Register
087H	DMA Page Register
089H-08BH	DMA Page Register
08FH	DMA Page Register
092H	Port 92
0C0H-0CEH	DMA Channel
0D0H-0DEH	DMA Controller 2
0102H	Parallel Port Configuration
0278H-027AH	LPT2
02F8H-02FFH	Serial Controller Port B
0372H-0377H	Diskette Drive Controller
0378H-037AH	LPT1
03BCH-03BEH	LPT3
03F0H-03F5H	Diskette Drive Controller Port Status
03F8H-03FFH	Serial Controller Port A
0461H	Port 461 EISA mode
0C00H	Extended System Port 1
0C01H	Extended System Port 2
0C02H	Extended System Port 3
0C03H	Extended System Port 4
0C10H	Extended System Port 6
03E0-03E1	PCMCIA

Interrupt Controller

The interrupt controller operates as an interrupt manager for the CPU. The controller receives requests from peripherals and issues interrupt requests to the CPU. Interrupt-level assignments 0 through 15 are listed in Table Section 1-7, in order of decreasing priority.

Table Section 1-7 Versa S Series Interrupt-Level Assignments

Controller Master/Slave	Priority	Name	Device
Master	0	IRQ00	Counter/Timer 1
Master	1	IRQ01	Keyboard
Master	2	IRQ02	Cascade for 8 to 15
Slave	3	IRQ08	Real-time Clock
Slave	4	IRQ09	VGA
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
Slave	10	IRQ15	Reserved
Master	11	IRQ03	COM2, COM4*
Master	12	IRQ04	COM1, COM3*
Master	13	IRQ05	Parallel Port 2
Master	14	IRQ06	Diskette Drive Controller*
Master	15	IRQ07	Parallel Port 1*

*Industry standard locations

Power Management Overview

The Versa system uses power management features to prolong system battery life.

The CPU (SL Enhanced i486) implements a System Management Interrupt (SMI) function that works transparently with the operating system and application software. When activated, the processor mode changes to real mode. Unique "SM-RAM" containing power management software is mapped at address 30000h — 3FFFFh. This activity is inherent to the system and does not require any adjustment to the operating system or application software.

The power management program is located in ROM at location E8000h — EFFFFh. In onboard DRAM, the software is physically allocated at the same location.

Use the System Configuration Utility to select specific power management options. For information on how to select these options, see Section 3, Power Management.

SPECIFICATIONS

Table Section 1-8 provides a complete list of Versa E series system specifications.

Table Section 1-8 Specifications

Item	Specification
Chassis	
Size	Width: 10.76 in. (276 mm) Depth: 8.26 inches (212 mm) Height: — Versa S/50C, S/33C: 1.63 in. (42 mm — Versa S/33D:)1.52 in. (39 mm) — Versa S/33M: 1.4 in. (36 mm) Weight: — Versa S/50C: 5.07 lb (2.30 kg) — Versa S/33C: 4.71 lb (2.14 kg) — Versa S/33D: 4.71 lb (2.14 kg) — Versa S/33M: 4.23 lb (1.92 kg) (Exact weight depends on options)
Keyboard	PS/2 compatible, 80-key standard (U.S.), 81-key standard (UK and Germany) Fn Key for ROM-based functions
Device Slots	One internal 2 1/2-inch x 0.75-inch high slot, right side access, for standard hard disk One 3 1/2-inch x 0.75-inch high slot, bottom-access, for primary battery One memory slot for optional memory card Two PCMCIA slots that support up to two optional cards oriented one on top of the other
Power	AC Adapter: Input Voltage: 90 to 240 VAC, 50 or 60 Hz, 1200 mA DC/DC Adapter: On board Battery Pack: 12 VDC, 1800 mA Battery Life: approximately 2 hours under typical operating conditions Recharging time: approximately 1.5 hours Bridge battery: backs up memory contents and system status for up to 5 minutes under Suspend mode.

Table Section 1-8 Specifications

Item	Specification	
System Board		
Flash ROM	128 KB:	28F010
	System BIOS:	64 KB
	Video BIOS:	32 KB
	Power Management:	32 KB
I/O Interface Connectors	6-pin PS/2 External Keyboard/mouse Connector	
	9-pin Serial Connector	
	15-pin VGA Connector	
	25-pin Parallel Connector	
	3-pin DC-In Power Connector	
	72-pin Internal Memory Connector	
	44-pin IDE Connector	
	26-pin External Diskette Drive Connector	
CPU	SL Enhanced i486 DX2-50 or SX-33	
Clock Speed	50 MHz or 33 MHz	
Memory		
System Memory	4 MB resident on system board	
Optional	Expandable to 12 MB	
Video RAM	512 KB	
Cache RAM	8 KB	
Display		
Monochrome Model	Technology: FTN, backlit, monochrome LCD	
	Resolution: 640 x 480 pixels	
	Display: 64 shades of gray	
	Dot Pitch: 0.3 mm	
	Viewing Area: 9.5 in. screen	
	Interface: Super VGA	
Color Models	Technology: — Versa S/50C, S/33C: TFT, backlit, color LCD — Versa S33DDSTN, backlit, color LCD	
	Resolution: 640 x 480 pixels	

Table Section 1-8 Specifications

Item	Specification
	Display: — Versa S/50C, S/33C: 4096 colors — Versa S/33D: 256 colors
	Dot Pitch: 0.3 mm
	Viewing Area: 9.5 in. screen
	Interface: Super VGA
Internal Device Support	
Diskette Drive	External, 3 1/2-inch, 1.44-MB
Hard Disks	210-MB (Versa S/33C, S/33D, S/33M)
	260-MB (Versa S/50C)
	Controller: IDE controller integrated on hard disk
Software	
Standard	MS-DOS version 6.2
	Windows version 3.1
	APM drivers
	Mouse drivers
	Systemsoft CardSoft PCMCIA
	Auxiliary Windows Video Drivers (AWD)
	NEC Communications Assistant
	Versa S on-line help
	Windows and DOS on-line help
Recommended Environment	
Operation	Temperature: 41_ to 95_F (5_ to 35_C)
	Relative Humidity: 20% to 80% (No condensation)
Storage	Temperature: -4_ to 104_F (-20_ to 40_C)
	Relative Humidity: 10% to 80% (No condensation)
Administrative Compliance	
	UL 1950 CSA C22.2 No. 220 FCC Class B TUV EN60950: 1988 C.R.C., c.1374 VDE 0871/6.78

Section 2

Setup and Operation

This section provides setup and operation information for the Versa S (including cabling, power-on verification, and using the System Configuration Utility).

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 includes the base unit, external diskette drive, AC adapter, AC power cable, software diskettes, spare SurePoint caps, and user documentation.

SETUP

Perform the following procedure to set up the Versa S.

1. Open the LCD panel.

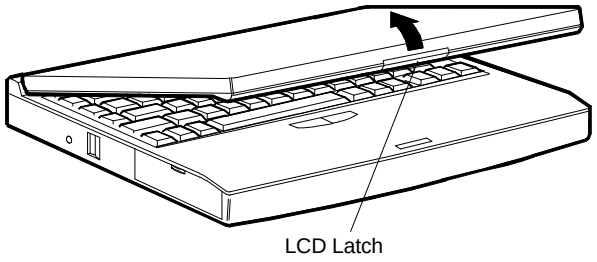

Figure Section 2-1 Opening the LCD Panel

2. Connect the AC adapter cable to the power port on the back of the system.

3. Connect one end of the AC power cable to the AC adapter and the other end to a properly grounded wall outlet.

The LED on the AC adapter and the Charge LED on the system lights.

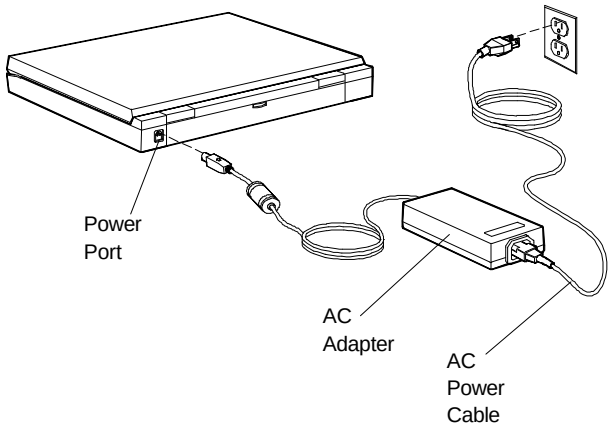

Figure Section 2-2 Attaching the AC Adapter

4. Connect the diskette drive (optional) to the system as follows:

- Align the diskette drive cable connector with the diskette drive port on the system.
- Press the connector into the port until it clicks into place.

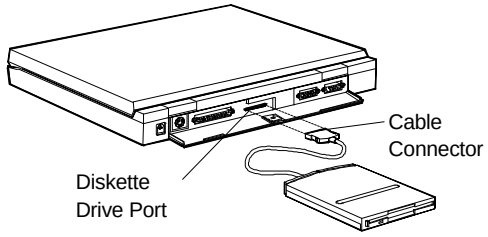

Figure Section 2-3 Connecting the Diskette Drive

5. Press the power button to turn on the system.

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

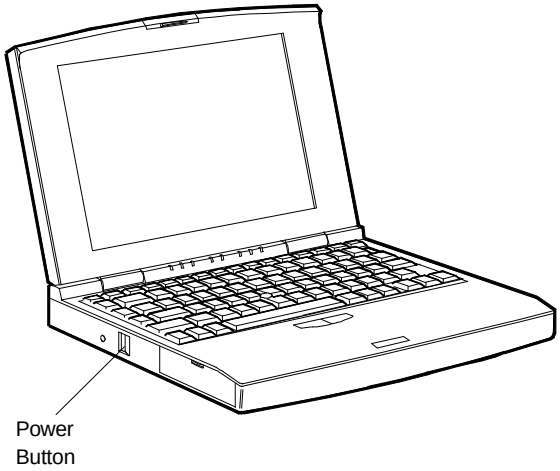

Figure Section 2-4 Turning on the Versa S

Replacing a Battery Pack

Follow these instructions to replace a battery pack.

1. Close the LCD panel securely. Disconnect any external options.

2. Turn the Versa S upside down.

3. Locate the battery release latch on the bottom of the system and slide it back.

4. Lift up and remove the battery pack.

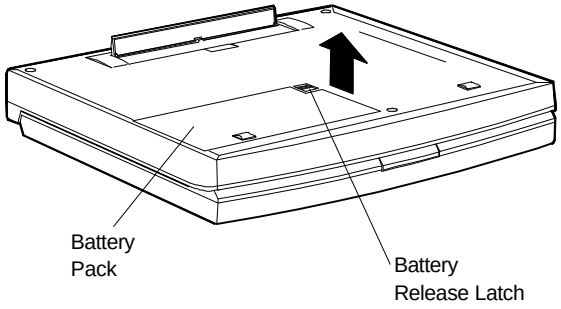

Figure Section 2-5 Removing the Battery Pack

5. Locate the tabs on the end of the new battery pack. Fit the tabs into the grooves inside the compartment.

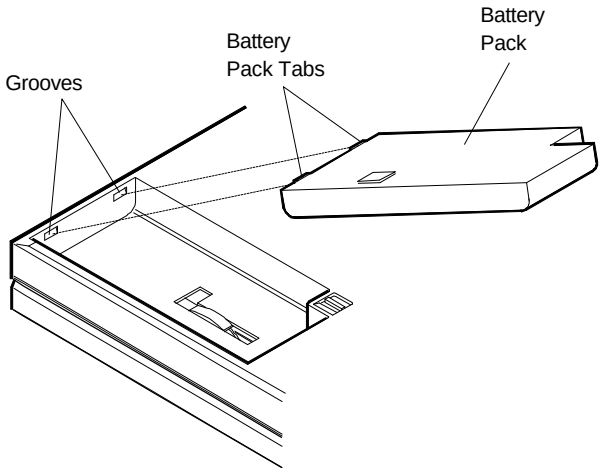

Figure Section 2-6 Locating the Tabs and Grooves

6. Lower the battery pack into the compartment. Press it down until the battery pack latch clicks and locks the battery in place.

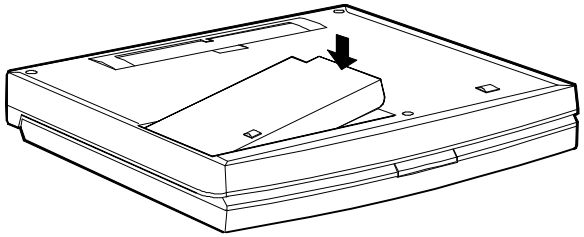

Figure Section 2-7 Inserting the Battery Pack

7. Turn the Versa S right side up and reconnect the external options.

OPERATING CONTROLS

The following section describes system controls. Refer to Figure Section 2-8 to locate system controls and buttons.

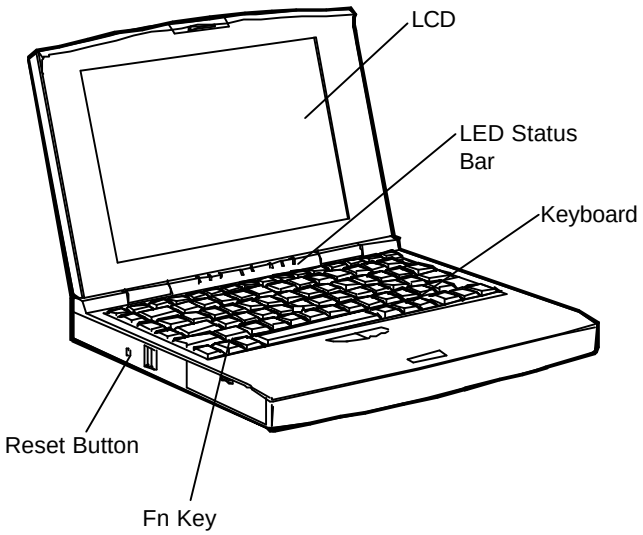

Figure Section 2-8 Control and Button Locations

LED Status Bar

The LED status bar contains eight light emitting diodes (LEDs) that light or blink to show the status of Versa S components. Figure Section 2-9 identifies the LEDs on the status bar. A description of the LEDs follow.

