DIGITAL HiNote VP 550-575 Series

Service Quick Reference Guide

Part Number: ER-PD1WF-SR. A01

Digital Equipment Corporation

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DIGITAL HiNote VP 550-575 Series Service Quick Reference Guide

FCC Notice

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.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

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 into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

All external cables connecting to this basic unit need to be shielded. For cables connecting to PCMCIA cards, see the option manual or installation instructions.

Contents

Contents

Preface

This Service Quick Reference Guide describes how to test, troubleshoot, and remove and replace the DIGITAL HiNote VP 500 series Models VP 550, 575 notebook computer Field Replaceable Units (FRUs).

This guide is written specifically for DIGITAL approved on-site service engineers. On-site repair of systems beyond the approved FRU list is prohibited and may void warranty.

CAUTION: Digital recommends that only A+ certified engineers attempt to repair this equipment. All troubleshooting and repair procedures are detailed to support subassembly/module level exchange. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or make modifications to any printed circuit board. Improper repairs can create a safety hazard. Any indications of component replacement or circuit board modifications might void any warranty or exchange allowances.

Overview 1

Introduction

This chapter introduces the DIGITAL HiNote VP 500 series notebook computers. It provides a system overview and describes the controls, indicators, and hot keys.

System Overview

The HiNote VP 500 series are high-performance portable computers designed for the mobile professional.

Figure 1-1 shows a functional block diagram of the notebook computer. The following sections provide an overview of the different functions.

CPU and Chip Set

The HiNote VP 500 series notebook computers use the Intel P54CSLM 120/133 processors and P55C 150/166/175 processors mounted on a daughter card.

The following chip set is used to implement the core functions of the system.

- Intel Mobile Triton chip set provides system controller & PCI IDE controller functions

Overview

- SMC669FR provides support for floppy disk controller (FDC), two serial ports (one serial port and one FIR) and one parallel port
- Intel 80C51SL provides the keyboard controller and scanner and the battery management unit
- Cirrus CL-PD6832 is used as the PCI PCMCIA controller
- ESS ES1878 for the audio subsystem

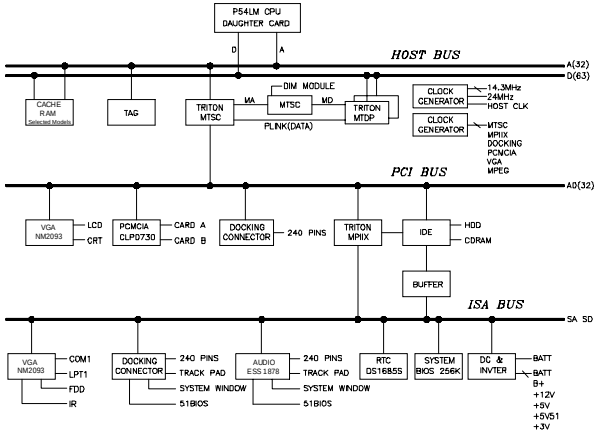


Figure 1-1. Functional Block Diagram

Memory

The system comes with 16 MB of on-board DRAM for system memory and 256KB of L2 cache memory (on selected models).

System memory can be upgraded to a total of 24 MB, 32 MB, 48 MB, and 80 MB. The upgrade is performed by installing two 4 MB, 8 MB, 16 MB, or 32 MB DIMM modules. Two identical memory modules must be installed when adding additional memory.

BIOS

The system has a 256KB Flash ROM for system BIOS (Phoenix BIOS 4.04). The BIOS provides support for the following:

- Suspend to RAM/Disk
- Full APM 1.2 supported
- Password protection(System and HDD)
- Auto-configured with replicator/docking/modules
- Windows 95 ready with PnP
- 32KB ROM for 51SL keyboard controller
- Gas-gauge for battery status information
- Various hot-keys for system control

Video Controller Chip

Video support is provided by the Neo Magic NM2093 VGA Controller Chip. This chip provides the following functions:

- PCI Bus support
- Simultaneous display supported
- Integrated 128-bit wide, 7Mbits Display Memory – 1.1 MB of Video RAM
- Integrated programmable linear address feature accelerates GUI performance
- Supports NON-interlaced CRT monitors with resolutions up to 1024 x 768/256 colors
- Advanced power management features minimize power consumption during:
  - Normal operation
  - Standby mode
  - SUSPEND mode
  - VESA DPMS for monitor by 2093 (option)
- Graphic accelerator for WINDOWS application
- 3.3V/5V panel Interface support
  - bit BLT Engine
  - Memory mapped I/O
  - Linear addressing
  - Color expansion
  - 64x64 hardware cursor
  - 64x64 or 128x128 hardware ICON

- High resolution SVGA (800x600) panel
  - TFT displays support a maximum of 64K colors
  - DSTN displays support a maximum of 64K colors

I/O Ports

The system has the following I/O ports:

- One 9 pin Serial port, 16550A compatible
- One 25 pin Parallel port, EPP/ECP Capability
- One 15 pin CRT port
- 6 pin external full keyboard/numeric key-pad / PS/2 mouse connector
- One microphone in port & one speaker out port
- 240 pin docking connector that supports PS2 mouse port, AT-keyboard, 1S1P, CRT, audio ports, MIDI port, and AC jack.
- Built-in microphone
- Built-in IRDA FIR transmitter-receiver

Option Modules

The following expansion modules can be installed in the system:

Secondary LiIon Battery

Components, Controls and Indicators

This section shows the locations and provides a description of the different components, controls, and indicators on your DIGITAL notebook computer.

Front and Side Components (Panel Closed)

	Component	Description
❶	Removable Hard Drive	Easily removable and upgradable.
❷	Lid Release	Slide the two latches located on either side of the notebook toward you to open the LCD panel.
❸	Main Battery Module	Removable battery module that can be replaced with a charged battery.
❹	Expansion bay	Supports the 12X CD-ROM/FDD Combination module and optional lithium-ion secondary battery module.

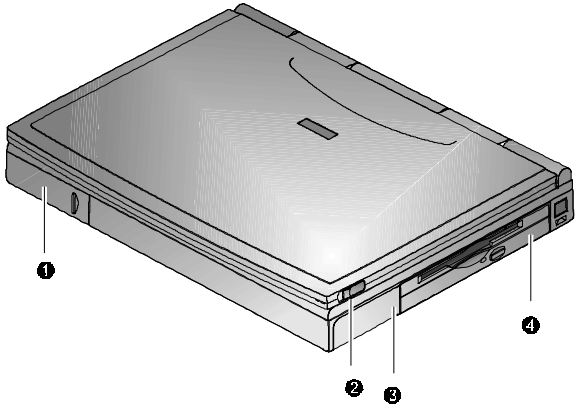


Figure 1-2. Right Front View (Panel Closed)

Rear View

	Component	Description
❶	Fast Infrared Interface	Allows wireless data transfer between the notebook and other IR devices. (Selected models only)
❷	Serial (COM) Port 	A serial device connects to this port.
❸	Parallel LPT Port 	A parallel device, such as a printer, connects to this port.
❹	Reset Button	Using a pen or paper clip, press this button to reboot the system. All unsaved data will be lost.
❺	VGA Display Port 	An external VGA or SVGA monitor connects to this port.
❻	Minidock Port	This 240-pin port allows you to connect the notebook to the Minidock Port Replicator.
❼	External Keyboard or PS/2 Mouse Port 	An external keyboard or PS/2 mouse connects to this port.

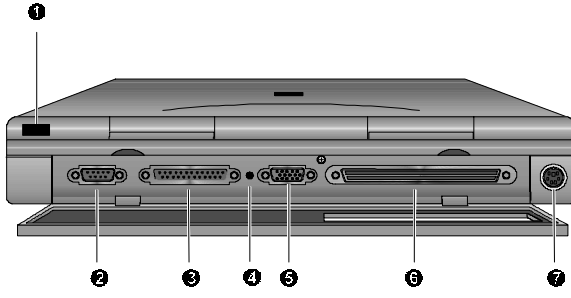


Figure 1-3. Rear View

Left and Side Components

	Component	Description
❶	Speaker-out Port 	External speakers or headphones connect to this port.
❷	External Mic Port 	An external microphone connects to the notebook.
❸	PC Card Lower Socket Eject Button	Ejects a PC Card Type II from the lower socket or to eject a Type III card.
❹	PC Card Socket	Insert PC Card Type II or Type III cards into this socket.
❺	PC Card Upper Socket Eject Button	Ejects a PC Card Type II from the upper socket..
❻	AC Power Port 	The AC Adapter power cord connects to this port.
❼	Security Lock Port 	A Security Lock device, such as a Kensington Lock, connects to this port.
❽	AC Power LED 	Lights green when the notebook is operating on AC power.
❾	Battery Charger LED 	Lights amber when the battery is being charged. When the battery is fully charged the amber LED turns off.

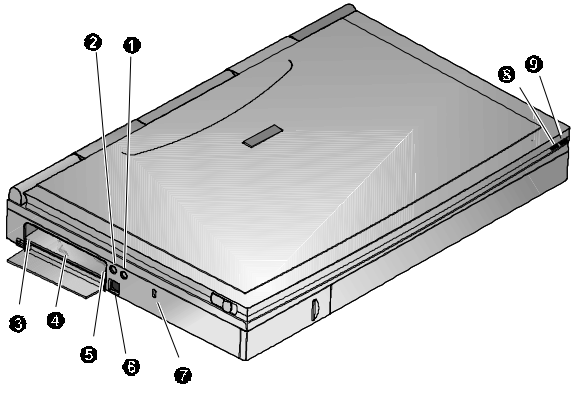


Figure 1-4. Left Front View (Panel Closed)

Right Front View (Panel Open)

	Component	Description
❶	Internal Microphone	Used to record music, voice and sound files.
❷	LCD Display	DSTN or TFT Super VGA back-lit display.
❸	LCD Status Display	Provides system operating status.
❹	Suspend/ Resume Button	Turns the notebook on and toggles between the suspend/resume mode. Press [fn + Suspend/Resume] to turn off the notebook.
❺	Lid Switch	Close the notebook's LCD lid to suspend the system. Open the lid to resume the normal operation. The Lid Switch can be configured to CRT display mode from within the Power menu of the BIOS Setup Program. Please refer to Chapter 2.
❻	Internal Stereo Speakers	Used to hear sound files and system sounds through stereo speakers.
❼	Touch pad	A touch sensitive pointing device providing all the functions of a two-button mouse.