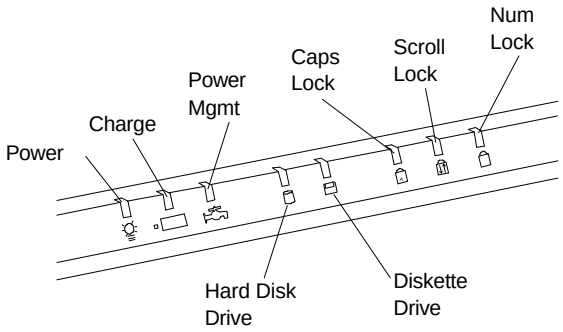

Figure Section 2-9 LED Status Bar

- Power LED — lights yellow or green.

— When steady green, the computer is running on AC power.

  — When steady yellow, the computer is running on battery power and battery power is sufficient.

  — When blinking yellow, the computer is running on battery power and battery power is low.

  — When off, the computer is in Suspend mode or the computer power is off.

- Charge LED — lights orange.

  — When lit continuously, the battery is charging.

  — When blinking orange, the battery has malfunctioned.

  — When off, no battery is installed, the AC adapter is not attached, or the battery is fully charged.

- Power Management LED — lights green

  — When lit continuously, Power Management features are enabled.

  — When blinking, the system is in Suspend mode.

  — When off, Power Management features are disabled.

- Hard Disk LED — lights green when the hard disk is being accessed. Avoid turning off the Versa S when this LED is lit.

- Diskette Drive LED — lights green when a diskette is being accessed.

- Caps Lock LED — lights green when the Caps Lock is in effect.

- Scroll Lock LED — lights green when the scroll lock key is active.

- Num Lock LED — lights green when Num Lock mode is in effect.

SurePoint and Selection Buttons

A pointing device that performs the functions of a mouse is located between the G, H, and B keys. To move the cursor on the screen in a specific direction, press against the SurePoint in that direction. The two selection buttons below the keyboard act like a left and right mouse button on a two-button mouse.

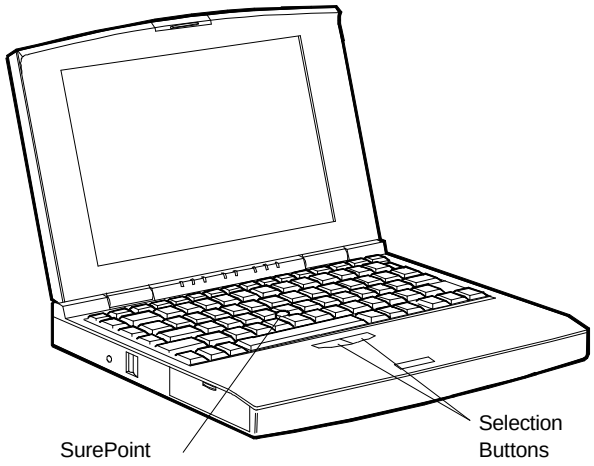

Figure Section 2-10 SurePoint and Selection Buttons

Fn Key

The **Fn** key is used in conjunction with other control keys to perform preprogrammed functions. To use these keys, press and hold the **Fn** key while pressing another control key. The **Fn** and control key combinations provide the following system functions.

- **Fn-Esc** (the Suspend button) puts the system in Suspend mode. This initiates power-saving features to conserve energy and battery power.
- **Fn-Home** (the Break key) stops whatever command is currently executing.
- **Fn-Pg Up** (the Print Screen key) sends the current screen to the assigned printer.
- **Fn-Pg Dn** (the Pause key) temporarily stops command execution.
- **Fn-End** (the Num Lock key) puts the system in Num Lock mode and activates the embedded keypad.
- **Fn-F2** — toggles between three settings: LCD, CRT (external display), and Both.
- **Fn-F3** — for monochrome models only. Toggles between normal and reverse text on the LCD screen. For example, if the screen shows white text on a black background, it changes to black text on white.
- **Fn-F4** — increases the display brightness.

- **Fn-F5** — decreases the display brightness.

> **NOTE:** For longer battery power, decrease the brightness.

- **Fn-F6** — increases the display contrast.
- **Fn-F7** — decreases the display contrast.
- **Fn-F8** — accesses Power Management setup.
- **Fn-F9** — accesses the SCU setup.
- **Fn-F11** — toggles Scroll Lock on and off. In some programs, **Scroll Lock** affects how the cursor controls work. Pressing a cursor control key scrolls the entire screen instead of moving the cursor. For example, pressing the up arrow once moves the entire screen up a line. The cursor stays where it was.
- **Fn-F12 —** acts as an interrupt key.

Reset Button

The reset button resets the system without turning power off. Push in the reset button using a pointed object like a straightened paper clip. Use this if the system locks up or fails to respond to keystrokes.

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 **F1** to enter the SCU. Press **Enter** to review the settings, and make any necessary corrections. For more complete information, see “Using the SCU” in the following subsection.

If no error messages appear but the system still malfunctions, first check the items in the list below, then turn to Section 4, Troubleshooting and Repair.

- 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.

SYSTEM CONFIGURATION UTILITY

The system uses the System Configuration Utility (SCU) to store information about the Versa S hardware and software. Use the SCU to perform the following functions:

- set date and time
- change CPU speed
- set a password
- activate power management features
- update system hardware changes.

Accessing the SCU

From the DOS prompt, press **Ctrl-Alt-S** or **Fn-F9** to access the SCU. (Do not access the utility from Windows.) A screen similar to the following appears.

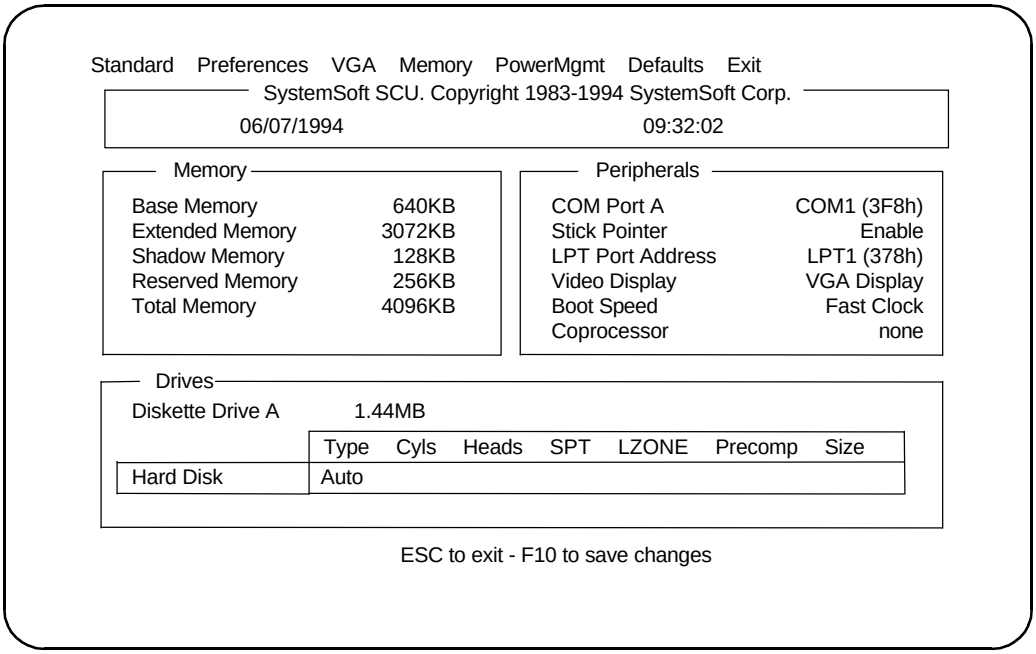

Figure Section 2-11 SCU Main Menu

The Main Menu is made up of the following areas:

- A menu bar at the top of the screen lists the menus.
- The next block shows information about the SCU software, the current date, and time.

- The next three blocks show system settings.
  - — The Memory block displays system memory information.
  - — The Peripherals block shows settings for system peripherals.
  - — The Drives block specifies the diskette drive and hard disk installed.
- The bottom line of the screen shows what key functions are available at that screen level and what they do.

Using the SCU

Use the following procedure to use the SCU.

1. Use the cursor arrows to highlight the menu selection and press **Enter**. Suboptions give three ways to make selections, depending on the option:
   - Enter information, as when setting the date or time.
   - Toggle between enabled and disabled, as when selecting Num Lock. Press **Enter** to enable a highlighted option. A check appears next to the enabled option.

     Press **Enter** to disable an enabled option. The option is disabled and the check disappears.
   - Some options display a list from which to choose as when selecting a typematic rate. Use the up and down arrows to highlight the selection and press **Enter**.
2. Press **Esc** to return to the previous menu.
3. Press **F10** to save the SCU changes at any time while using the SCU.

SCU Menu Options

Descriptions of menu bar selections and options follow.

Standard

Use the options under Standard to view and modify the following settings.

- Date — Set the date using the format *MM*/*DD*/*YYYY*. The initial setup date is 01/01/1993.
- Time — Set the time using the format *HH:MM:SS*. The initial setup time is 00:00:00.

- COM Port A — Set the Serial Port I/O Address for COM Port A.

— COM1 (3F8h) – default setting

— COM2 (2F8h)

— COM3 (3E8h)

— COM4 (2E8h)

— Disable

- SurePoint — Enables or disables the SurePoint pointer.

— Enable – default setting

— Disable

- LPT Port Address — Set the parallel port I/O address.

— LPT1 (378h) – default setting

— LPT2 (278h)

— LPT3 (3BCh)

— Disable

- Diskette Drive — Set the diskette drive type for Drive A. It is recommended that this setting not be changed.

— 1.44 MB – default setting

— 720 KB

— None

- Hard Disk — Set the hard disk type for Drive C. If replacing the hard disk, see the documentation that comes with the new drive for hard disk setting information.

— Standard

— Custom

— Auto – default setting

— None

- Video Display — Set the video display type. Choose from the following selections if connecting an external monitor.
  - VGA – default setting
  - CGA80 Column
  - CGA40 Column
  - Monochrome

Preferences

Options available under the Preferences menu are described next.

- Quick Boot — Enable/disable the system to bypass the memory test when the self-test is performed at start-up.

  The default setting is disabled.

- Num Lock — Enable/disable Num Lock mode at system start-up. (The embedded keypad produces the assigned numbers rather than letters when enabled.) Regardless of this setting, the Num Lock key will enable and disable the Num Lock mode.

  The default setting is disabled.

- Boot Speed — Set the initial CPU speed. When running on battery power, the slower speed can extend operating time. Choose from the following selections.
  - Fast Clock – default setting
  - Slow Clock

- Typematic Rate — Set the speed at which a character repeats when a key is pressed and held. Choose from the following character per second (cps) values.
  - 30 cps
  - 20 cps
  - 15 cps
  - 10 cps – default setting
  - 6 cps
  - 2 cps

- Typematic Delay — Set the delay time between the key press and starting the repeat action. Select from the following millisecond (ms) values.
  - 250 ms
  - 500 ms – default setting
  - 750 ms
  - 1000 ms

- Boot Password — Set a password to prevent unauthorized system use. When a boot password is set, the system requires that the password be entered correctly before completing the boot cycle.
- Enter a password as follows.
  - Highlight “Boot Password” and press **Enter**.
  - When prompted, type a password that is from 4 to 8 characters long and press **Enter**.
  - When prompted to re-enter the password, enter the password again, and press **Enter**.

    When the password entry is verified, Boot Password is enabled. No one will be able to use the system without first entering the password. If the password is forgotten, call the NEC Technical Support number listed in Chapter 4.

- SCU Password — Set a password to access the SCU. When this option is enabled, no one can change system setup parameters without first entering the correct password. This option prevents someone from setting a boot password that could deny a user access to the Versa S.
- Set an SCU password as follows.
  - Highlight “SCU Password” and press **Enter**.
  - When prompted, type a password that is from 4 to 8 characters long and press **Enter**.
  - When prompted to re-enter the password, enter the password again, and press **Enter**.

    When the password entry is verified, SCU Password is enabled. No one will be able to use the SCU without first entering the SCU password.

  If the password is forgotten, call the NEC Technical Support number listed in Chapter 5.

- First Boot — Select the drive that the system first looks for the operating system at system startup.
  - — Drive A – default setting
  - — PCMCIA Card
  - — Drive C

VGA

VGA submenu option is described next.

- Display Mode — Select and activate the display mode. To use an external monitor with the Versa S, select "Both."
  - — Both
  - — LCD – default setting
  - — CRT

Memory

Memory setup features enable and disable cache memory.

- Cache Enable —Enabling this feature can speed up some application processing. The cache is enabled at the factory.

  To disable cache memory, highlight the option and press **Enter**.

Power Management

For details about power management features and settings, see Section 3.

Default Setup

Sets default values for all setup entries. Defaults set for the Standard menu are as follows:

- Date — 01/01/1993 (default setting)
- Time — 00:00:00 (default setting)
- COM Port A — COM1 (3F8h)
- SurePoint — Enable
- LPT Port Address — LPT1 (378h)

- Diskette Drive — 1.44 MB; diskette drive
- Hard Disk — Auto
- Video Display — VGA display

Defaults set for the Preferences menu are as follows.

- Quick Boot — Disabled; performs memory test at start-up
- Num Lock — Disabled; off at start-up
- Boot Speed — Fast clock
- Typematic Rate — 10 cps
- Typematic Delay — 500 ms
- Boot Password — Disabled
- SCU Password — Disabled
- First Boot — Drive A

The default setting in the VGA submenu is as follows.

- Display Mode — LCD

The default setting in the Memory submenu is as follows.

- Cache Enable — Enabled.

Exit

Highlight **Exit** and press **Enter** to exit the SCU.

- If no changes were made, the following system message appears:

  ESC to exit now

  Any other key to continue

  Press **Esc** to exit the utility. Press any other key to continue making SCU selections.

- If any of the SCU settings were changed, the following screen message appears.

  Do you wish to save your changes?

  ESC to exit – Enter to save and exit

  Any other key to continue

  — If **Esc** is pressed, the system does not save any changes and exits the SCU. The system does not reboot.

  — If **Enter** is pressed, the system writes the new setup values to backup battery memory, then exits the program. The system reboots.

  — If any other key is pressed, the system returns to the SCU Main Menu.

Section 3

Power Management

Power Management is a set of power-saving features built into the Versa S. These features conserve energy, maximize the life of the battery pack and LCD backlight, and protect against data loss due to low battery power.

Versa S has two programs that work together to provide power management capabilities.

- Power Management Utility — accessed through the SCU
- Advanced Power Management (APM) — accessed through MS-DOS or Windows.

This section describes the Power Management Utility and APM. It also provides guidelines for extending battery life for the Versa S.

POWER MANAGEMENT UTILITY

The Power Management utility provides settings for various power-saving features. They include:

- enable or disable Power Management
- set the system to go into Suspend mode automatically when closing the LCD panel
- specify time-outs for the CPU, LCD, and hard disk before going into Suspend mode
- stipulate many other power-saving features.

Accessing the Power Management Utility

Access Power Management with one of the following methods. (Do not try to access this utility from Windows.)

- Use the function key combination **Fn-F8** to go directly into Power Management.
- From the DOS prompt, press **Ctrl-Alt-S** to access the SCU Main menu. From the menu bar, highlight “Power Mgmt” and press **Enter**.

A screen similar to the following appears.

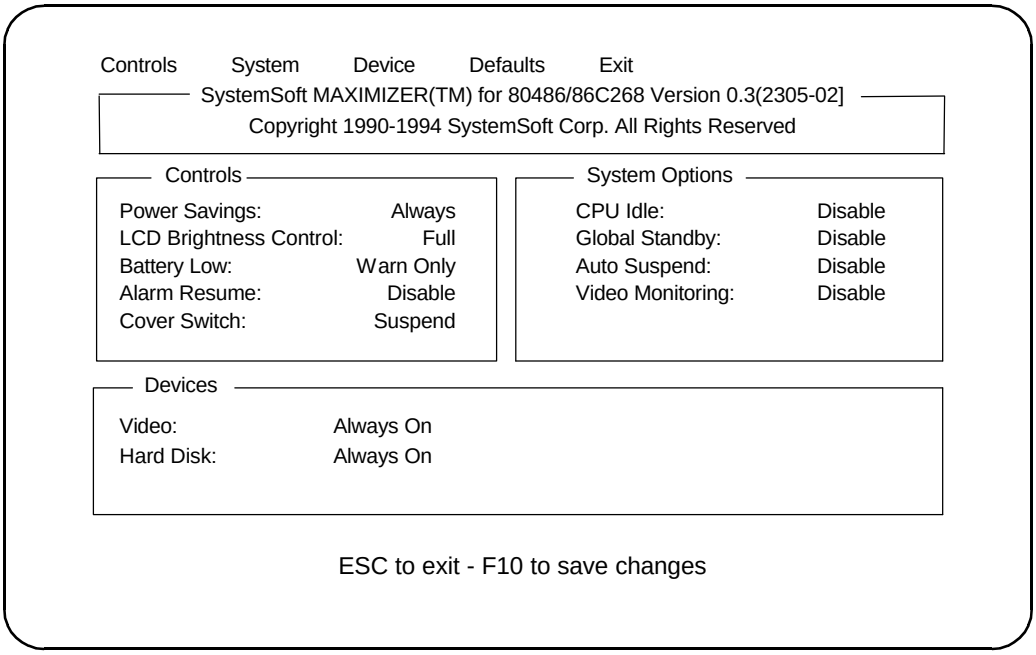

Figure Section 3-1 Power Management Menu

To make selections in Power Management, use the keyboard keys as follows:

1. Use the right and left cursor arrows to highlight the menu selection.
2. Press **Enter**.
3. In the submenu, use the up and down cursor arrows to highlight a suboption.
4. Press **Enter**. Suboptions provide two ways to make a selection:
   - Some options toggle between being enabled and disabled. Press **Enter** to enable a highlighted option. A check appears next to the enabled option.

     Press **Enter** to disable enabled options. The check disappears and the option is disabled.
   - Some options display a list from which to choose. Use the up and down arrows to highlight the desired choice and press **Enter**.
5. Press **Esc** to return to the previous menu.
6. Press **F10** to save the changes at any time.

Menu Options

Descriptions of the menu bar selections and options follow.

Controls

Use the Controls menu to enable and disable the following features.

- Power Saving — This option specifies when power saving features are enabled. Select from the following choices.
  - — Always – enables Power Management when the system is running on either battery or AC power.
  - — Battery – enables Power Management when the system is running on battery power (default setting).
  - — Disable – disables Power Management.
- LCD Bright Ctrl — Specifies the initial brightness setting for the LCD panel.
  - — Full – default setting when running on AC power
  - — Standard – default setting when running on battery power
- Battery Low — Enabling Battery Low directs the system to enter Suspend mode when it detects low battery power.
- Modem Ring Resume — When enabled, this option specifies that if the system detects a modem ring, it returns to normal operation mode if it is in a power-saving mode.
- Alarm Resume — When enabled, this option directs the system to exit power-saving modes at a specified time. Once enabled, the system asks for a time to resume operation mode.

  Highlight Alarm Resume and press **Enter** to enable the option. Enter the time in the *xx:xx* (hour:minute) format, using a 24-hour clock.
- Cover Close Switch — This option directs the Versa S to do one of the following when the LCD panel is closed. It either turns off just the LCD panel or puts the entire system in Suspend mode.
  - — LCD On/Off (turns off just the LCD panel)
  - — Suspend – default setting (puts the Versa S into Suspend mode)
- Beeper On/Off — This option enables and disables the system's internal speaker. The default setting is Enabled.

System Options

System Options menu specifies how long the system is inactive before initiating power-saving features and going into Suspend mode. Use the System Options menu to enable and disable the following features.

- CPU Idle — Set how long the system is idle before slowing the rate of the CPU speed. Choices are as follows.
  - — 4 sec (default setting)
  - — 8 sec
  - — 16 sec
  - — Disable
- Global Standby — Specify how long the system is idle before entering Global Standby mode. Global Standby powers down the specified devices and slows the CPU clock speed.
  - — 1 Minute (Min)
  - — 2 Min
  - — 4 Min (default setting)
  - — 6 Min
  - — 8 Min
  - — 12 Min
  - — 16 Min
  - — Disable
- Auto Suspend — Define how long the system is inactive before automatically going into Suspend mode.
  - — 1 Min (default setting)
  - — 5 Min
  - — 10 Min
  - — 20 Min
  - — 30 Min
  - — 40 Min

— 60 Mine

— Disable

- Video Monitoring — Specify whether Power Management monitors video activity as it relates to going into Suspend mode. Disabling video monitoring is useful for applications that have something happening on the screen constantly. For example, a changing clock on the screen can keep the system from initiating power saving features even though the system is not in use.

  Choose from the following selections.

  — Enable: ON

  — Disable: OFF (default setting)

Device Setup

The options under Device Setup specify how long a device is inactive before power-saving is activated.

- Video — Specify how long the monitor waits for system inactivity before putting the LCD or CRT into Video Standby mode. The screen goes blank in Video Standby. This mode is most effective in LCD mode, because it turns off the panel backlight.

  — 1 Min

  — 2 Min (default setting)

  — 4 Min

  — 6 Min

  — 8 Min

  — 12 Min

  — 16 Min

  — Always On

- Hard Disk — Set how long the hard disk waits for access before going into Hard Disk Standby mode. Hard Disk Standby mode slows the hard disk speed.

  — 1 Min

  — 2 Min (default setting)

  — 4 Min

— 6 Min

— 8 Min

— 12 Min

— 16 Min

— Always On

Default Setup

Highlight Default Setup and press **Enter** to reset Power Management options to their default settings.

Exit

Highlight Exit to exit the Power Management Utility screen.

- Press **Enter**. If changes were made, the system displays the following message.

  Do you wish to save your changes?

  ESC to exit – ENTER to save and exit

  Any other key to continue

- If no changes were made, the system displays the following message.

  ESC to exit now

  Any other key to continue

Follow the appropriate instructions.

APM PROGRAM

Advanced Power Management conserves power through features that are specified by the APM program. APM settings are already specified in the system. When power management is enabled through the SCU, the system retrieves the settings specified in APM and initiates them after the defined timeouts. If the settings are changed, either through DOS or Windows, the new settings are initiated. (See the *MS-DOS and Windows User's Guide* for details.)

The following subsections describe the APM features.

Hardware Power Management

Specific hardware power management features include the following.

- Clock stretching — APM reduces the CPU speed without adding a wait state when a 0.5-cycle wait state is needed in case of DRAM access.
- Quiet bus — APM inhibits all signals in the AT Bus except the AT bus cycle. This function saves energy by reducing the number of unnecessary charges and discharges.
- Power-saving devices — APM puts devices that have power-saving features into Standby mode when they are not active.

System Power Management

System power management features include the following.

- APM Idle — APM uses an Idle Detector to sense system inactivity. (The detector does not work with some applications.)
- CPU Standby — When enabled, APM slows the CPU clock speed to 3.125 MHz if no system activity is detected for the specified timeout. Once system activity is detected, the CPU clock speed returns to normal.

> **NOTE:** System activity includes diskette drive and hard disk access, keyboard activity, COM port and LPT port input/output.

- Global Standby — When enabled, global standby puts all specified devices into Standby mode and slows the CPU clock speed to 3.125 MHz after the specified timeouts. Once system activity is detected, the system returns to normal operation mode.
- Auto Suspend — When enabled, Auto Suspend puts the system into Suspend mode after the specified timeout elapses.

Device Status

The following table shows the status of system devices in Auto Suspend mode.

Table Section 3-1 Status of Devices in Auto Suspend Mode

Device	Status
PT86C368	Suspend
Main/expansion memory	Slow refresh
82C206	Active
32-KHz Oscillator	Active
80C51SL	Standby
VGA Controller	Standby
Video Memory	Slow Refresh
Power SW Circuit	Active

NOTE: Suspend/Resume does not work with operating systems that employ protected modes (such as OS/2 and UNIX). To use a protected-mode operating system, disable power saving.

The following table shows the status of devices when the system is in the listed power-saving mode.

Table Section 3-2 Status of Devices in Power Saving Mode

Device	CPU Standby	Global Standby	Suspend
CPU	1/2 maximum	1/2 maximum	Off
Evergreen/PINE	On	On	Suspend Mode
8C206	On	On	Suspend Mode
FDC37C665	On	On	Off
Main Memory	Normal	Normal	Slow Refresh
ROM	On	On	Off
80C51SL	Idle	Idle	Suspend Mode
Internal keyboard	Active	Active	Any-Key Resume

Table Section 3-2 Status of Devices in Power Saving Mode

Device	CPU Standby	Global Standby	Suspend
External keyboard	Active	Active	Off
Cirrus VGA	On	Standby	Slow Refresh
LCD (Display and Backlight)	On	Off	Off
SurePoint	On	On	Off
PS/2-Style Mouse	On	On	Off
Diskette Drive	On	Standby	Off
Hard Disk	On	Standby	Off
Serial Port Buffer	On	On	Off

EXTENDING BATTERY LIFE

Use the following guidelines to reduce power consumption and maximize battery life. These guidelines work with AC power as well as battery power. (Some of these features must be set up through the Power Management utility. See the preceding sections in this section for details.)

- Turn off the system when not using it.
- Adjust the LCD brightness and contrast to the lowest settings that are comfortable for viewing.
- Use the Power Management utility to shorten the timeouts set for powering down the system.
- If leaving the computer for a short time but plan to return soon, put the system in Suspend mode. Do so as follows:
  - — Press the Suspend button (**Fn-Esc**).
  - — Close the LCD panel to automatically put the system into Suspend mode. (Selected through Power Management.)

Section 4

Options

This section provides installation procedures for adding the following options:

- PCMCIA cards
- External devices:
  - — Parallel interface devices, (parallel printer)
  - — Serial interface devices, (modem or serial printer)
  - — Keyboard
  - — Mouse
  - — Monitor.
- Internal Upgrades:
  - — Memory module
  - — Hard disk.

> **NOTE:** Some options described here may not be available outside of the U.S. Contact an authorized NEC dealer for specific information.

PCMCIA CARDS

The Versa S has two PCMCIA card slots for attaching options like a fax/modem, Local Area Network (LAN) card, additional memory, and extra hard disk storage.

The Versa S can handle Type I, II, or III PCMCIA cards and card combinations.

- Up to two Type I cards
- Up to two Type II cards
- One each, Type I and Type II card
- One Type III card.

See the *Versa Series PCMCIA User's Guide* for information about installing cards, card types, and their uses.

The PCMCIA slots are located on the left side of the Versa S. Slot 0 is the bottom slot; slot 1 is the top slot.

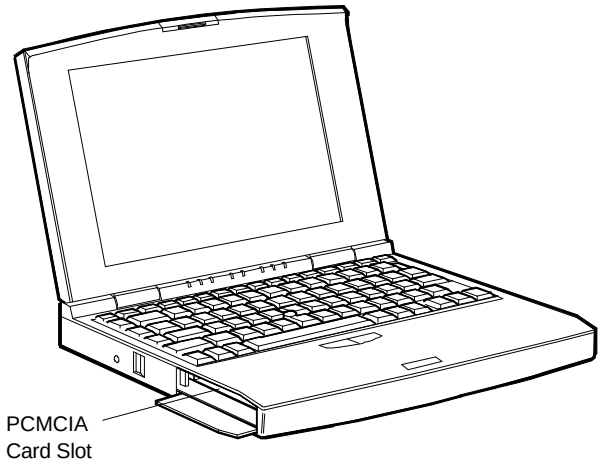

Figure Section 4-1 PCMCIA Card Slots

Modem Card Connection

A telephone cable with modular (RJ11) connectors on both ends is required to connect a modem card to a telephone system. These cables and other accessories can be purchased wherever telephones are sold.