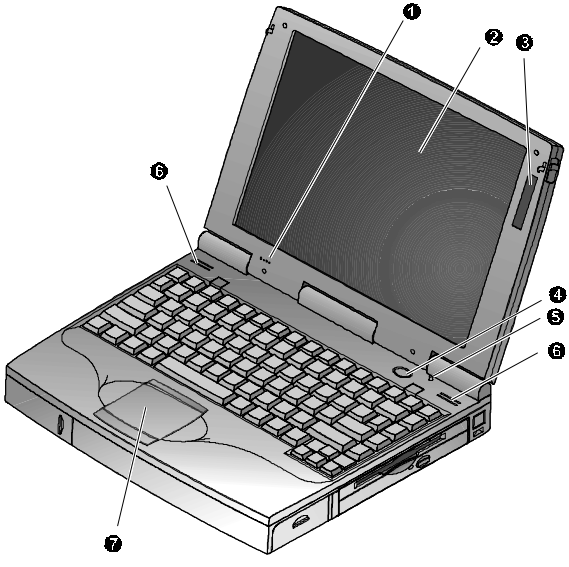
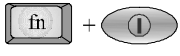


Figure 1-5. Right Front View (Panel open)

Controlling Power

Unique to DIGITAL notebook's, the suspend/resume button not only enables you to take advantage of the built-in power saving features but also turns the notebook on and off.

Action	How to...
On 	Press the Suspend/Resume button to turn the system on.
Suspend 	When the system is on, press this button to place your system in Suspend mode.
Resume 	Press the Suspend/Resume button to resume normal operation from the Suspend mode.
Off 	To completely shut off your notebook, press and hold [fn + suspend/resume] button until a system beep sounds, indicating that the system has been successfully turned off.
Suspend Lid Switch	In its factory default mode, closing the LCD lid will also enter the notebook into Suspend mode. Refer to Chapter 3, in the section labeled *Power Menu* for instructions on how to configure the Lid Switch function.

Battery Charge Gauge (in LCD Status Display)

Icon	When Displayed, Indicates…
	76% to 100% battery operating time remaining. When the lines within this icon are rotating, it indicates that the battery is being charged. When the rotating stops, the battery is fully charged.
	51% to 75% battery operating time remaining.
	26% to 50% battery operating time remaining.
	Low battery to 25% battery operating time remaining. The system's warning beep will sound. Save your work, replace the low battery with a fully charged one or use an AC power source to run the notebook. The [fn + F7] keys shut off the warning beep. It also mutes all audio.
	System has ceased charging the battery. An abnormal condition exists causing the core of the battery to reach its maximum temperature and battery charging has been suspended..

LCD Status Display

Icon	When Displayed Indicates...
	Embedded Numeric Keypad is enabled by the hot key combination. The keyboard's embedded keypad functions as a cursor control keypad. When displayed in conjunction with the Num Lock icon, the embedded keypad functions as a numeric keypad.
	Scroll Lock is enabled by a hot key combination.
	Num Lock is enabled by a hot key combination.
	Caps Lock is enabled.
	Hard Disk Drive/CD-ROM is being accessed by the system.
	Floppy Disk Drive is being accessed by the system.
	The external monitor (CRT) or Simul mode is enabled. If the icon is blinking, the system is in Save to RAM mode.

Keyboard Hot Keys

Hot keys are activated by holding down the [fn] key (located in the lower left corner of the keyboard) and pressing the desired function key.

[fn] +	Function
[fn + esc]	Places the computer in Standby Mode.
[fn+A]	Places the computer in Save to RAM Mode.
[fn+F]	All open data and system settings are Saved to Disk.
[fn + F1]	Decreases brightness level.
[fn + F2]	Increases brightness level.
[fn + F4]	Switches between the three display modes: 1. LCD Display 2. LCD Display and External Monitor 3. External Monitor only Each time you press this hot key combination the computer changes to the next display mode.
[fn + F5]	Decreases the display contrast (DSTN screens only).
[fn + F6]	Increases the display contrast (DSTN screens only).
[fn + F7]	Enables or disables audio/speaker output including system beep indicating low battery.
[fn + F8]	Toggles the keyboard's embedded key pad on and off. When used by itself, it functions as a cursor control keypad. Press [fn+F9] and then the [fn+F8] hot key combination to use the notebook's numeric embedded keypad.

continued

[fn] +	Function
[fn + F9]	Toggles Num Lock on and off. Used by itself, fn+F9 enables an external keyboard numeric keypad.
[fn + F10]	Toggles Scroll Lock on and off. The Scroll Lock functions in certain applications, leaving the cursor in its current position while moving the screen in the direction of the arrow pressed.
[fn + home/pause]	Pauses the display output. Press a key to resume.
[fn + end/break]	If Break is enabled, pressing this hot key sends a system break.
[fn + PrScr/ SysReq]	Determined by application software.
[fn + ↑]	Increases the audio volume.
[fn + ↓]	Decreases the audio volume.

Related Information

Documentation

DIGITAL HiNote VP 550, VP 575 Series User's Guide	English	ER-PD1WF-UA
	French	ER-PD1WF-UP
	Italian	ER-PD1WF-UI
	German	ER-PD1WF-UG
	Spanish	ER-PD1WF-US
	Japanese	ER-PD1WF-UJ
	Simple Chinese	ER-PD1WF-U2
DIGITAL HiNote VP 550, VP 575 Series Quick Reference Card	English	ER-PD1WF-BA
	French	ER-PD1WF-BP
	Italian	ER-PD1WF-BI
	German	ER-PD1WF-BG
	Spanish	ER-PD1WF-BS
	Japanese	ER-PD1WF-BJ
	Simple Chinese	ER-PD1WF-B2
Quick Setup Guide	English, French, Italian, German, Spanish, Japanese	ER-PD1WF-IM
	English, Dutch, Danish, Swedish, Norwegian, Finnish	ER-PD1WF-IX
	English, Simple Chinese	ER-PD1WF-I2

AC Adapter Bulletin	English, French, Italian, German, Spanish, Japanese	ER-PB1WF-DM
DIGITAL HiNote System CD		AG-R49UA-BE

World Wide Web

Information such as drivers, BIOS updates, and on-line documentation is available from DIGITAL's World Wide Web Site.

The URL for the site is:

`HTTP://WWW.WINDOWS.DIGITAL.COM/`

System Restoration 2

Introduction

This chapter provides information on how to restore the operating system and drivers on a DIGITAL HiNote VP 500 series notebook computer. It provides instructions on how to create a bootable floppy for the system and how to restore the system using the bootable floppy or the DIGITAL HiNote System CD.

CAUTION: Do not compress the boot drive using compression utilities. It will cause the notebook computer's Save to File feature to not function properly.

Reinstalling and Installing Drivers

Reinstalling Drivers – The procedures for reinstalling certain drivers over an existing installation is different than installing the drivers on a clean installation. For information on how to reinstall drivers, refer to the latest version of the DIGITAL HiNote System CD.

Installing Drivers – In order to restore the system back to its original DIGITAL factory shipped configuration, you must install the HiNote VP 500 Series audio, video, track pad and network drivers (the need to install the network driver depends upon the individual requirements). If you have installed WinNT, you will also want to install the EPM (Enhanced Power Management) driver located in the Driver/WinNT directory. Please refer to Chapter 5 of the User's Guide in the section labeled *Installing PC Cards in WinNT 4.0*, for information on EPM features. These drivers are located on the DIGITAL HiNote System CD. To install any of these drivers, please refer to the following instructions:

1. Boot to Windows.
2. Insert the DIGITAL HiNote System CD into the CD-ROM drive.
3. From the Taskbar, click on Start and then Run. In the Run command box type X:\CDInstall (X represents the drive letter of the CD-ROM).
4. At the Welcome screen, click on Next. Then at the Install screen, click on Driver Installation Instructions.
5. Select the driver(s) you wish to install. A README.TXT file will appear. Print the file(s). These are the installation instructions to install the selected drivers(s).

Creating a Bootable Floppy

To create a bootable floppy, perform the following:

1. Boot to Windows. Insert the DIGITAL HiNote System CD into the CD-ROM drive. Click on Start and then Run. In the Run dialog box command line type X:\CDInstall (X: represents the drive letter of the CD-ROM).
2. Click through the Welcome screens until the Install Menu appears.
3. Click on the Utilities box and then click on Next.
4. Click on Create Boot Floppy and click on Next. Click on Next again.
5. Insert a 3½ inch 1.44 MB floppy into the floppy disk drive. Follow the on-screen instructions. The utility (Sysboot.exe) will format the floppy, make the floppy bootable and copy appropriate system files to the floppy. Before creating the boot floppy, ensure that the floppy is NOT write protected. Any previous data on the diskette will be erased.
6. After the bootable floppy has been created, ensure that it is write protected. Paste a label onto the diskette and label it HiNote VP 500 Series Bootable Floppy.