NOTE: PCMCIA modem connector adapters vary. See the guide that came with the modem card for specific setup information.

Follow these steps to connect the system to a phone line.

1. Install the PCMCIA modem card in one of the slots in the Versa S. (See the *Versa Series PCMCIA User's Guide* for details about installation.)

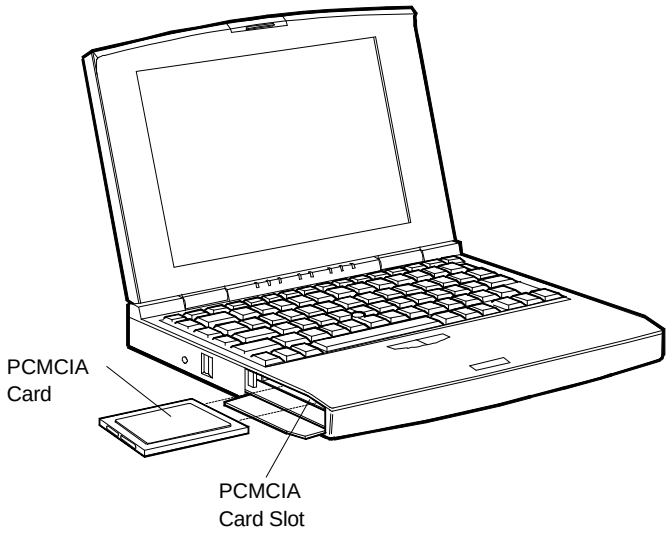

Figure Section 4-2 Installing the Modem Card

2. Connect the modem adapter to the modem card.

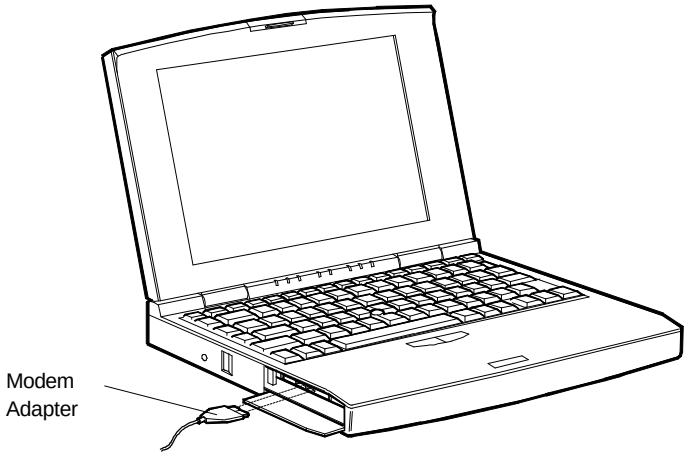

Figure Section 4-3 Connecting the Adapter

3. Plug one of the modular telephone cable connectors into the jack on the modem adapter.

4. Proceed as follows:

- To connect the modem directly to a wall outlet, plug the other end of the phone cable into a telephone jack in the wall.

  Attaching the modem is complete.

- To connect the modem and telephone to the same wall jack, go to step 5. (To connect both the modem and telephone, a dual-RJ11 connector is needed.)

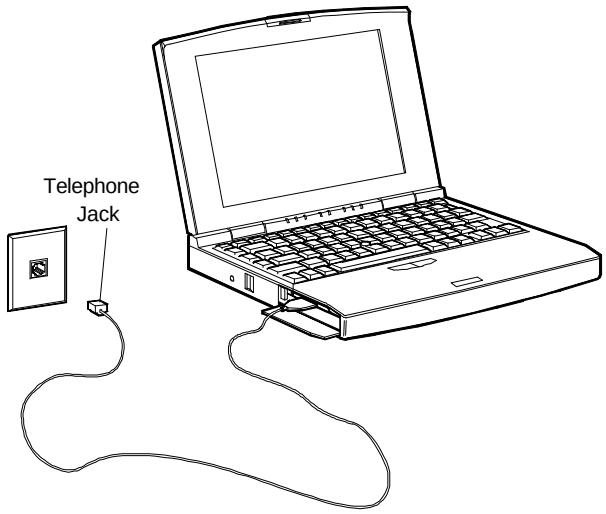

Figure Section 4-4 Telephone Line Connection

5. Plug the other end of the phone cable into the single jack on a dual-RJ11 connector.

6. Unplug the telephone cable from the wall. Plug the cable into one of the remaining jacks on the dual-RJ11 connector.

7. Connect another telephone cable to the second jack on the dual-RJ11 connector and to the wall jack.

NOTE: An international telephone adapter may be required outside the U.S. and Canada.

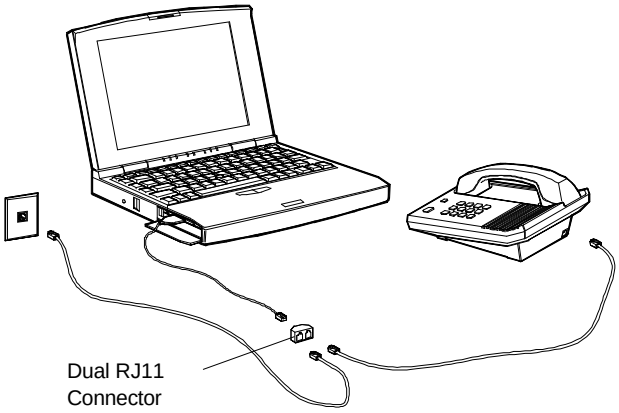

Figure Section 4-5 Modem and Telephone Connection

EXTERNAL DEVICES

This section provides installation procedures for connecting external devices to the Versa S. Before connecting the device, set it up using the instructions that come with the device.

Parallel Devices

To install a printer or other parallel device, a cable with a 25-pin male connector is required. For most parallel printers, one end of the cable should have a 36-pin Centronics® connector.

Follow these steps to attach a parallel device to the Versa S.

1. Open the port cover on the back of the Versa S and locate the parallel port.
2. Connect the 25-pin cable connector to the parallel port.
3. Secure the connection with the screws provided.
4. Connect the 36-pin connector to the port on the device. Lock the connector clips.
5. Connect the power cable to the printer and a properly grounded wall outlet.

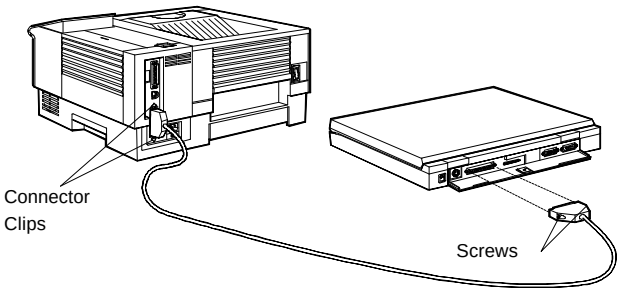

Figure Section 4-6 Connecting a Parallel Device

Serial Devices

To install a serial device, like a printer or an external modem, a cable with a 9-pin female connector for the system is required. Follow these steps to attach a serial device to the Versa S.

1. Check that power to both Versa S and device is off.
2. Open the port cover on the back of the system and locate the serial port.
3. Connect the device cable connector to the serial port. Secure the connection with the screws provided.
4. Align and connect the 9-pin connector to the correct port on the serial device. Secure the connection with the screws provided.
5. Connect the power cable to the serial device and a properly grounded wall outlet.

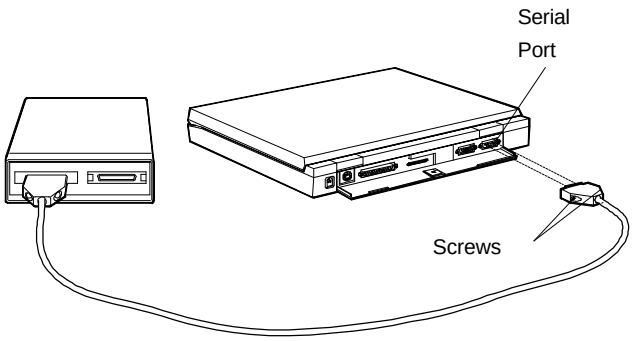

Figure Section 4-7 Attaching a Serial Device

Keyboard

Follow these steps to connect an external keyboard to the system.

1. Turn off the Versa S. Do not leave it in Suspend or Standby mode.

> **CAUTION:** Make sure the system power is off whenever attaching or removing the keyboard. Failure to do so can damage the keyboard.

2. Open the cover on the back of the Versa S and locate the external keyboard port.

3. Connect the keyboard cable connector to the port.

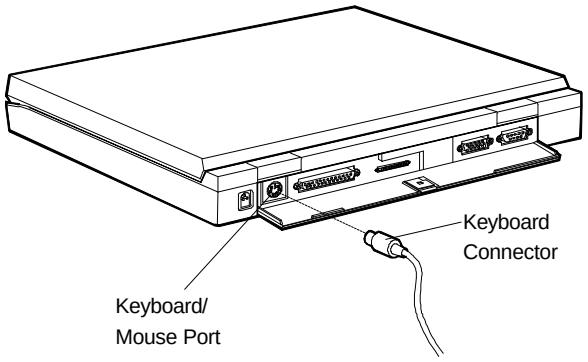

Figure Section 4-8 Attaching the External Keyboard

NOTE: The **Fn-Esc** or **Fn-F9** key combination cannot be used from the external keyboard.

Mouse

The software needed to recognize the external mouse in Windows and DOS programs is already installed in the system. Connect an external mouse to the Versa S as follows:

1. Turn off the Versa S. Do not leave it in Suspend or Standby mode.

CAUTION: Make sure the Versa power is off whenever adding or removing the mouse. Otherwise, the system fails to recognize the mouse.

2. Open the port cover on the back of the Versa S and locate the external keyboard connector.

3. Connect the mouse cable connector to the port.

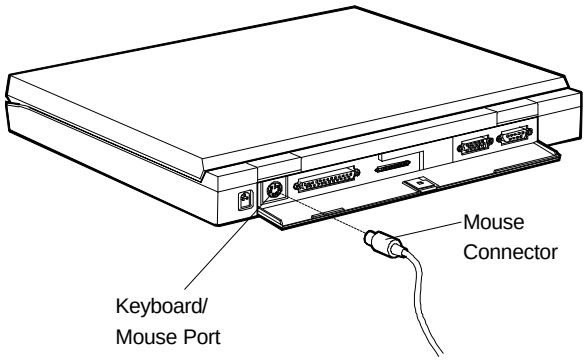

Figure Section 4-9 Connecting the Mouse

4. Turn on the system and start the SCU.
5. Under the Standard menu, locate the **SurePoint** option and disable it.

> **NOTE:** The SurePoint or its selection buttons cannot be used when attaching an external mouse.

6. Save the changes when exiting the SCU. The system automatically recognizes the external mouse.

Monitor

Before attaching the external monitor, change the VGA setting through the SCU or the **Fn-F2** function key. To use the monitor, the VGA option should be either CRT or Both.

If the setting is LCD, the Versa S does not recognize or activate the external monitor. See Chapter 2 for details about using the SCU.

> **NOTE:** Use **Fn-F2** to toggle between LCD, CRT, and Both.

Follow these steps to connect an external monitor to the Versa S.

1. Turn off the power to both the external monitor and the Versa S. Do not leave the notebook in Suspend mode. The system will not recognize the newly connected monitor when returning to the operating mode.

2. Slide the cover latch down and open the port cover on the back of the Versa S.
3. Connect the 15-pin cable connector to the monitor port on the Versa S. Attach and secure the connection with the screws provided.

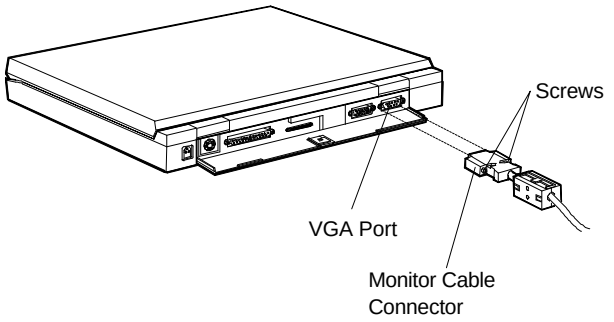

Figure Section 4-10 Connecting the External Monitor

4. Plug the monitor power cable into a properly grounded wall outlet.
5. Turn on power to the monitor.

> **NOTE:** Whenever using an external monitor with the Versa S, turn on the monitor first. Otherwise, the notebook does not recognize the external monitor type.

6. Turn on power to the Versa S.

INTERNAL UPGRADES

Internal upgrades to the Versa S include expanding memory and upgrading the hard disk.

Performing these upgrades require the following basic procedures:

- Moving the keyboard out of the way.
- Performing the upgrade.
- Replacing the keyboard.
- Running SCU to set up the new system configuration.

This section describes each process in detail.

Section 4

Moving the Keyboard

Follow these steps to move the keyboard out of the way before installing memory or replacing the hard disk.

1. Unplug the Versa S system and any peripheral devices connected to it.
2. Turn off system power.

> NOTE: Do not leave the system in Suspend or Standby mode when installing internal options.

3. Open the LCD panel until it lies flat.
4. Locate the plastic retainer across the top of the keyboard.
5. Find the groove between the **F7** and **F8** function keys. Insert a thin pointed object (like the tip of a small screwdriver) under the retainer.

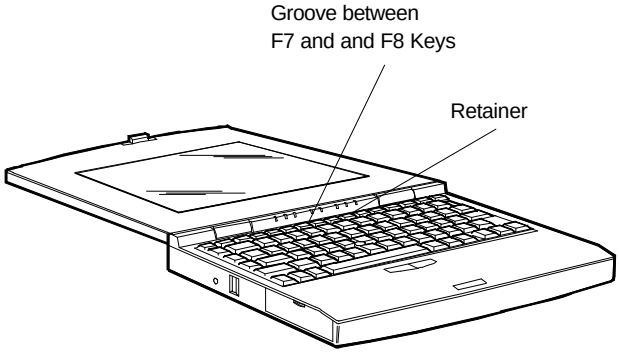

Figure Section 4-1 Locating the Retainer

Flip the retainer up to remove it. Put it in a safe place. The keyboard springs up a ways when the retainer is removed.

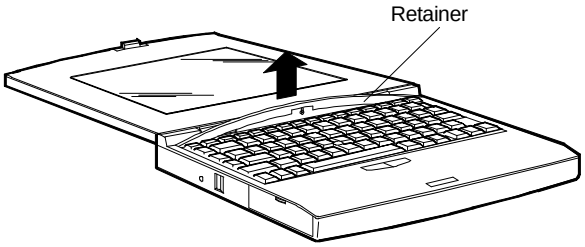

Figure Section 4-2 Removing the Retainer

6. Move the keyboard out of the way as follows:

- Gently lift the back of the keyboard up no more that 1.5 inches.
- Pull the keyboard back slightly to release the front tabs from under the chassis.

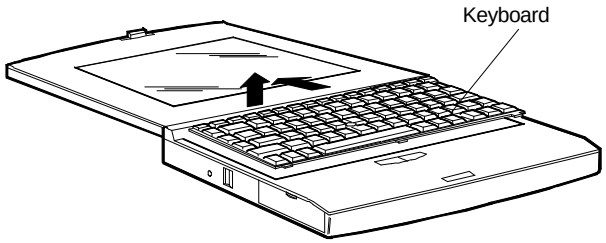

Figure Section 4-3 Lifting the Keyboard

- Once the keyboard clears the chassis, gently turn the keyboard over, moving the keys towards the LCD panel.
- Rest the keyboard on the LCD panel.

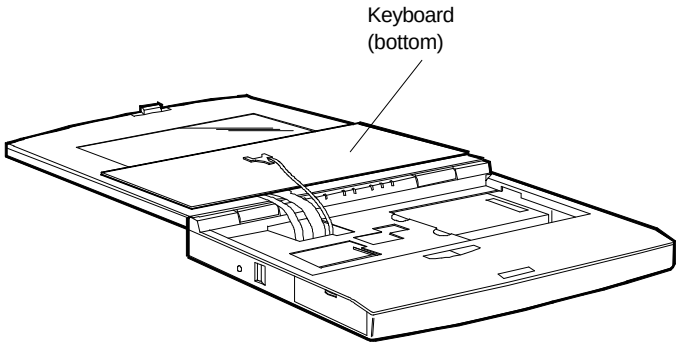

Figure Section 4-4 Leaning the Keyboard against the LCD

7. Proceed as follows:

- To install a memory module, go to “Upgrading Memory.”
- To install a new hard disk, go to “Upgrading the Hard Disk.”

Upgrading Memory

The Versa S comes with 4 megabytes (MB) of random access memory (RAM) installed on the system board. Memory can be increased up to a maximum of 12 MB, by installing one of the following memory modules.

- 4-MB memory module
- 8-MB memory module.

Install the memory module as follows.

1. Move the keyboard out of the way (follow the instructions in the preceding section).
2. Locate the memory module socket on the system board.

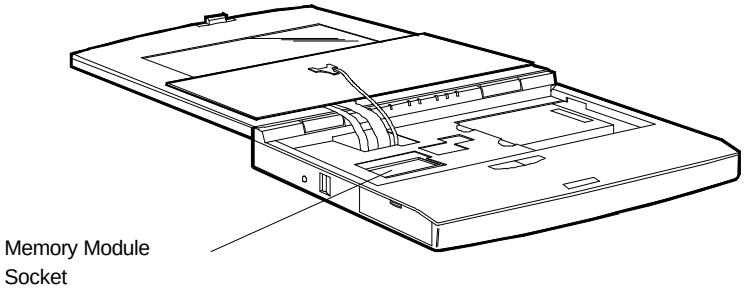

Figure Section 4-5 Locating the Memory Module Socket

3. Align the memory module connector with the socket on the system board.

4. Press the memory module gently to ensure a secure connection.

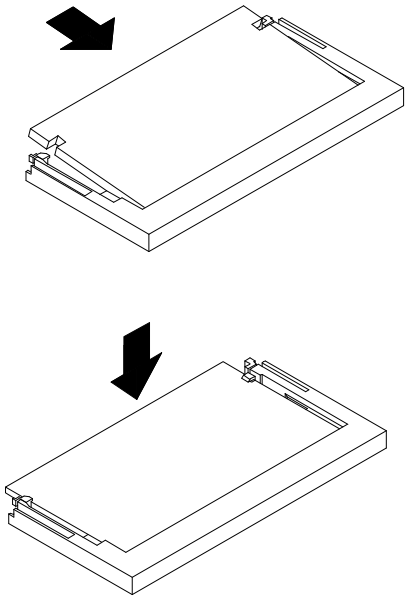

Figure Section 4-6 Installing the Module

5. If there is nothing else to be installed, go to “Replacing the Keyboard” to continue with the upgrade.

Upgrading the Hard Disk

Upgrade the hard disk as follows:

1. Move the keyboard out of the way following the instructions in “Moving the Keyboard.”
2. Locate the hard disk.

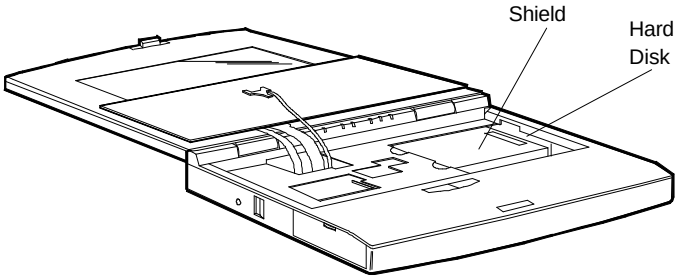

Figure Section 4-7 Locating the Hard Disk

3. Locate and remove the screw that secures the protective shield and the drive.

CAUTION: Do not use a magnetic screwdriver when removing the screw. Doing so can erase the data on the hard disk.

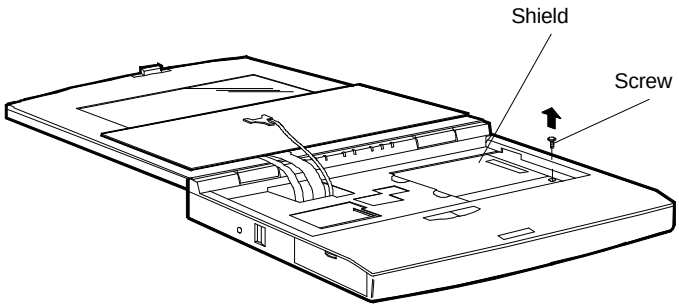

Figure Section 4-8 Removing the Screw

4. Lift the shield out of the system.

5. Disconnect the hard disk from its connectors and slide it out of the system.

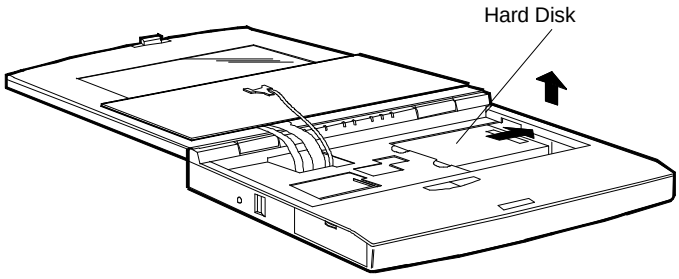

Figure Section 4-9 Removing the Hard Disk

6. Lower the new drive into the system, align the drive connectors with those in the system, and slide the drive into position.

7. Firmly press the drive towards the connectors until the attachment is secure.

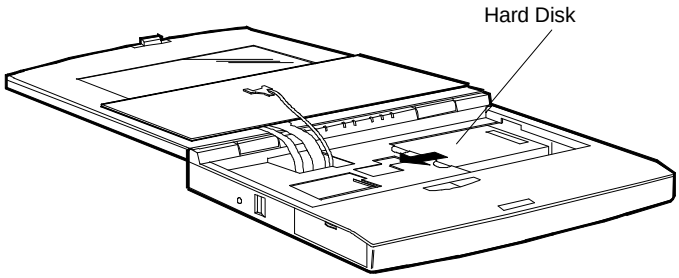

Figure Section 4-10 Installing the Hard Disk

8. Lower the protective shield over the hard disk.
9. Replace the screw that secures the drive and shield.

> CAUTION: Do not use a magnetic screwdriver to replace the screw. Doing so can erase the data on the hard disk.

10. If there is nothing else to be installed, go to the next section, “Replacing the Keyboard" to continue with the upgrade.

Replacing the Keyboard

Replace the Versa S keyboard as follows:

1. Turn the keyboard over and align it so it is parallel with the system.
2. Lower the tabs on the front of the keyboard under the edge of the chassis.

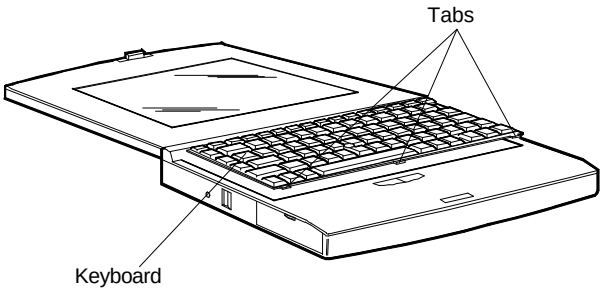

Figure Section 4-11 Positioning the Keyboard

3. Lower the keyboard back into position.

> CAUTION: Be sure to tuck the keyboard cables under the keyboard.

4. Re-insert the plastic retainer as follows:
   - Locate the tabs on the retainer.
   - Align the tabs with the grooves in the system.
   - Fit the tabs into the grooves. The retainer will curve up slightly in the middle.
   - Once the tabs are fitted into the grooves, press down on the center of the retainer until it snaps into place.

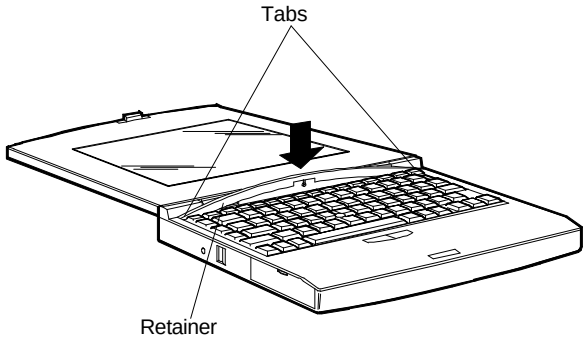

Figure Section 4-12 Inserting the Retainer

5. Reconnect any external options that were disconnected before starting the installation.
6. To complete the software part of the installation, continue with the next section, "Running Setup."

Running Setup

The first time starting the Versa S after installing the memory module or hard disk, an error message appears. Proceed as follows.

Memory Modules

If upgrading memory, follow these steps.

1. Press **Ctrl-Alt-S** or **Fn-F9** to start the SCU. The Versa S automatically looks at the new RAM size.

2. Press **F10** or **Fn-F9** to save the amount of memory. Once the information is saved, the system automatically recognizes the additional memory.

Hard Disk

If replacing the hard disk, follow these steps.

1. Press **Ctrl-Alt-S** or **Fn-F9** to start the SCU. Select Standard, then HDD, then Auto to read the new hard disk parameters.
2. Press **F10** to save the new drive parameters. Once the information is saved, the system automatically recognizes the new drive.

Section 5

Troubleshooting and Repair

This section provides information on maintaining, troubleshooting, and repairing the Versa S series sub-notebooks. NEC service and information telephone numbers are listed in Table Section 5-1.

Table Section 5-1 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 (see "BIOS Update Utility" in Section 2)
To down load files - provides software drivers and the latest ROM BIOS for flash ROM computer systems	1(508) 635-4706 (see "BIOS Update Utility" in Section 2)
NEC Service	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 NASC (National Authorized Service Centers) Administration - new dealer service authorization/warranty claims 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 Laptops/Notebooks (Versa/ProSpeed/UltraLite) Desktop/Tower Computers (Ready/Image/PowerMate/BusinessMate/Express) Printers (Silentwriter/Colormate/Pinwriter)
FastFacts™ - automated service that sends the latest information about NEC products to your fax machine 24 hours a day	In the U.S., call 1(800) 366-0476 Outside the U.S., call 1(708) 860-9500, Ext. 2621
Use FastFacts to obtain Technical Information Bulletins.	
Canadian Inquires	1(416) 795-3554

MAINTENANCE

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

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

WARNING: Remove the battery and disconnect the AC adapter before performing any maintenance. Voltage is present inside the system even after the power button is off.

Cleaning

Use the following procedure for cleaning the system.

1. Power off the system, unplug all power cables, and remove the battery pack.
2. Wipe the outside of the system unit, keyboard, and LCD with a soft, clean cloth. Remove stains with a mild detergent. Do not use solvents or strong, abrasive cleaners on any part of the system.
3. Clean the LCD with glass cleaner, then wipe with a clean lint-free cloth.
4. Clean the keys with a damp cloth. A small, soft-brittle 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 keypad and metal plate, possibly damaging the components under the keys. If the keyboard gets wet, thoroughly dry it before operating the system.

Routine Checks

Make the following routine checks when servicing the computer.

- Inspect all cabling. Replace any damaged cables.
- If the computer no longer saves settings (date, time), replace the battery.
- If the LCD display quality is poor, adjust the LCD contrast and brightness knobs.