Using the Boot Floppy

The hard drive in the system has been partitioned using the FDISK utility. The hard drive has also been formatted. A "SAVETOFILE.BIN" file has been created for the system by using PHDISKF. Without Save-to-File.bin, it will not be possible to take advantage of the system's Save to Disk power management feature.

FDISK, format and PHDISKF are located on both the DIGITAL HiNote System CD and the bootable floppy, which can be created from the DIGITAL HiNote System CD.

Re-installing the Operating System

To re-install the Windows Operating System on top of the current Operating System, perform the following:

1. Insert the bootable floppy into the floppy disk drive. Power on the system. A list of choices appear.

   NOTE: To exit this menu and go to a DOS prompt, press 2. To re-enter this menu from a DOS prompt, type AUTOEXEC and press the Enter key. AUTOEXEC must be typed from the A: prompt.

2. Insert the Microsoft Operating System CD into the CD-ROM drive.
3. From the bootable floppy Main Menu, choose Option 3 (Re-install).
4. Follow Microsoft's on-screen instructions.
5. Remove the Microsoft Operating System CD and insert the DIGITAL HiNote System CD. Run CDInstall. Click on the Next buttons until the Main Install screen appears.
6. Click on Enhancements and Updates, and then click on Next. Follow the on-screen instructions. These enhancements update the Microsoft Operating system.
7. After re-installing the Operating System you should re-install all drivers. Please refer to the section on Reinstalling/Installing Drivers for information on installation procedures.

System Installation

To remove all files from the hard drive and re-install Windows Operating System but NOT remove the hard drive partitions, please perform the following.

1. Insert the bootable floppy into the floppy disk drive. Power on the system. A list of choices appear.

NOTE: To exit this menu and go to a DOS prompt, press 2. To re-enter this menu from a DOS prompt, type AUTOEXEC and press the Enter key. AUTOEXEC must be typed from the A: prompt.

2. Choose Option 4. This Option will Format the hard disk's drive C: and then create a 86016 KB Save-to-file.bin This file is created by the PHDISKF Utility and enables the use of the notebook's Save to Disk feature.
3. Insert the Microsoft Operating System CD into the CD-ROM drive.
4. Choose Option 5 (Install OS) from the bootable floppy Main Menu. This will run Microsoft's OEMSETUP program from the Microsoft Operating System CD. OEMSETUP runs SCANDISK and then installs the OS.
5. Remove the Microsoft Operating System CD and insert the DIGITAL HiNote System CD. Run CDInstall. Click on the Next buttons until the Main Install screen appears.
6. Click on Enhancements and Updates, and then click on Next. Follow the on-screen instructions. These enhancements update the Microsoft Operating system.

7. After re-installing the Operating System you should re-install all drivers. Please refer to the "Reinstalling/Installing Drivers" section of this chapter for information.

8. Create a directory on the hard drive for the operating system installation files.

Windows 95: Create a directory on the hard drive under C:\Windows called Options and then make a directory under that called Cabs. The new directory path is C:\Windows\Options\Cabs. Copy the Win95 directory from the Microsoft CD onto the hard drive's C:\Windows\Options\Cabs directory.

Windows NT: After completing the installation of Windows NT, locate the directory on the Microsoft O/S CD labeled, I386. Copy this directory to the drive where the operating system is located, most likely drive C:\. The files in this directory are needed when installing certain drivers such as network drivers.

Complete System Restoration

To perform a complete system restoration on a new hard drive or to remove all files and re-partition the hard drive and then install a Microsoft Operating System, please perform the following:

1. Insert the bootable floppy into the floppy disk drive. Power on the system. A list of choices appear.

NOTE: To exit this menu and go to a DOS prompt, press 2. To re-enter this menu from a DOS prompt, type AUTOEXEC and press the Enter key. AUTOEXEC must be typed from the A: prompt.

2. Choose Option 7 from the bootable floppy Main Menu. This will initialize the hard disk using FDISK. Running FDISK will erase all data from the hard drive. During FDISK, you will be prompted for much information.

   When running FDISK, we strongly recommend that you do not enable large disk support,(choose NO, when asked). If you choose [YES] you will not be able to install WinNT or a WIN95 non-SR2 operating system at a later time. Also make sure you set the Active Partition flag to make it bootable.

   NOTE: Although OEMSETUP does FDISK the hard drive, the utility is NOT designed to run with hard drives 2.1 GB or larger. It will cause unexpected results. Use the FDISK Option provided on the boot media.

3. Choose Option 4. This Option will Format the disk and then create a 86016 KB Save-to-file.bin This file was created by the PHDISKF Utility and enables you to use the notebook's Save to Disk feature.

4. Insert the Microsoft Operating System CD into the CD-ROM drive.

5. Choose Option 5 (Install OS) from the bootable floppy Main Menu. This will run Microsoft's OEMSETUP program from the Microsoft Operating System CD. OEMSETUP runs SCANDISK and then installs the OS.

6. Remove the Microsoft Operating System CD and insert the DIGITAL HiNote System CD. Run CDInstall. Click on the Next buttons until the Main Install screen appears.

7. Click on Enhancements and Updates, and then click on Next. Follow the on-screen instructions. These enhancements update the Microsoft Operating system.

8. After re-installing the Operating System you should re-install all drivers. Please refer to the “Installing Drivers” section of this chapter for information.

9. Create a directory on the hard drive for the operating system installation files.

Windows 95: Create a directory on the hard drive under C:\Windows called Options and then make a directory under that called Cabs. The new directory path is C:\Windows\Options\Cabs. Copy the Win95 directory from the Microsoft CD onto the hard drive’s C:\Windows\Options\Cabs directory.

Windows NT: After completing the installation of Windows NT, locate the directory on the Microsoft O/S CD labeled, I386. Copy this directory to the drive where the operating system is located, most likely drive C:\. The files in this directory are needed when installing certain drivers such as network drivers.

Using the DIGITAL HiNote System CD

This section describes the steps used to install a Microsoft Operating system and drivers onto a new hard drive, or on an existing drive which needs restoration.

Preparing a New Hard Drive

PHDISKF and FDISK are the two utilities needed in order to prepare the hard disk for general use. These utilities can be found on the DIGITAL HiNote System CD. The FDISK utility formats the hard drive while the PHDISKF utility creates a DOS file on the hard drive. This DOS file is necessary in order to take advantage of the notebook’s Save to Disk power management feature.

FDISK and Format Disk Utility

The DIGITAL HiNote System CD is a bootable CD. It boots to the A:\ prompt. In the following instructions we will be running the FDISK Utility on a 1.44 GB hard drive.

1. Insert the DIGITAL HiNote System CD into the CD-ROM tray. The CD should boot to the A:\ prompt. At the A:\ type FDISK the command line should read A:\FDISK.

   Press <Enter>.

2. This will execute the FDISK utility. When asked if you want to enable enlarged disk support, choose [No]. If you choose [Yes], you will not be able to install WinNT or a Win95 non-SR2 operating system.

3. At the FDISK Main Menu, choose 1 to create a DOS partition or logical DOS drive. To choose this option, type the number 1 and press <Enter>.

4. Choose 1 again to create a primary DOS partition by typing 1 and pressing <Enter>.

5. If you wish to make the whole hard drive one large partition, press <Enter> to accept the default Yes. Continue to press the <esc.> key until you have exited FDISK and are at the DOS prompt. Restart the system by pressing Ctrl+Alt+Del. Proceed to step 16. If you wish to create multiple partitions on the hard drive, press the N key (signifying No) and then press <Enter>. Proceed to step 6.

6. FDISK will inform you of the approximate space available on the hard drive and prompts you to enter the percent of disk space or the number of MB you wish to assign for the primary partition. For the purpose of this example, we have chosen to assign drive C: 500 MB.

7. Type 500 and press <Enter>. FDISK displays the partition information. Press the <esc.> key to continue.

8. If you wish to make the primary partition C: bootable, type 2 and then press <Enter>. You will be asked to enter the number of the partition you wish to make active (bootable). Type 1, and press <Enter>. Press <esc.> to return to the FDISK Main Menu.

9. If you wish to make more DOS partitions accessible by Win95, press 1, Create DOS Partition or Logical DOS Drive (recommended) at the FDISK Main Menu. If you do not, press <esc.> to exit the Main Menu and then press <esc.> again to exit FDISK. We have chosen to Create a DOS Partition or Logical DOS Drive.

10. Press 2 to create an Extended DOS partition and then press <Enter>. FDISK will give you the available hard disk space. On our 1.44 GB drive, the space remaining is 878 MB.

11. If you wish to assign the remaining space as the Extended DOS partition, press <Enter>. If you wish to customize the capacity, type in the amount in MB or percentage of the available space (for ex, 50%) and press <Enter>. We will assign the remaining drive space (878 MB) to and Extended DOS partition.

12. After pressing <Enter>, press <esc.>. FDISK will inform you that there are no Logical Drives assigned. Define the size you wish or press <Enter> to accept the default. If you press <Enter> the entire (878 MB) capacity will be assigned as drive D:.

13. Type the amount you wish drive D to be assigned. For our purposes we have chosen to assign drive D 400 MB, so we type 400. Press <Enter>. FDISK will display the information for drive D: and inform you of the remaining capacity (478 MB).

14. Press <Enter> to assign the remaining capacity to drive E:. All Extended DOS partitions have been assigned to logical drives.

15. Press <esc.> to continue. Press <esc.> again to exit the FDISK Main Menu. You will be informed that you need to reboot the system. Press <esc.> to exit FDISK. At the DOS prompt, press Ctrl+Alt+Del to reboot the system.

16. The system will reboot to the CD-ROM. You must now format all partitioned segments of the hard drive.

17. At the DOS prompt, type:

    Format C:/S/U and press <Enter>.