CMOS CLEAR SWITCH

The CMOS clear switch deletes the system configuration information that was stored in CMOS memory by the SCU. Use this switch when a user forgets his password. Activating the switch will clear the old password, allowing him to set a new one. After activating the switch, the SCU must be run to reenter the sytem configuration information (date, time, hard disk type, and so on).

> CAUTION: Activating the CMOS clear switch deletes required system configuration information stored in CMOS memory. After activating this switch, run the SCU to reenter the system information (date, time, hard disk type, and so on).

Follow these steps to clear CMOS memory.

1. Turn off system power.
2. Move the keyboard out of the way (see “Removing the Keyboard” in Section 4, Options). Do not disconnect the keyboard cables from the system board.
3. Locate the CMOS clear switch on the system board.

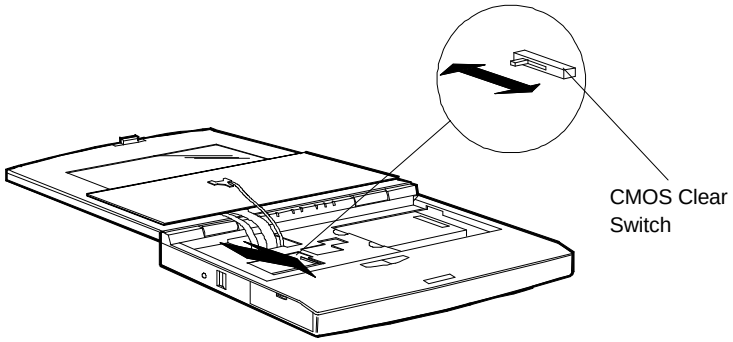

Figure Section 5-1 Locating the CMOS Clear Switch

4. Turn on the system power.

> CAUTION: Do not use a conductive tool (screwdriver, metal paper clip, and so on) to set the CMOS clear switch. A conductive tool could cause a short circuit and damage the system board.

5. Using a non-conductive tool, slide the switch toward the front of the unit, and then slide it back to its original position (toward the rear of the unit).
6. Turn off the system power.
7. Replace the keyboard (see “Replacing the Keyboard” in Section 4, Options).
8. Run the SCU to reenter the system configuration information (see Section 2, Settup and Operation).

TROUBLESHOOTING

This subsection provides information that helps isolate and repair computer malfunctions at the field level. Step-by-step instructions on diagnosing and solving computer problems are provided.

If disassembly is required, see “Disassembly and Reassembly” later in this section. Connector pin assignments are explained in Appendix A.

Problem Checklist

First check the items in the following list. If these do not help, see the following subsection “Diagnosing and Solving Problems.”

- Power is connected to the computer.
- The electrical outlet to which the AC adapter is connected is working. Test the outlet by plugging in a lamp or other electrical device.
- If using battery power, the battery pack is charged.
- All cables are tightly connected.
- The display setting is configured correctly.
- The display brightness and contrast are adjusted properly.
- System parameters are set correctly through the SCU.

Diagnosing and Solving Problems

Successful computer power-up is indicated by a beep. This should occur each time the computer is powered up. If an error condition exists, the system will respond in one of the following ways:

- displays an error message
- transmits a beep code.

The following subsections provide corrective actions when the computer has an error condition. Refer to the appropriate section and Table Section 5-2 to help isolate the problem. Also see Table Section 5-2 if an error occurs and the system does not display an error message or transmit a beep code. Table Section 5-2 summarizes problems that may develop during system operation and lists (in sequential order) suggested corrective actions.

Table Section 5-2 Problems and Solutions

Problem	Corrective Action
No power	1. Check that the AC adapter is plugged into the power connector on the system. Also, that the AC adapter is plugged into a properly grounded AC power outlet. If using the battery as the main power source, see the following step.
	2. Check that the primary battery pack is charged and inserted correctly.
	3. Replace the system board.
Data on the LCD is unreadable.	1. Adjust the brightness and contrast controls.
	2. Check that the LCD is connected to the system correctly.
LCD screen does not show data.	1. Power saving mode has shut off the backlight. Press any key, Fn Esc or the suspend button.
	2. The built-in LCD may not be selected. Press Fn F2
	3. Brightness and contrast controls need adjustment.
	4. Plug in the AC adapter or replace the primary battery pack. Press the suspend button to resume operation.
Battery power does not last.	1. Make sure the power management features are set.
	2. Replace the primary battery pack with a new one.
System halts during loading sequence.	1. Check condition of selected bootload device (diskette or hard disk) for bad boot track or incorrect OS files.
	2. Try booting from diskette or recopy operating system files onto the hard disk.
I/O processing malfunctions.	1. Check the connections of all internal devices.
Diskette drive does not work.	1. Replace diskette drive.
	2. Replace the system board.
Hard disk malfunctions.	1. Check that the built-in IDE controller is enabled.
	2. Check drive cables and connections.
	3. Replace the drive if necessary.
Suspend button does not work.	1. The hard disk may be accessing data. Wait until the reading/writing process stops and try again.

Table Section 5-2 Problems and Solutions

Problem	Corrective Action
Memory malfunction	1. Reseat the memory card. 2. Replace the memory card. 3. Replace the system board.
Keyboard or pointer malfunction	1. Check that the keyboard cables are connected to the system board. 2. Replace keyboard. 3. Replace the system board.
PCMCIA card does not work	1. Check the PCMCIA card connection. 2. Check Auto Setup to see if system is configured for PCMCIA use. 3. Make sure the PCMCIA driver is installed.
Mouse does not work	1. Check mouse connection. 2. Make sure mouse driver is installed.
Serial devices do not work	1. Check the RS232C connection. 2. Check SCU to see if system is configured for RS232C use. 3. Make sure RS232C driver is installed.
Parallel devices do not work.	1. Check printer connection. 2. Check SCU to see if system is configured for parallel devices. 3. Make sure printer driver is installed.
Suspend mode does not work.	1. Remove the DC cable if connected. 2. Push the suspend button again, firmly.
Resume does not work.	1. Disconnect DC cable if connected. 2. Push the suspend button again, firmly.

Error Messages

The system displays “Invalid Configuration Information” at power on when the following conditions exist:

- The current configuration information does not match the configuration information stored in memory. This happens when an internal option is added.
- The system loses configuration information stored in memory.

If either condition exists, press **Ctrl-Alt-S** and run the SCU. Check the last settings to see if they are still active or select Defaults to resolve configuration problems quickly. If the problem persists, see Table Section 5-2 for further assistance.

Other error messages are provided in Table Section 5-3. Look up the message in the following table and perform the corrective action. Follow the instructions.

Table Section 5-3 Error Messages

Message	Corrective Action
Diskette drive failure	The diskette drive does not work or is not properly connected. Check that the drive is securely connected and power is on. Press **Ctrl-Alt-S** to check the diskette drive parameters. If the problem persists, replace the diskette drive.
Diskette read failure	Remove the diskette from drive A and try another diskette. If the problem persists, replace the diskette drive.
No boot device available	Go into the SCU and check the hard disk type defined. Correct the setting.
Invalid configuration information — run SCU	Start the SCU, check the system parameters set, and correct them. Exit and save the parameters set. Connect the AC adapter to charge the internal backup battery. Restart the SCU and set the correct parameters.
Real time clock failure	Set the time and date using the SCU. Exit and save to update the parameters. Connect the AC adapter to charge the internal backup battery.
Time-of-day not set	Run SCU and set the time and date. Exit SCU and save to update the time and date.
Fixed disk configuration error.	Start the SCU. Make no changes. Exit and save to update the parameters. If a problem still exists, replace the hard disk.
Fixed disk failure	Start the SCU. Make no changes. Exit and save. If a problem still exists, replace the hard disk.
Fixed disk controller failure	Start the SCU. Exit and save to update the parameters. If problems continue, replace the system board.
Keyboard clock line failure	Replace the keyboard.
Keyboard data line failure	Replace the keyboard.
Keyboard controller failure	Replace the keyboard.
Keyboard stuck key failure	A key is jammed. Remove any obstructions. If the error message remains, clean or replace the keyboard.

Beep Codes

When the system detects an error and cannot display an error message because of the hardware fault, the system indicates the error by beeping.

One beep indicates that the computer has completed its power-on self-test. If intermittent beeping occurs, power off the computer and try again. If the beeping persists, see Table Section 5-4 for a description of the beep codes.

Table Section 5-4 Beep Codes

Beep Sequence	Description
S-S-S-P-S-S-L-P	DMA page register failure
S-S-S-P-S-L-S-P	Refresh failure
S-S-S-P-S-L-L-P	ROM checksum failure
S-S-S-P-L-S-S-P	CMOS RAM failure
S-S-S-P-L-S-L-P	DMA controller failure
S-S-S-P-L-L-L-P	interrupt controller failure
S-S-S-P-L-L-L-P	80C51SL (8042) keyboard controller failure
S-S-L-P-S-S-S-P	Video adapter failure
S-S-L-P-S-S-L-P	RAM failure (no message is displayed)

Note: S = Short beep
P = Pause
L = Long beep

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.

Disassembly consists of removing the following components:

Table Section 5-5 Disassembly

Sequence	Part	See Page
1	Battery pack	5-9
2	Keyboard	5-10
3	Memory module	5-13
4	Hard disk	5-14

Table Section 5-5 Disassembly

Sequence	Part	See Page
5	System cover and LCD assembly	5-15
6	CMOS or bridge battery	5-17
7	Inverter circuit board	5-18
8	System board	5-19
9	LED circuit board	5-20
10	LCD cover	5-21
11	Separating the LCD assembly from the system cover	5-22

All other system components must be removed at the factory (depot). The exploded-view diagram and parts list for the system unit are shown later in this section.

Required tools include a Phillips-head screwdriver (nonmagnetic), small flat-tip screwdriver, and needle-nose pliers. When disassembling the system unit, follow these general rules.

- Turn off and disconnect all power and all options, including the AC adapter and battery pack.
- Do not disassemble parts not specified in the procedure.
- Label all removed connectors. Note where the connector goes and in what position it was installed.

Removing the Battery Pack

Follow these steps to remove the battery pack.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.

3. At the bottom of the system, slide the release latch and remove the battery pack.

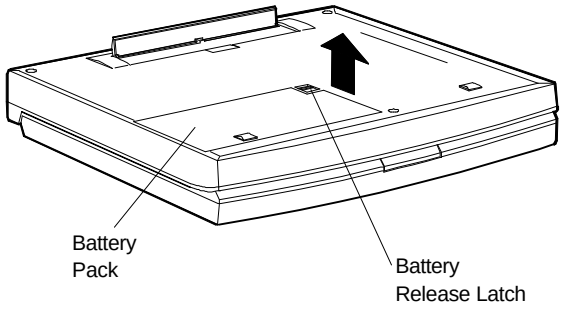

Figure Section 5-2 Removing the Battery Pack

Removing the Keyboard

Follow these steps to remove the keyboard.

NOTE: Do not leave the system in Suspend or Standby mode when installing internal options.

1. Turn off system power.

2. Unplug the Versa S and any peripheral devices connected to it.

3. Open the LCD panel until it lies flat.

4. Locate the plastic retainer across the top of the keyboard.

5. Find the groove between the **F7** and **F8** function keys. Insert a thin pointed object (like the tip of a small flat-tip screwdriver) under the retainer.

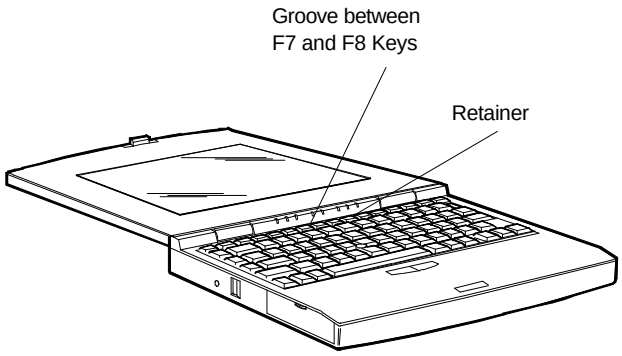

Figure Section 5-3 Locating the Plastic Retainer

6. Flip the retainer up to remove it. Put it in a safe place.

The keyboard springs up a ways when the retainer is removed.

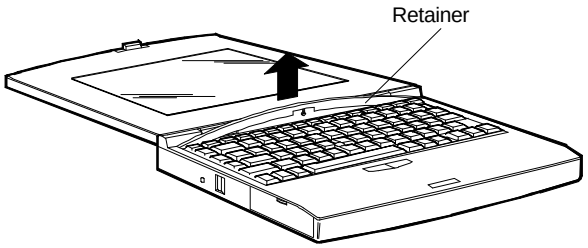

Figure Section 5-4 Removing the Retainer

7. Move the keyboard out of the way as follows:

- Gently lift the back of the keyboard up no more that 1.5 inches.
- Pull the keyboard back slightly to release the front tabs from under the chassis casing.

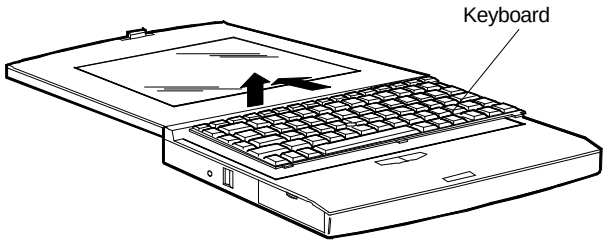

Figure Section 5-5 Lifting the Keyboard

- Once the keyboard clears the chassis, gently turn the keyboard over, moving the keys towards the LCD panel.
- Rest the keyboard on the LCD panel.

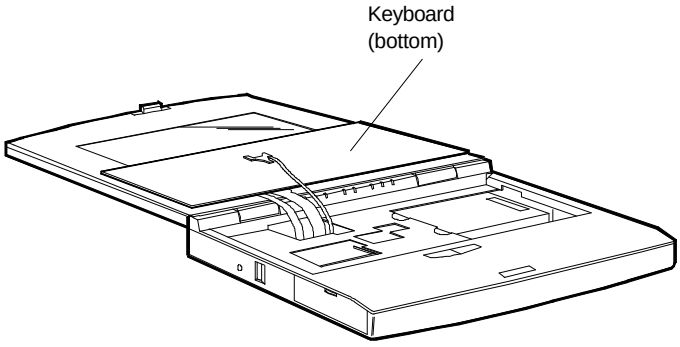

Figure Section 5-6 Leaning the Keyboard Against the LCD

8. Using a non-conductive tool, disconnect the three keyboard cables from the system board.

To release the cable from the connector, push the two tabs on the conductor toward the cable.

9. Remove the keyboard from the system unit.

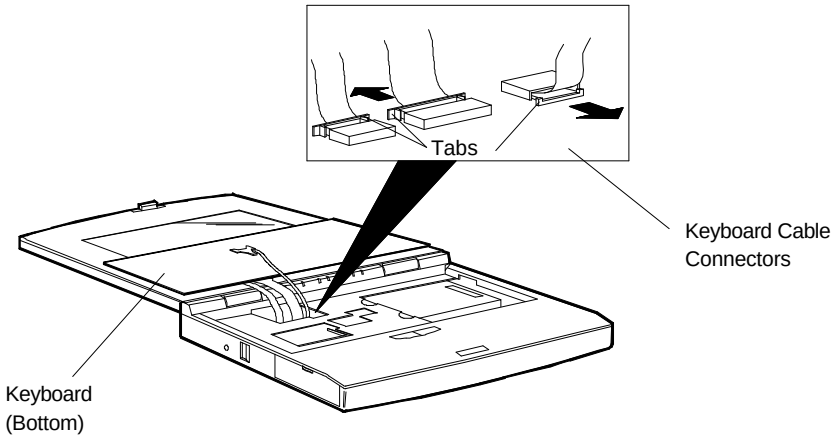

Figure Section 5-7 Disconnecting the Keyboard Cables

Removing the Memory Module

Follow these steps to remove the memory module.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Move the keyboard out of the way (see the instructions in the preceding section).
4. Locate the memory module on the system board.

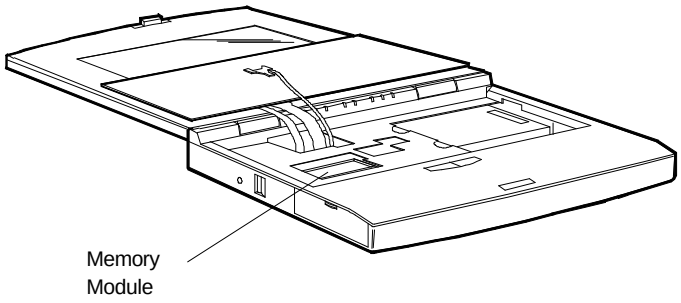

Figure Section 5-8 Locating the Memory Module

5. Spread apart the two plastic tabs at each end of the memory module (the tabs are part of the memory board's sockets). Tilt the memory module back, allowing the post to slide out of the hole in the memory module.
6. Remove the memory module from the system board.

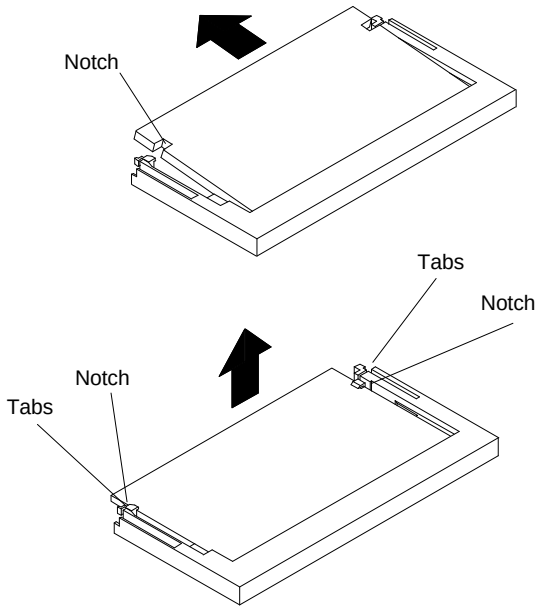

Figure Section 5-9 Removing the Memory Module

Removing the Hard Disk

Follow these steps to remove the hard disk.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Move the keyboard out of the way following the instructions in "Removing the Keyboard."
4. Locate the hard disk.

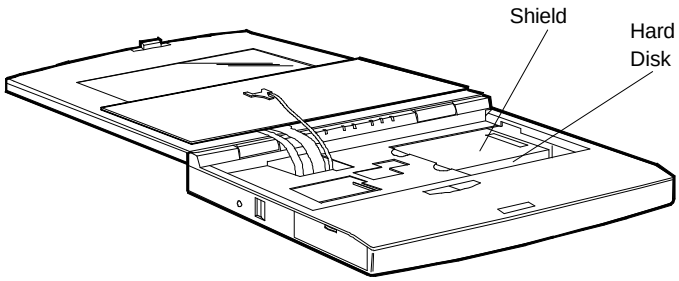

Figure Section 5-10 Locating the Hard Disk

5. Locate and remove the screw that secures the protective shield and the hard disk.

CAUTION: Do not use a magnetic screwdriver when removing the screw. Doing so can erase the data on the hard disk.

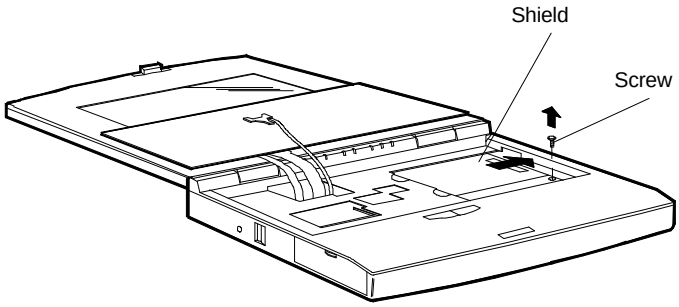

Figure Section 5-11 Removing the Screw

6. Slide the shield to the right away from the system board. Lift the shield out of the system.
7. Disconnect the hard disk from its connectors and slide it out of the system.

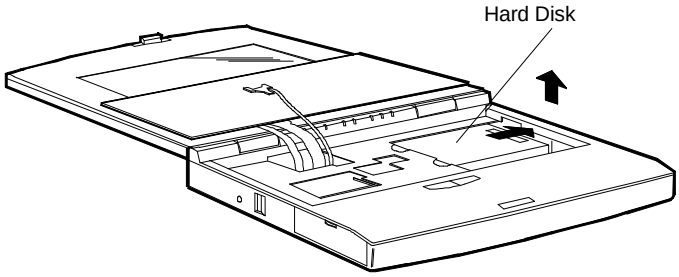

Figure Section 5-12 Removing the Hard Disk

Removing the System Cover and LCD Assembly

Follow these steps to remove the system cover and LCD assembly from the system chassis.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk.
4. Close the LCD panel.
5. At the rear of the system, open the port cover and remove the rear cover screw securing the system cover to the system chassis.

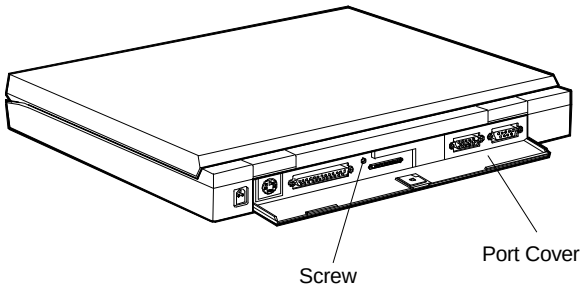

Figure Section 5-13 Removing System Cover Screw (Rear)

6. Turn the system over. Make sure the system is protected from any hard surfaces that could scratch it.
7. Locate the three rubber plugs that conceal the bottom cover screws.
8. Using a small flat-tip screwdriver or other sharp object, pry out the rubber plugs.

1. Turn the system over. Make sure the system is protected from any hard surfaces that could scratch it.
2. Locate the three rubber plugs that conceal the bottom cover screws.
3. Using a small flat-tip screwdriver or other sharp object, pry out the rubber plugs.
4. Remove the three screws securing the system cover to the system chassis.

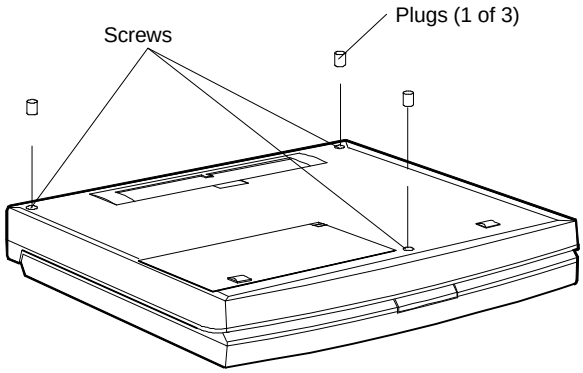

Figure Section 5-1 Removing System Cover Screws (Bottom)

5. Turn the system back over to its normal position and open the LCD until it lies flat.
6. Remove the six top cover screws securing the system cover to the system chassis.

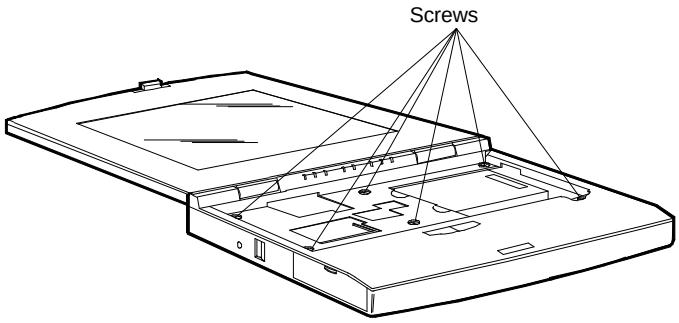

Figure Section 5-2 Removing System Cover Screws (Top)

7. Remove the system cover and LCD assembly as follows:

   - Open the PCMCIA cover and lightly lift up on the system cover, providing a small separation between the system cover and system chassis.

> CAUTION: The system cover is fragile. Start at the front of the system when removing the system cover from the chassis. Cable connections must be disconnected before removing the system cover from the rear of the system.

   - Using a small flat-tip screwdriver in the other hand, insert the screwdriver into the small separation and carefully twist the screwdriver to pry a portion of the system cover away from the system chassis.
   - Continue to separate the front portion of the system cover from the chassis using the screwdriver.
   - Carefully lift the front of the system cover and disconnect cables as needed. Remove the system cover and LCD assembly.

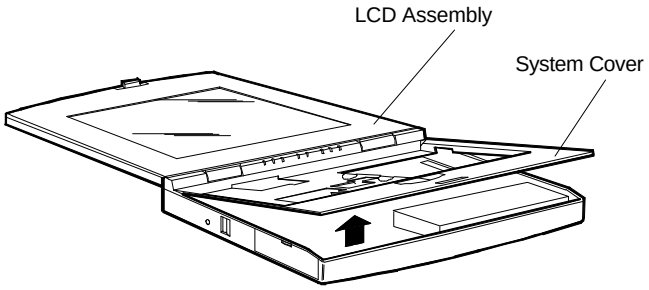

Figure Section 5-3 Removing the System Cover and LCD Assembly

Removing the CMOS or Bridge Battery

Follow these steps to remove the CMOS or bridge battery.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly.

4. Disconnect the battery cable from the system board and remove the battery.

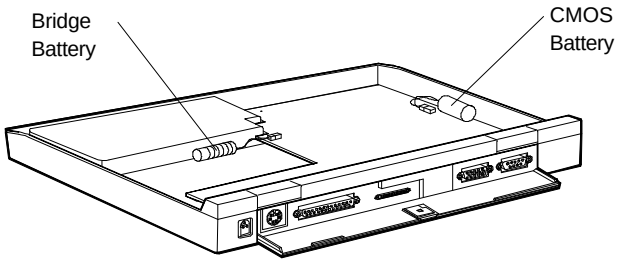

Figure Section 5-4 Removing the CMOS and Bridge Batteries

Removing the Inverter Circuit Board

Follow these steps to remove the inverter circuit board.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly.
4. Disconnect and remove the inverter circuit board from the system board.

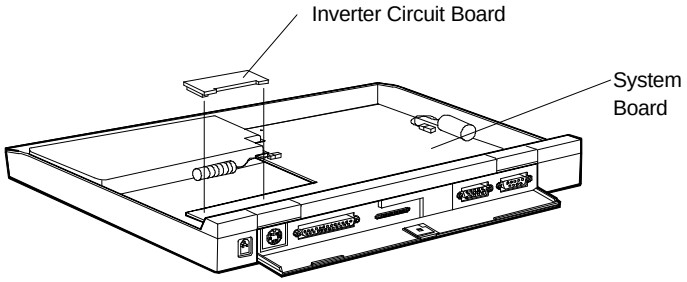

Figure Section 5-5 Removing the Inverter Circuit Board

Removing the System Board

Follow these steps to remove the system board.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly
   - CMOS and bridge batteries
   - inverter circuit board.
4. At the rear of the system, remove two screws securing the system board to the chassis.
5. Using needle-nose pliers, remove six nuts securing the system board to the chassis.
6. At the top of the system, remove three screws and remove the system board.