    (There must be a space between the word “format” and “C”)

    This will format the primary partition C, and copy all system files to the primary drive. If you have created more than one partition you must format them as well. To format the D drive for example, at the DOS prompt type:

    Format D:/U and press <Enter> (There must be a space between the word “format” and “D”.)

18. Continue until all partitions have been formatted. At the completion of Format Disk, you will be returned to the DOS prompt. Refer to the following section on how to run the PHDISKF Utility.

PHDISKF Utility

You will need to create a DOS File segment on the hard drive in order to take advantage of the Save to Disk Power Management Feature. The DOS file can be created before or after you install the operating system. Creating the DOS file after the installation of the operating system will NOT erase any data from the hard drive. For the purpose of these instructions, we have decided to first create the DOS file and then install the operating system. To use the PHDISKF utility, please refer to the following instructions:

1. Insert the DIGITAL HiNote System CD into the CD-ROM tray. The CD should boot to the A:\ prompt. At the A:\, type:

   PHDISKF /create 86016

   There needs to be a space between the words "PHDISKF" and "/create"

   and a space between "/create" and "86016".

2. Press <Enter>.

86016 represents the size of the DOS file to be create in KBytes. The equation for determining the DOS file size is 1024 (80 MB + 4 MB). 1024 is the number of KBytes per MegaByte. 80 MB is the maximum amount of system memory and the additional 4 MB is for overhead.

Before you can load the Microsoft Operating System onto the hard drive, you must first load the CD-ROM driver from the DIGITAL HiNote System CD to the hard drive. It is located in the Driver directory.

System Installation

If you want to remove all files from the hard drive and re-install Windows Operating System but NOT remove the hard drive partitions, please perform the following.

1. Insert the DIGITAL HiNote System CD into the CD-ROM drive and power on the system.
2. Run format and then PHDISKF. Please refer to the appropriate sections of this chapter.
3. Remove the DIGITAL HiNote System CD and power off the notebook.
4. Insert the bootable floppy into the floppy drive and turn on the system.

5. At the list of options choose number 2 (exit to DOS). Insert the Microsoft CD into the CD-ROM drive.

6. From the DOS prompt, type the letter that represents the CD-ROM drive, then a colon and a backslash. For example: D:\

7. Enter the command to start the operating system installation:

   Windows 95:

   D:\win95\setup

   Windows NT:

   D:\winnt \b—Use this command string if you do not want to create an Emergency Backup Repair disk (recommended). You must include a space between the "winnt" and the "\b".

   D:\winnt—Use this command if you want to create an Emergency Backup Repair Disk as a part of the installation.

8. Press <Enter> and follow the instructions that appear on the screen to complete the installation.

9. Remove the Microsoft Operating System CD and insert the DIGITAL HiNote System CD. Run CDInstall. Click on the Next buttons until the Main Install screen appears.

10. Click on Enhancements and Updates, and then click on Next. Follow the on-screen instructions. These enhancements update the Microsoft Operating system.

11. After re-installing the Operating System you should re-install all drivers. Please refer to the "Installing Drivers" of this chapter for information.

12. Create a directory on the hard drive for the operating system installation files.

Windows 95: Create a directory on the hard drive under C:\Windows called Options and then make a directory under that called Cabs. The new directory path is C:\Windows\Options\Cabs. Copy the Win95 directory from the Microsoft CD onto the hard drive's C:\Windows\Options\Cabs directory.

Windows NT: After completing the installation of Windows NT, locate the directory on the Microsoft O/S CD labeled, I386. Copy this directory to the drive where the operating system is located, most likely drive C:\. The files in this directory are needed when installing certain drivers such as network drivers.

Complete System Restoration

If you have purchased a new hard drive or you want to remove all files and re-partition the hard drive and then install a Microsoft Operating System, please perform the following:

1. Insert the DIGITAL HiNote System CD into the CD-ROM drive and power on the system.
2. Run FDISK, format the hard drive and then run PHDISKF. These instructions are covered in detail in Appendix B of the User's Guide.
3. Remove the DIGITAL HiNote System CD and power off the notebook.
4. Insert the bootable floppy into the floppy drive and turn on the system.
5. At the list of options choose number 2 (exit to DOS). Insert the Microsoft CD into the CD-ROM drive.
6. From the DOS prompt, type the letter that represents the CD-ROM drive, then a colon and a backslash. For example: D:\

7. Enter the command to start the operating system installation:

   Windows 95:

   D:\win95\setup

   Windows NT:

   D:\winnt \b—Use this command string if you do not want to create an Emergency Backup Repair disk (recommended). You must include a space between the "winnt" and the "\b".

   D:\winnt—Use this command if you want to create an Emergency Backup Repair Disk as a part of the installation.

8. Remove the Microsoft Operating System CD and insert the DIGITAL HiNote System CD. Run CDInstall. Click on the Next buttons until the Main Install screen appears.

9. Click on Enhancements and Updates, and then click on Next. Follow the on-screen instructions. These enhancements update the Microsoft Operating system.

10. After re-installing the Operating System you should re-install all drivers. Please refer to the "Installing Drivers" section of this chapter for information.

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Windows NT: After completing the installation of Windows NT, locate the directory on the Microsoft O/S CD labeled, I386. Copy this directory to the drive where the operating system is located, most likely drive C:\. The files in this directory are needed when installing certain drivers such as network drivers…

System BIOS 3

Introduction

This chapter provides information related to the system BIOS and its Setup program.

BIOS Setup Program

The BIOS (Basic Input and Output System) Setup Program is a menu driven utility that enables you to make changes to the system configuration and tailor the operation of your notebook to suit your individual work needs. It is a ROM-based (Read only Memory) configuration utility that displays the system's configuration status and provides you with a tool to set system parameters. These parameters are stored in non-volatile battery backed-up CMOS RAM, which saves this information even when the power is turned off. CMOS chips are extremely low power consuming. When the system is turned back on, the system is configured with the values found in CMOS.

NOTE: The CMOS battery receives a charge when the system is being operated on AC power. If the system is off for more than one year, the CMOS battery will drain and the ROM data will be lost.

By activating user friendly menus, you can configure such items as:

- Hard drives, diskette drives and peripherals
- Password protection from unauthorized use
- Power Management Features

The settings made in the Setup program affect how the notebook performs. It is important to try to understand all the Setup options and to make settings appropriate for the way you use the notebook.

Navigating through the BIOS Setup Program

When turning on the notebook for the first time you may get a message prompting you to run the BIOS Setup program. A warning message may appear on the screen if the hardware configuration is changed or the Power On Self Test (POST) fails. This message will inform you of any errors or invalid settings and prompt you to run Setup to correct the problem.

Even if you are not prompted by a message instructing you to use Setup, at some time in the future you may want to change the configuration of your computer. For example, you may want to make changes to the power management settings, or for security purposes, enable the notebook's password function. It will then be necessary to reconfigure your system using the Setup program so that the computer can recognize these changes.

A few examples of why you may want to run the BIOS setup program follow.

- You want to redefine the communication ports to prevent any conflicts.
- You want to make changes to the Power Management configuration.
- You want to change the password or make other changes to the security setup.

Accessing the BIOS Setup Program

To access the BIOS Setup program, press the F2 key when prompted during bootup. There are three essential elements to the BIOS screens: Menu Bar, Item Specific Help Window and Legend Bar.

Menu Bar

The top of the screen has a menu bar with the following selections:

Main	Changes to the basic system configuration are made from within this menu.
Peripherals	Use this menu to enable and make changes to the system port addresses and modes.
Security	Sets System and Boot/Resume password.
Power	From within this menu, you will be able to configure and enable Power Management features.
Boot	Allows you to specify the device the system will boot from and the boot device sequence.
Exit	Use this menu to save changes, set factory defaults and exit the Setup program.

Item Specific Help

Note that on the right side of each BIOS Setup screen, there is a section labeled *Item Specific Help.* While moving through the Setup program, note that explanations for the currently highlighted field appear in the *Item Specific Help* window.

Legend Bar

At the bottom of the BIOS Setup screen you will notice a legend bar. The keys in the legend bar allow you to navigate through individual setup menus. The following table lists the keys found in the legend bar with their corresponding alternates and functions.

Legend Key	Alternate Key	Function
F1	Alt + H	Displays the General Help window.
ESC		Exits the current menu and returns you to the previous screen.
← or →		Selects a different menu bar item.
↑ or ↓		Moves the cursor up and down between fields.
<Tab>		Cycles the cursor forward through the particular highlighted field. If the field has only one value, the Tab key will move the selection cell down to the next field.
<Shift + Tab>		Cycles the cursor backward through the particular highlighted field . If the field has only one value, the [Tab + Shift] key combination will move the selection cell up to the previous field.

continued

Legend Key	Alternate Key	Function
- minus key	F5	Scrolls backwards through the values of the highlighted field.
+ plus key	F6	Scrolls forward through the values of the highlighted field.
F9		Sets the fields for the active menu to their default values.
F10		Sets the fields for the active menu to their previous values.
<Enter>		Executes commands or selects a submenu.

Launching Submenus

Notice that a pointer symbol appears next to selected fields in the menu screens. For example, open the Peripherals Menu and you will see a pointer that resembles a triangle on its side next to the Integrated Peripherals field. This symbol indicates that a submenu can be launched from this field. A submenu contains additional options. To launch a submenu:

1. Move the highlighted cell to the desired Menu Bar item and press <Enter>.
2. Use the legend keys to navigate around the screen and make the needed configuration changes.
3. When you finish, press the [esc] key to exit the submenu and return to the main screen.

General Help

In addition to the Item Specific Help window, the BIOS setup program also provides a General Help screen. This screen can be called up from any menu by simply pressing the function key, F1 or the [Alt + H] combination. The General Help screen lists the legend keys with their corresponding alternates and functions.

The scroll bar to the right of the help window indicates that there is more information to be displayed. Use the PgUp and PgDn keys or the up and down arrow keys (↑ ↓)to scroll through the entire help document. Press <Home> to display the first page, press <End> to go to the last page. To exit the help window press <Enter> or the <Esc> key.

The Main Menu

The following settings are available in the Main Menu screen of the BIOS Setup Program.

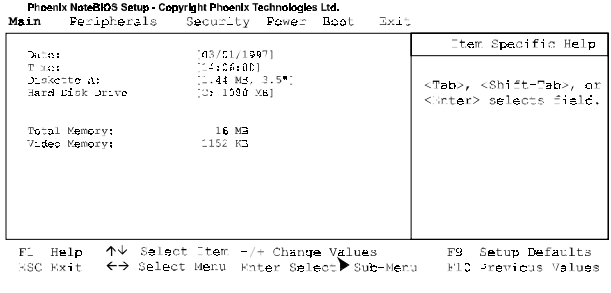


Figure 3-1. The BIOS Setup Main Menu

Field	Settings	Description
Date	Enter current date: month, day, year format	Sets the system to specified date.
Time	Enter current time: hour, minute, second format	Sets the system to specified time.
Diskette A	Display only field	Indicates the presence and size of the FDD.
Hard Disk Drive	Display only field	Indicates the size of your notebook's hard drive.
Total Memory	Display only field	Indicates the amount of total (RAM) memory.
Video Memory	Display only field	Indicates the amount of system video memory.

* Default value.

The Peripherals Menu

Notice the pointer icon next to the words Integrated Peripherals. This indicates the presence of a submenu.

The following settings are available in the Peripherals Menu screen of the BIOS Setup Program.

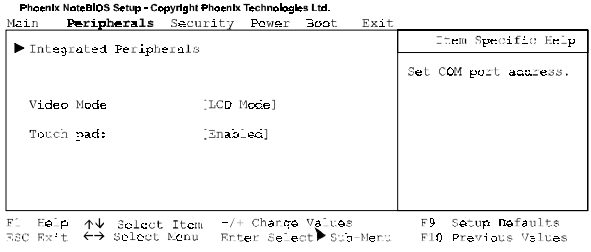


Figure 3-2. The BIOS Setup Peripherals Menu

Field	Settings	Description
Integrated Peripherals	Submenu	Press Enter to set the following port addresses and modes:
		Serial Port
		Infrared Port
		Parallel Port
		Parallel Port Mode
		Audio
Video Mode		Sets the Video mode
	Simul Mode	Allows simultaneous viewing of externally connected monitor (CRT) and the notebook's LCD display.
	LCD Mode*	Allows viewing of the notebook's LCD only.
	CRT Mode	Allows viewing of the CRT only.
Touch Pad	Enabled * Disabled	Enables or disables the touch pad. Connecting a mouse to the serial port will disable the Touch Pad.

* Default value.

Integrated Peripherals (Peripherals submenu)

Move the highlighted cell to this field and press <Enter> to launch the submenu. The following settings are available in the Integrated Peripherals Menu.

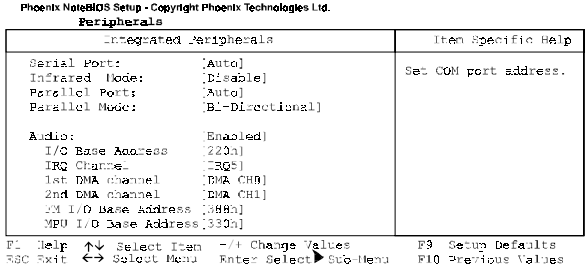


Figure 3-3. The BIOS Setup Integrated Peripherals Menu

Field	Settings	Description
Serial Port	Auto* Disabled COM 1 (3F8h - IRQ4) COM 2 (2F8h - IRQ3) COM 3 (3E8h - IRQ4) COM 4 (2E8h - IRQ3)	Enables, configures or disables the serial port. Set the serial port to disable in order to increase the battery run time.
Fast Infrared	Auto Disabled* COM 1 (3F8h - IRQ4) COM 2 (2F8h - IRQ3) COM 3 (3E8h - IRQ4) COM 4 (2E8h - IRQ3)	Enables, configures or disables the infrared port. Set the infrared port to disable in order to increase the battery run time. When the FIR port is enabled two additional configurable settings appear: Uart 2 Mode and Fast IR DMA Channel. Choose the default settings for these fields or refer to the IR device User's manual.
Parallel Port	Auto* Disabled 378h,IRQ7 or IRQ5 278h,IRQ7 or IRQ5 3BCh,IRQ7 or IRQ5	Enables, configures or disables the parallel port. Set the parallel port to disable in order to increase the battery run time.

continued

Field	Settings	Description
Parallel Mode	Disabled	Disables the parallel port.
	Normal	Parallel port is set for data-out mode only.
	Bi-Directional *	Parallel port permits both data output and data input.
	EPP Mode (Extended Parallel Port)	Operates only with EPP aware peripherals.
	ECP (Extended Capabilities)	Operates only with ECP aware peripherals. See your parallel device user's guide.
Audio	Enables * Disables	Enables, configures or disables the audio port. Some DOS based software require editing the Audio chip's settings for DMA Channels, IRQ, etc. Please see your application's user guide for details.

Default value.

The Security Menu

Select Security from the menu bar to display the following menu.

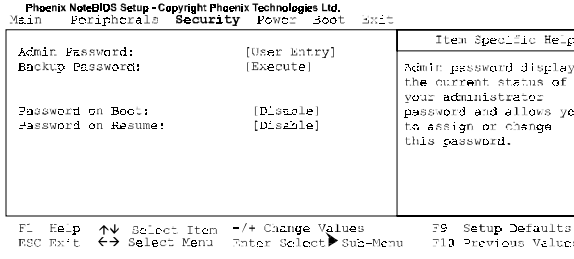


Figure 3-4. The BIOS Setup Security Menu

Field	Settings	Description
Admin. Password	[Press Enter]	Setting the Admin. Password will limit unauthorized access to the notebook, including the BIOS Setup Program.
Backup Password	[Execute]	Backs up Admin. password to diskette.
Password on Boot	Enabled Disabled *	When enabled, the system will require the Admin. Password during system boot. If order to enable Password on Boot, you must have an Admin. Password set.
Password on Resume	Enabled Disabled *	When enabled, the system will required the Admin. Password when resuming from suspend. In order to enable Password on Resume, Password on Boot must be set.

* Default value.

Setting Admin. Password

To set the Admin. Password, move the highlighted cell to the Admin. Password field and press <Enter>. The following dialogue box will appear:

Set Admin. Password

Enter new password: [ ]

Confirm new password: [ ]

1. Type in your password and press <Enter>. The password can be up to seven alphanumeric characters. Symbols and other keys are ignored.
2. Type the password in a second time to confirm. Press <Enter>. The System Password is now set.

Changing Admin. Password

To change the Admin. Password, move the highlighted cell to the Admin. Password field and press <Enter>. When the Admin. Password dialogue box appears, enter the new password. Enter it a second time to confirm. The new password is now set.

Deleting Admin. Password

To delete a previously set Admin. Password and disable the password feature:

1. Open the Admin. Password dialogue box.
2. With the cursor in the Enter new password field, press <Enter>.
3. The cursor will move to the Re-enter new password field. Press <Enter> again.
4. When the Notice dialogue box appears notifying you that changes have been saved, press <Enter> a third time. The password has been deleted.

Using Backup Password

It is highly recommended that you save backup your Admin. Password to a floppy diskette. To backup the password:

1. Insert a blank formatted floppy disk into the notebook's floppy disk drive.
2. From within the BIOS Setup Program's Security Menu, move the highlighted cell to Backup Password and press <Enter>.
3. The password has successfully been backed up to the floppy. This is a hidden file.
4. Remove the floppy from the drive, label it and then store it in a safe place. Please see Chapter 7 for tips on floppy disk care.

To use the password backed up on floppy, please refer to the following:

1. For the purpose of this illustration, we have assumed that you have set Password on Boot to enable.
2. Upon booting, the system will prompt you for the password. Insert the password floppy into the notebook's floppy disk drive.
3. Type in the word "floppy" and press <Enter>. The system will continue with its boot.
4. When prompted to by the system, press F2 to enter the BIOS Setup Program. Enter the Security Menu and first delete the existing password by following the steps outlined in the section labeled *Deleting Admin. Password.*
5. After deleting the password, create a new one and back it up to a blank, formatted floppy disk.

The Power Menu

The Power Menu allows you to enable and adjust the notebook's power saving features. Enabling these features will extend the battery run time.