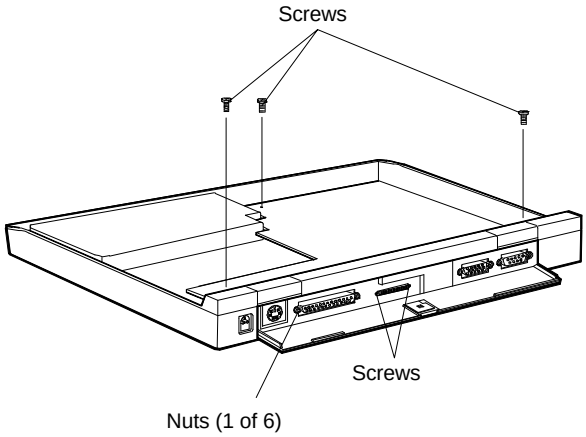

Figure Section 5-6 Removing the System Board

Removing the LED Circuit Board

Follow these steps to remove the LED circuit board.

1. Turn off system power.

2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly.
4. Locate the LED circuit board at the bottom of the system cover and LCD assembly.
5. Remove two screws and remove the LED circuit board and rear cover support bracket.

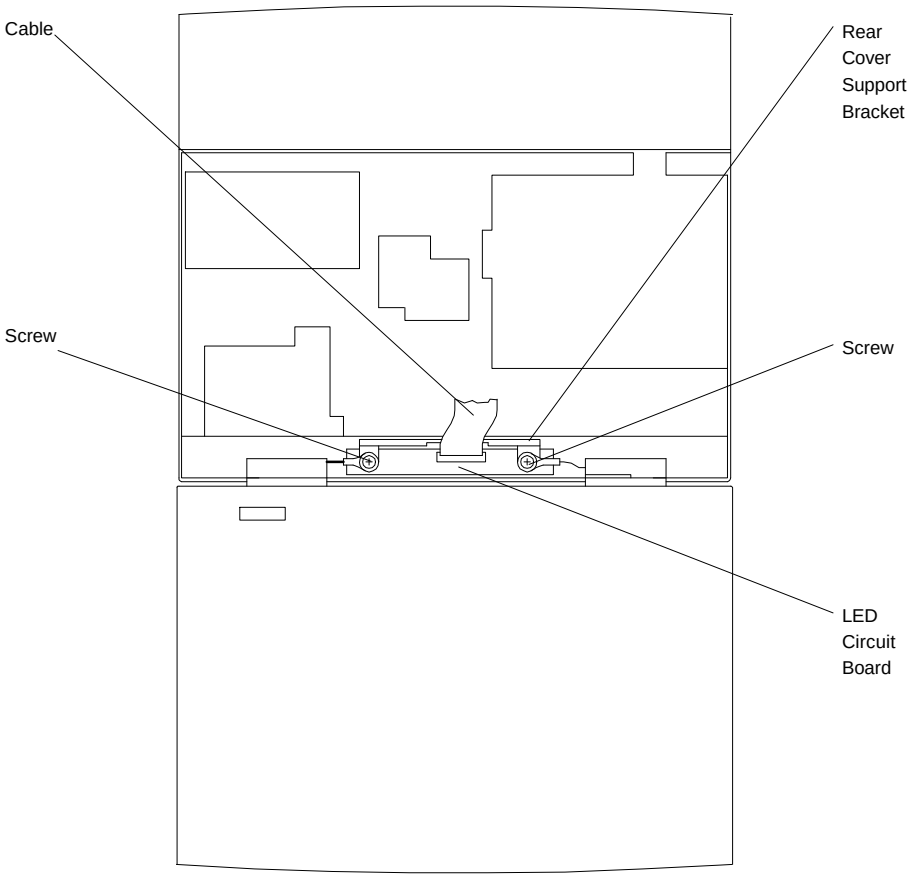

Figure Section 5-7 Removing the LED Circuit Board

Removing the LCD Cover

Follow these steps to remove the LCD cover.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly.
4. Locate the two rubber plugs that conceal the LCD cover screws.
5. Using a small flat-tip screwdriver or other sharp object, remove the rubber plugs.
6. Remove the two screws securing the LCD cover to the LCD assembly.
7. Locate the two LCD cover tabs that conceal the LCD cover screws.
8. Remove the two screws securing the LCD cover to the LCD assembly.

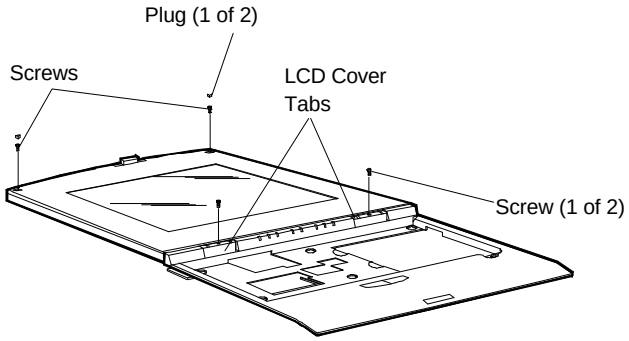

Figure Section 5-8 Removing LCD Cover Screws

9. Remove the LCD cover from the LCD assembly as follows:

> CAUTION: The LCD cover is fragile. Proceed with caution when removing the LCD.

   - Grasp the two LCD cover tabs that concealed the screws removed in step 8.
   - Carefully lift up and remove the LCD cover.

Separating the LCD Assembly from the System Cover

Follow these steps to remove the LCD assembly.

1. Turn off system power.
2. Unplug the Versa S and any peripheral devices connected to it.
3. Remove the following items using the procedures provided earlier in this section:
   - keyboard
   - hard disk
   - system cover and LCD assembly
   - LED circuit board
   - LCD cover.
4. Locate the two cover hinges at the bottom of the system cover.
5. Remove the two screws securing the two cover hinges.
6. Locate the two hinge plates at the top of the system cover.
7. Remove the four screws securing the two hinge plates. Remove the hinge plates and cover hinges.
8. Separate the LCD assembly and system cover.

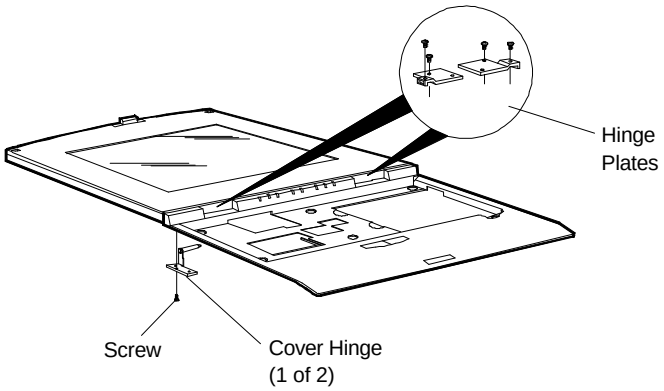

Figure Section 5-9 Separating the LCD Assembly and System Cover

ILLUSTRATED PARTS BREAKDOWN

This subsection contains the illustrated parts breakdown (IPB) and NEC part numbers for the Versa S. Table Section 5-1 lists the field-replaceable parts for the Versa S, Table Section 5-2 lists the documentation available for the Versa S, and Figure Section 5-10 shows the IPB.

NOTE: In the U.S., call 1(800) 632-4525 to order NEC spare parts. To order options in the U.S., call your local sales office.

Table Section 5-1 Versa S Field-Replaceable Parts List

Item	Description	Part Number
1	Diskette Drive	808-873692-001A
2	Foot Plate (Retractable Leg)	136-611684-001A
3	PCMCIA Port Cover	136-612683-001A
4	Rubber Foot (Chassis) (3)	136-611659-A
5	Connector Cover	136-612682-001A
6	CMOS Battery (Lithium)	808-873936-602A
7	System Board (G8RFA – 33 Mhz, Mono/DSTN)	136-611646-001A
	System Board (G8RFA – 33 Mhz, Color/TFT)	136-611646-002A
	System Board (G8RFA – 50 Mhz, Color)	136-611646-003A
8	Memory Module (4 MB)	808-873936-607A
	Memory Module (8 MB)	808-873936-608A
9	LED Circuit Board Assembly	136-611636-001
10	Front (System) Cover Assembly	136-611631-001A
11	LCD Assembly (Mono)	136-235002-001A
	LCD Assembly (DSTN)	136-235002-002A
	LCD Assembly (TFT)	136-235002-003A
12	Inverter Circuit Board (G8RFD – DSTN)	808-873936-606A
	Inverter Circuit Board (G8RFD – Mono)	808-873936-605A
13	Versa Pick Cap	808-873936-501A
14	Keyboard Press (Retainer)	136-611653-001A
15	Bridge Battery	808-873936-601A

This data was prepared June 1994. For an up-to-date listing of spare parts, please call Fast-Facts (800) 366-0476 and order document umber 42180975.

Table Section 5-1 Versa S Field-Replaceable Parts List

Item	Description	Part Number
16	Keyboard	808-873936-500A
17	Hard Disk Bracket (Shield)	136-613569-001A
18	Hard Disk, 200 MB	136-792874-002A
	Hard Disk, 260 MB	136-792874-003A
19	Hard Disk Ground Holder	136-612447-A
20	AC Cable	808-873936-609A
21	Battery Pack	808-873936-600A
22	AC Adapter	808-873936-610A

Table Section 5-2 Documentation

Description	Part Number
Versa S Series User's Guide	819-180945-000
Versa S Series Quick Reference Guide	819-180933-000
Versa S Battery User's Guide	819-180947-000
Versa Series PCMCIA Card User's Guide	819-180869-001
Versa S Series Service and Reference Manual	819-180975-000

This data was prepared June 1994. For an up-to-date listing of spare parts, please call Fast-Facts (800) 366-0476 and order document umber 42180975.

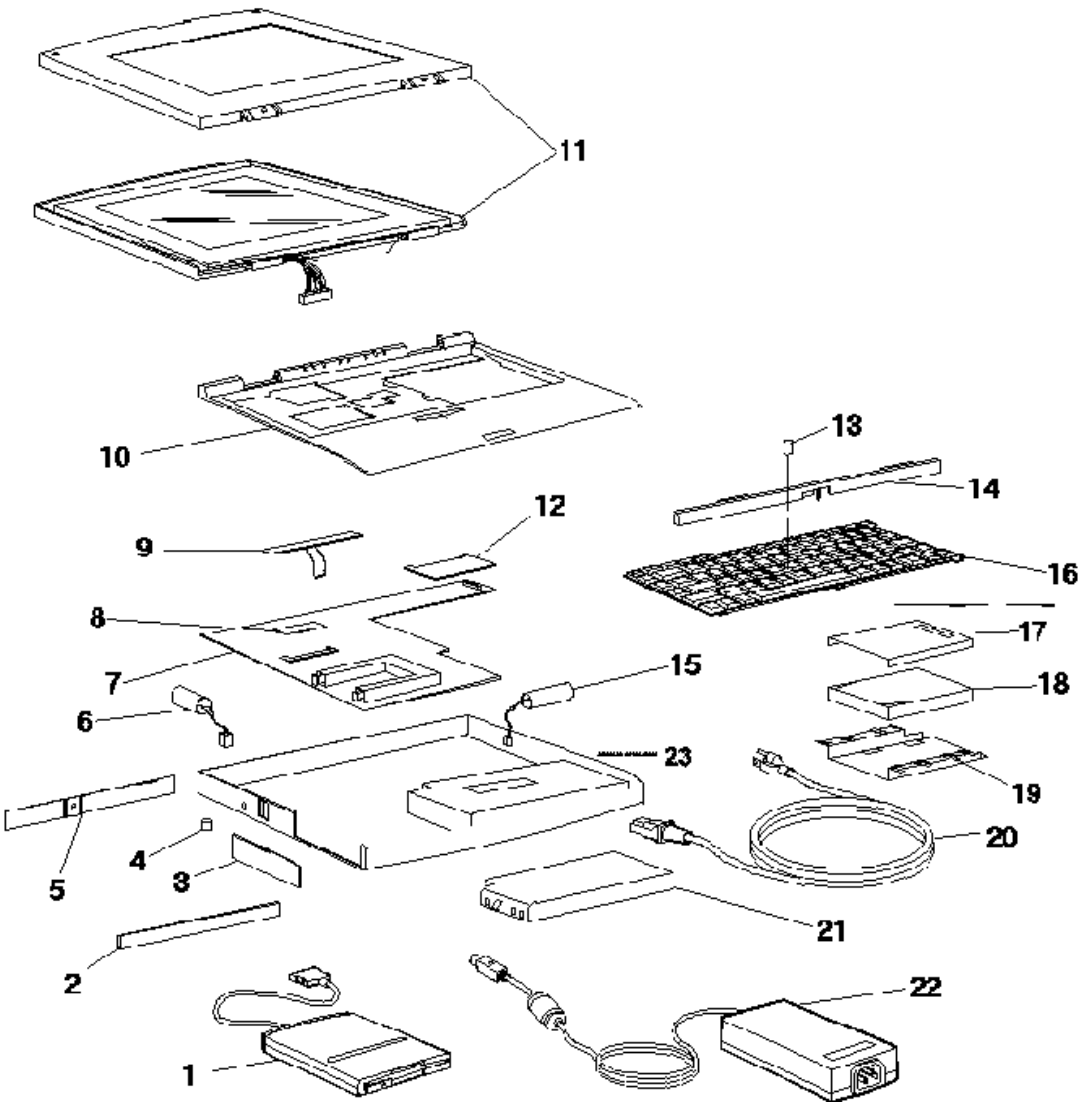

Figure Section 5-10 Versa S Illustrated Parts Breakdown

This data was prepared June 1994. For an up-to-date listing of spare parts, please call Fast-Facts (800) 366-0476 and order document umber 42180975.

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U

V

(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 àu Règlement sur le brouillage radioélectrique, C.R.C., ch.1374.

BATTERY REPLACEMENT

A lithium battery in your computer maintains system configuration information. In the event that the battery fails to maintain system configuration information, NEC recommends that you replace the battery. See Chapter 5 for battery replacement information.

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

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

BATTERY DISPOSAL

Do not place used batteries in your regular trash.

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

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

Return batteries to a federal or state approved battery recycler. This may be where you purchased the battery or a local seller of automotive batteries. In MINNESOTA, call1-800-225-PRBA if further disposal information is required.

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