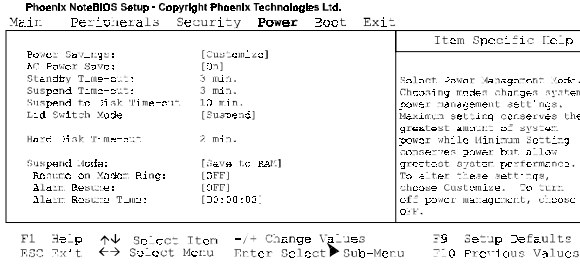


Figure 3-5. The BIOS Setup Power Menu

Field	Settings	Description
Power Savings	Off	Sets the Power Management Mode.
		Disables all Power Management
	Customize *	Allows you to customize the Power Management fields (Standby, Suspend, Suspend to Disk, Hard Disk Time-out) to suit your individual work needs.
	Maximum Performance*	Power Management fields will be set with pre-defined values to provide best system performance with some power conservation.
	Maximum Battery Life	Power Management fields will be set with pre-defined values to ensure maximum battery run time.

continued

Field	Settings	Description
Suspend-to-Disk Time-out	Disabled 1, 2, 3, 5 Min. 10 Min. * 15, 20, 30 Min.	Indicates the amount of time the system needs to be in Save to RAM before entering Suspend-to-Disk mode. In order to make customized changes to this field, Power Savings must be set to Customize.
Lid Switch	CRT Suspend *	Sets action system performs when the notebook's Lid Switch is closed. If connecting an external monitor, set this field to CRT.
Hard Disk Time-Out	Disabled 1 Min. 2 Min. * 3 Min. 5, 10, 15, 20 Min.	Indicates the amount of time the hard disk needs to be inactive before it is turned off. In order to make customized changes to this field, Power Savings must be set to Customize.
AC Power Save	On * Off	When enabled all system power management is enabled, when operating on AC power. If disabled, all system power management is disabled when operating on AC power.
Suspend Mode	Save to RAM* Save to Disk	Selects Suspend mode the system will enter when forced to suspend, i.e. pressing the suspend/resume button.

continued

Field	Settings	Description
Resume on Modem Ring	OFF* ON	If enabled, a modem ring will resume the system from suspend mode.
Alarm Resume	OFF * On	Enables or Disables Alarm Resume Time
Alarm Resume Time	Enter time in a 24 hour format. 13:00 = 1:00 p.m.	Allows you to specify the time the system will resume.

* Default value.

The Boot Menu

From this menu you can choose where the system looks to boot from. You can also prioritize the different boot devices.

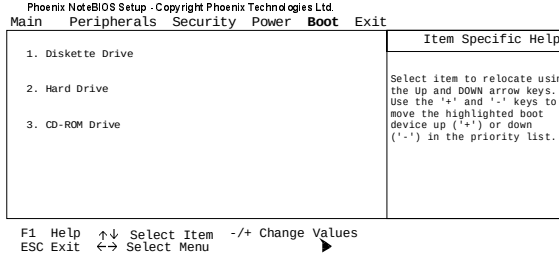


Figure 3-6. The BIOS Setup Boot Menu

Field	Action	Description
Boot Sequence		This field allows you to prioritize which device the system looks at to boot from. Move the highlighted cell to the device you wish to select. Use the + or - key to set its priority in the list.
	Diskette First*	The system will attempt to boot from drive A. If the drive is empty or a non-system disk is present, the system will attempt to boot from the next drive of priority.
	Hard Disk Only	The system will boot from the hard disk, drive C only.
	CD-ROM	The system will boot from the CD-ROM.

* Default value.

The Exit Menu

Enter the Exit Menu to save changes, set factory defaults or exit the Setup program.

Field	Action	Description
Save Changes & Exit	<Enter>	Saves the current changes and exits the BIOS Setup Program.
Discard Changes & Exit	<Enter>	Discards the current changes and exits the BIOS Setup Program.
Get Default Values	<Enter>	Loads the factory default values for each of the fields in the BIOS Setup Program. To keep default values and exit the BIOS Setup Program, you must move the highlighted cell to the Save Changes & Exit field and press the <Enter> key.
Load Previous Values	<Enter>	Discards any changes made during the current BIOS configuration session, and loads the prior session's values. You cannot exit the BIOS through this field.
Saves Changes	<Enter>	Saves the changes made during the current BIOS configuration session. You cannot exit the BIOS through this field.

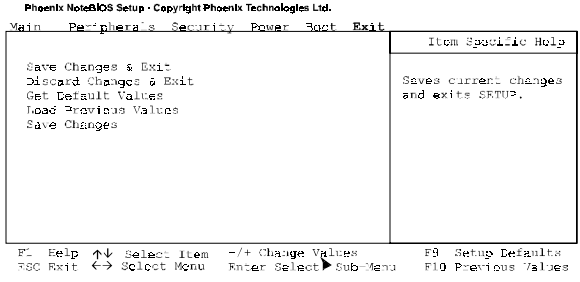


Figure 3-7. The BIOS Setup Exit Menu

Modifying Flash BIOS

The DIGITAL HiNote VP 500 Series notebook computer has a flash updatable system BIOS. As improvements are made to the system BIOS they are made available from DIGITAL's Web site. Use address:

`Web Site: HTTP://WWW.WINDOWS.DIGITAL.COM`

Updating Flash BIOS

The Flash BIOS update come as a self-extracting file that creates a bootable floppy disk. After downloading the update procedure you restore the update image to floppy disk. This procedure creates a bootable floppy with the PHLASH update program. The BIOS update is provided with a set of instructions on how to use it.

Before running the BIOS update procedure set up the notebook computer as follows:

- Connect the AC adapter. For the BIOS update to run the system has to be running from its AC power source.
- Remove any peripheral devices from the system:
  - PCMCIA devices
  - Port Replicator
- Set the System BIOS to its factory default settings

To run the BIOS update:

1. Insert the BIOS Update disk in the floppy drive.
2. Cold boot the system.
   a. Press the [fn] + Suspend/Resume button to power off the system
   b. Press the Suspend/Resume button to cold boot the system
3. Follow the instructions provided by the update program.

Restoring the Flash BIOS

If for some reason the system BIOS becomes corrupted the BIOS chip located under the DC-to-DC converter on the system motherboard will have to be replaced.

Troubleshooting 4

Introduction

This chapter provides a systematic method of isolating problems with the DIGITAL HiNote VP 500 Models VP 550, VP 575 series of notebook computers. It is assumed that you have a basic understanding of DOS-based computer systems as well as a knowledge of standard troubleshooting procedures. This manual is written under the assumption that the problems are indeed related to the notebook computer itself. The improper usage of the system and application software problems are excluded in this chapter.

The system BIOS power on self-tests (POST) are integral to the system and detect certain errors with the system board. They use a series of beep codes to identify certain system board problems.

The troubleshooting procedures when followed step by step, can help isolate system problems.

Troubleshooting Tips

In general, troubleshooting involves an organized system of approach to problem solving. Try to isolate the problem and identify the defective device (hardware) or improper setting (software). When you have a problem, you should do a thorough visual inspection of the notebook computer.

- If none of the indicators are lit and you cannot hear the HDD spinning, then the notebook computer is probably not receiving power.
- Make sure the power cord is plugged in, and the AC adapter is securely connected. The LEDs on the AC adapter and the system should be on when connected to a working AC source.
- If you are using a power strip or surge protector, ensure that these devices are turned on.

Often problems are caused by improperly connected cables.

- If you are using peripherals such as the mouse or keyboard, make sure they are properly connected to their respective ports. Ensure that none of the connectors' pins are bent or broken.
- Check all cables connected to the notebook computer. If any are cut, frayed, or damaged in any way, replace them right away. Never use a damaged cable. A damaged cable is not only a fire hazard, it may also cause a short circuit, resulting in irreparable damage to the notebook computer.
- Check all internal connections to ensure that they are secure. Often problems can occur because a connection is loose or backwards.

Verify that all test equipment works before using it to test a malfunctioning component.

Verify that a component is the only malfunctioning part of the computer by replacing the malfunctioning component with a properly functioning one, and then try to run the system. For example, if you have tested an FDD in a test computer and found it to be bad, you should also try a good FDD in the malfunctioning FDD's computer to be sure that another component (such as the FDD controller) is not bad as well.

As with assembly and disassembly, make sure you have adequate lighting, the right tools, and a stable clean working environment.

The examples that follow provide useful tips and information that will help isolate and solve some of the more common problems that may be encountered.

System Start Failure

When you turn on the computer, the system hangs before completing or starting the POST (power on self test). Power supply failure, post failure, and boot-up failure can result in a system start failure.

Power Supply Failure

Problem	Troubleshooting Procedure
You turn on the power switch and the following conditions apply: • There is no panel display • There is no noise coming from the HDD • The power indicator light is off.	If you are operating the notebook computer using the battery: • The system could be in suspend. Press the Suspend/Resume button. • The battery connection is loose. Remove and reinstall the battery. • The battery power is depleted. Plug in the AC adapter, or replace the battery. • The battery needs to be reformed. Reform the battery. • The system could be experiencing a hang. Press the reset button (Figure 1-3). If you are operating the notebook computer using the AC adapter: • Check that the AC adapter is plugged into an operational power supply. Check that the AC adapter is connected securely to the notebook computer's AC adapter socket.

continued

Problem	Troubleshooting Procedure
You turn on the power switch and the following conditions apply: • There is no panel display • There is no noise coming from the HDD The power indicator light is off.	• Check to see if the Power LED on the computer is lit and the LED on the AC adapter is lit. If not lit, then the AC adapter is bad. Replace the AC adapter, and test the notebook computer again. • Press the Suspend/Resume button • Press the system's "Reset Button" located on the back of the unit between the serial and parallel port connectors. If the above items are functioning, then the notebook computer's internal power circuit is probably damaged. Check the power circuit of the notebook computer.

Boot-up Failure

Problem	Troubleshooting Procedure
You turn on the notebook computer and the following conditions apply: • The notebook computer's power is on. • There is no screen display	• System in Suspend Mode. Press the Suspend/Resume button. • System hung possibly hung after using a screen saver. Press the Reset button located on the back on the unit (Figure 1-3). Check the DRAM connections to be sure that they are secure. • Check the LCD connections. • Check the system board power circuit.

Post Failure

Problem	Troubleshooting Procedure
You turn on the computer and the following happens: • There is power to the system. • The HDD seems to be spinning. • The screen is operational, and error codes and messages are displayed.	• A POST failure usually indicates a keyboard, memory, or HDD failure. • Check the error code or message against the error codes and messages in this chapter.

Password Failure

Problem	Troubleshooting Procedure
You do not have the password or the password is not known.	• To clear the password, short Jumper 5 on the motherboard.

LCD Panel Failure

Problem	Troubleshooting Procedure
You turn on the computer and one of the following conditions apply: • The system is working, but there is no LCD panel display. • The system is working, but the LCD panel display vertical or horizontal lines. • The backlight comes on, but there is no display. • There is a display, but you have garbled characters on the screen.	• Make sure that the LCD cable is securely connected to the Motherboard. • Make sure that the LCD cables are securely connected to the inverter. • If the cables are securely connected and the LCD still doesn't work, replace the LCD panel and test the system again. • If the display is garbled, verify the video setup in the operating system's Control Panel Display application. If these are correct, there is probably a VGA chip failure. Replace the motherboard.

CRT Failure

Problem	Troubleshooting Procedure
The notebook computer has power, the notebook computer's LCD panel is working and one of the following conditions apply: • The notebook computer's LCD panel is working. • There is no display on the CRT. • The color of the CRT is wrong. • There is a display, but the display is not stable.	• Make sure the CRT output is enabled. • Make sure that the CRT's power is on anf the power cables are securely connected. • Make sure that the CRT to notebook computer cable connection is secure. Check the CRT port on the notebook computer to make sure the connection is secure, and that there are no damaged pins or connectors. • Make sure the settings in the operating system's Control Panel Display application are supported by the monitor. • If the CRT still doesn't work, change to a different CRT and try again. • If the color is bad, adjust the Monitor's color controls (if any).

Notebook Computer Keyboard Failure

Problem	Troubleshooting Procedure
The notebook computer is fully powered-on. However, when pressing any of the keys on the keyboard, one of the following events occurs:	• If incorrect characters are displayed, check the COUNTRY.SYS settings in the operating system to see if an incorrect language is being used by the system.
• Pressing on the key doesn't have any effect.	• Make sure that the keyboard cable is securely connected into the keyboard connector.
• Incorrect characters are displayed on the screen.	• Check the keyboard circuit. • Replace the keyboard and check again.
• One stroke of a key produces too many characters on the screen.	• Replace the keyboard controller BIOS chip located in the memory compartment on the bottom of the system unit.

External Keyboard or PS/2 Mouse Failure

Problem	Troubleshooting Procedure
The notebook computer's power is on, and the keyboard is working. One of the following conditions occur: • Pressing keys on the external keyboard has no effect. • Pressing the key on the external keyboard gives incorrect characters. • The mouse cursor on the screen doesn't move in conjunction with the external mouse.	• Make sure that the external mouse or keyboard's connection to the notebook computer's PS/2 mini-DIN connector is secure. • Make sure the mouse trackball and postion sensors are clean and free of dust. • Replace the external mouse or keyboard and try again. • If the system still doesn't work, test the mini-DIN keyboard circuit. • If incorrect characters are displayed, check the COUNTRY.SYS settings in DOS to see if an incorrect language is being used by the system.

HDD Failure

Problem	Troubleshooting Procedure
When you try to access the HDD, one of the following conditions occur: • There is a message indicating that the HDD doesn't exist. • You can't read from the HDD. • You can't write to the HDD.	• Check to make sure that the BIOS settings are correct. Refer to Chapter 2 for BIOS information. • Make sure that the HDD connection is secure. • Install the HDD into another HiNote VP 550, VP 575notebook computer and test it. • If the HDD works in a test notebook computer, the HDD controller on the motherboard is probably bad. Test the motherboard.

FDD Failure

Problem	Troubleshooting Procedure
The notebook computer's power is on. The HDD is functioning correctly. When you try to access the FDD, one of the following conditions occurs: • You can't read from the FDD. • You can't write to the FDD. • You can't hear the FDD motor spinning, and the LED indicator light isn't on.	• Make sure the CD-ROM/FDD module is properly seated. • Switch to a different floppy disk and try again. Make sure that the floppy isn't write protected. • Clean the FDD's heads. • Change the CD-ROM/FDD module and test again. • If the FDD is OK, than there is probably an I/O chipset failure. Replace the main board.

CD-ROM Failure

Problem	Troubleshooting Procedure
The notebook computer's power is on. The HDD is functioning correctly. When you try to access the CD-ROM, one of the following conditions occurs: • You can't read from the CD-ROM. • You can't hear the CD-ROM motor spinning, and the LED indicator light isn't on.	• Make sure the CD-ROM/FDD module is properly seated. • Switch to a different CD-ROM disk and try again. • Clean the CD-ROM's lens. • Change the CD-ROM/FDD module and test again. • If the CD-ROM is OK, than there is probably an I/O chipset failure. Replace the main board.

Battery Failure

Problem	Troubleshooting Procedure
The notebook computer's AC power works. When trying to use battery power, the notebook computer doesn't operate. However, when the AC Adapter is connected, the battery charge indicator flashes.	• Make sure that the battery contacts are in good condition. • Make sure that the battery terminals are clean. If need be, clean the terminals with contact cleaner. • Form the battery and try again. • Change the battery and try again. • Check to make sure that the AC power supply (the AC adapter and AC adapter cord) are OK. If they are not supplying the correct voltage, it could damage the system.

Check Points and Error Messages

At the beginning of each POST routine, the BIOS outputs the test point error code to I/O address 80h. Use this code during troubleshooting to establish at what point the system failed and what routine was being performed.

If the BIOS detects a terminal error condition, it halts POST after:

- Issuing a terminal error beep code and
- Attempting to display the error code on upper left corner of the screen and on the port 80h LED display

If the system hangs before the BIOS can process the error, the code displayed at port 80h is that of the last test performed. In this case, the screen does not display the error code.

Phoenix BIOS Test Points

The following is a list of the checkpoint codes written at the start of each test and the beep codes issued for terminal errors:

Code	Beeps	POST Routine Description
02		Verify Real Mode
04		Get CPU type
06		Initialize system hardware
08		Initialize chipset registers with initial POST values
09		Set in POST flag
0A		Initialize CPU registers
0C		Initialize cache to initial POST values
0E		Initialize I/O
0F		Initialize the local bus IDE
10		Initialize Power Management
11		Load alternate registers with initial POST values
12		Jump to UserPatch0
14		Initialize keyboard controller
16	2-2-3	BIOS ROM checksum
18		8254 timer initialization
1A		8237 DMA controller initialization
1C		Reset Programmable Interrupt Controller
20	3-1-1	Test DRAM refresh
22	3-1-3	Test 8742 Keyboard Controller

continued

Code	Beeps	POST Routine Description
24		Set ES segment register to 4 GB
28		Autosize DRAM
2A		Clear 512K base RAM
2C	3-4-1	Test 512K base address lines
2E	3-4-3	Test 512K base memory
30		Base 64K RAM Error
32		Test CPU bus-clock frequency
34		Test CMOS RAM
35		Initialize alternate chipset registers
37		Reinitialize the chipset
38		Shadow system BIOS ROM
39		Reinitialize the cache
3A		Autosize cache
3C		Configure advanced chipset registers
3D		Load alternate registers with CMOS values
40		Set Initial CPU speed
42		Initialize interrupt vectors
44		Initialize BIOS interrupts
46	2-1-2-3	Check ROM copyright notice
47		Initialize manager for PCI Option ROMs
48		Check video configuration against CMOS
49		Initialize PCI bus and devices

continued

Code	Beeps	POST Routine Description
4A		Initialize all video adapters in system
4C		Shadow video BIOS ROM
4E		Display copyright notice
50		Display CPU type and speed
51		Initialize EISA board
52		Test keyboard
54		Set key click if enabled
56		Enable keyboard
58	2-2-3-1	Test for unexpected interrupts
5A		Display prompt "Press F2 to enter SETUP"
5C		Test RAM between 512 and 640k
60		Test extended memory
62		Test extended memory address lines
64		Jump to UserPatch1
66		Configure advanced cache registers
68		Enable external and CPU caches
6A		Display external cache size
6C		Display shadow message
6E		Display non-disposable segments
70		Display error messages
72		Check for configuration errors
74		Test real-time clock

continued

Code	Beeps	POST Routine Description
76		Check for keyboard errors
7C		Set up hardware interrupt vectors
7E		Test coprocessor if present
80		Disable onboard I/O ports
82		Detect and install external RS232 ports
84		Detect and install external parallel ports
86		Re-initialize onboard I/O ports
88		Initialize BIOS Data Area
8A		Initialize Extended BIOS Data Area
8C		Initialize floppy controller
90		Initialize hard-disk controller
91		Initialize local-bus hard-disk controller
92		Jump to UserPatch2
94		Disable A20 address line
96		Clear huge ES segment register
98		Search for option ROMs
9A		Shadow option ROMs
9C		Set up Power Management
9E		Enable hardware interrupts
A0		Set time of day
A2		Check key lock
A4		Initialize typematic rate

continued

Code	Beeps	POST Routine Description
A8		Erase F2 prompt
AA		Scan for F2 key stroke
AC		Enter SETUP
AE		Clear in-POST flag
B0		Check for errors
B2		POST done-prepare to boot operating system
B4		One beep
B6		Check password (optional)
B8		Clear global descriptor table
BC		Clear parity checkers
BE		Clear screen (optional)
BF		Check virus and backup reminders
C0		Try to boot with INT 19
DO		Interrupt handler error
D2		Unknown interrupt error
D4		Pending interrupt error
D6		Initialize option ROM error
D8		Shutdown error

continued

Code	Beeps	POST Routine Description
DA		Extended Block Move
DC		Shutdown 10 error
The following Error Codes are related to the Boot Block in the Flash ROM:		
E2		Initialize the chipset
E3		Initialize refresh counter
E4		Check for Forced Flash
E5		Check HW status of ROM
E6		BIOS ROM is OK
E7		Do a complete RAM test
E8		Do OEM initialization
E9		Initialize interrupt controller
EA		Read in the bootstrap code
EB		Initialize all vectors
EC		Boot the Flash program
ED		Initialize the boot device
EE		Boot code was read OK

If the BIOS detects error 2C, 2E, or 30 (base 64K RAM error), it displays an additional word of information reflecting the bit or address line that failed. For example, if "2C 0002" is displayed, address line 1 (represented by bit one) has failed. If "2E 1020" is displayed, then data bits 12 and 5 have failed in the upper 16 bits.

The BIOS sends the same information to the port 80h LED display. The check point code is followed by a delay, the high order byte, another delay, and then the low order byte of the error. This is be repeated continuously.

Warning Messages

The following is an alphabetic list of error and status messages which the PhoenixBIOS can generate and an explanation of each message. Many of the messages below refer to the built in Setup program.

Message	Description
nnnn Cache SRAM Passed	nnnn is the amount of system cache in kilobytes successfully tested.
Diskette drive A error	Drive A: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.
Entering SETUP	Starting Setup program
Extended RAM Failed at offset: nnnn	Extended memory not working or not configured properly.
nnnn Extended RAM Passed	nnnn is the amount of RAM in kilobytes successfully tested.
Failing Bits: nnnn	The hex number nnnn is a map of the bits at the RAM address (in System, Extended, or Shadow memory) which failed the memory test. Each 1 (one) in the map indicates a failed bit.
Fixed Disk 0 Failure or Fixed Disk 1 Failure or Fixed Disk Controller Failure	Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup to ensure that the fixed-disk type is correctly identified.
Incorrect Drive A type run SETUP	Type of floppy drive A: not correctly identified in Setup.

continued

Message	Description
Invalid NVRAM media type	Problem with NVRAM access.
Keyboard controller error	The keyboard controller failed test. You may have to replace keyboard or controller.
Keyboard error	Keyboard not working.
Keyboard error nn	BIOS discovered a stuck key and displays the scan code for the stuck key.
Keyboard locked Unlock key switch	Unlock the system to proceed.
Monitor type does not match CMOS	Run SETUP Monitor type not correctly identified in Setup
Operating system not found	Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.
Parity Check 1 nnnn Parity error found in the system bus	BIOS attempts to locate the address but failed and display it on the screen.
Parity Check 2 nnnn Parity error found in the I/O bus	BIOS attempts to locate the address but failed and display it on the screen.
Press <F1> to resume, <F2> to Setup	Displayed after any recoverable error message: Press <F1> to start the boot process or <F2> to enter Setup and change any settings. <F2> Press <F2> to enter SETUP Optional message displayed during POST.

continued

Message	Description
Previous boot incomplete	Default configuration used
Previous POST did not complete successfully	POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail.
Real time clock error	Real-time clock fails BIOS test. May require board repair.
Shadow RAM Failed at offset: nnnn	Shadow RAM failed at offset nnnn of the 64k block at which the error was detected.
nnnn Shadow RAM Passed	Where nnnn is the amount of shadow RAM in kilobytes successfully tested.
System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.
System BIOS shadowed	System BIOS copied to shadow RAM.
System cache error	Cache disable RAM cache failed the BIOS test. BIOS disabled the cache.
System CMOS checksum bad - run SETUP	System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. Run Setup and reconfigure the system.

continued

Message	Description
System RAM Failed at offset: nnnn	System RAM failed at offset nnnn of in the 64k block at which the error was detected.
nnnn System RAM Passed	nnnn is the amount of system RAM in kilobytes successfully tested.
System timer error	The timer test failed. Requires repair of system board.
UMB upper limit segment address: nnnn	Displays the address of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS which may be reclaimed by a virtual memory manager.
Video BIOS shadowed	Video BIOS successfully copied to shadow RAM.

FRU Replacement 5

Introduction

This chapter provides detailed procedures for replacing the DIGITAL HiNote VP 500 series notebook computer Field Replaceable Units (FRUs). Unless otherwise noted the replacement procedures for the FRUs are the reverse of the removal procedures.

SHOCK OR STATIC SENSITIVE: Static electricity collects on non-conductors such as paper, cloth, or plastic. A static discharge can be damaging even though you often cannot see or feel it. To prevent damage to circuit boards and/or components:

- Before touching any circuit board or component, touch the metal frame of your workstation to discharge any static electricity.
- Keep circuit boards and components away from non-conductors.

Required Tools

You will need the following tools to remove and replace the HiNote VP 500 series FRUs:

- #0 and #1 Phillips Head Screwdrivers
- 3/16 inch and 7/32 inch Nut Drivers

Key No.	Option Part Number	Orderable Spare Part	Mfg Part No.	Description
1	N/A	30-47926-01	2604251AD01M	CPU daughter card 133MHz/Intel
	N/A	30-46667-01	TBD	CPU daughter card 133MHz MMX/Intel
	N/A	30-48418-01	2604621A02V	CPU daughter card 166MHz MMX/Intel
2	N/A	30-47960-01	2603811A07M	Keyboard, US/ American, HiNote VP5h
3	N/A	30-47960-01	26058521A01M	Combo module (FDD/CD-ROM)
4	N/A	30-48532-01	2606351A01L	Spare main battery (ENMH) - 3900mah
	FR-PCP9H-BN	30-48534-01	TBD	OPT Li-ion battery, HiNote VP 500 II
	FR-PCP9H-BP	30-48533-01	TBD	Spare main battery (Li-ion), HiNote VP 500
5	N/A	29-33841-01	TBD	12.1 DSTN, Replacement on-site shell
	N/A	29-33842-01	TBD	12.1 TFT, Replacement on-site shell
6	FR-PCP9R-BA	30-47954-01	2604631A01S	Removable 1.44 GB HDD module, HiNote VP5h
	FR-PCP9R-BB	30-48535-01	TBD	Removable 2.1 GB HDD module HiNote VP500 II

continued

Key No.	Option Part Number	Orderable Spare Part	Mfg Part No.	Description
*	N/A	74-51657-01	2603781a01L	Door, HDD
*	N/A	17-04105-01	N/A	Power cord, US/American
*	FR-PCP9E-BB	30-47949-01	2601311AD4N	Mini dock w/o NIC, PR-1, HiNote VP5h
*	FR-PCP9E-BB	30-47950-01	2601311A03Q	Mini dock w/ NIC, PR-2 HiNote VP5h
*	FR-PCP9H-BW	30-47980-01	2603141A05N	Intl AC adapter, w/o AC cord, HiNote VP5h
*	N/A	30-47931-01	2604031AD01Q	Assy, memory door

* Not Illustrated

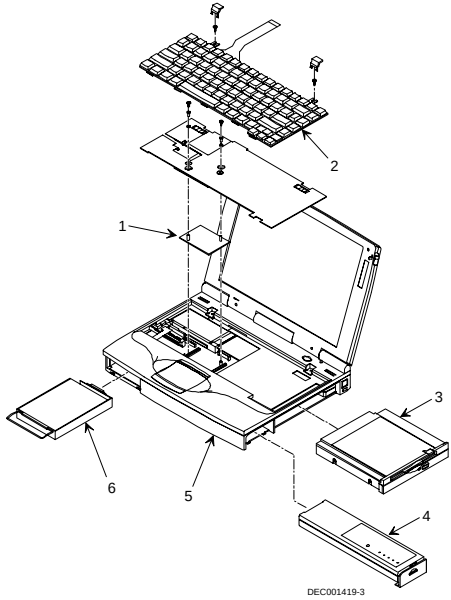


Figure 5-1. DIGITAL HiNote VP 550-575 Series

Removing the Battery

The battery is located on the right side of the system unit (Figure 5-2).

To remove the battery pack:

1. Slide the battery lock/release clip to the release position.
2. Pull the Battery Pack out of the system unit as shown.

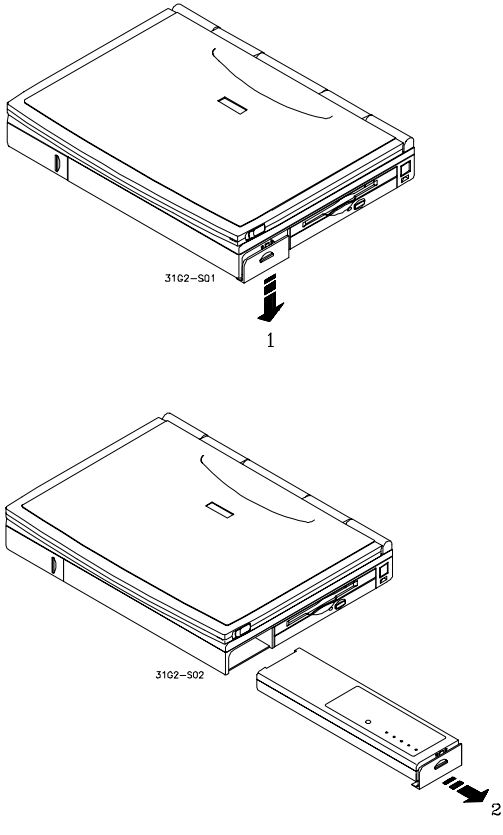


Figure 5-2. Removing the Battery

Removing the 12x CD/FDD Combination Module and Supplementary Battery

To remove the 12x CD/FDD Combination module or supplementary battery:

1. Slide the locking button (1), located on the bottom of the system, in the direction shown (Figure 5-3).
2. Slide and hold the module release latch (2) in the direction shown.
3. While holding the module release latch in position, slide the module out of the system unit (3).

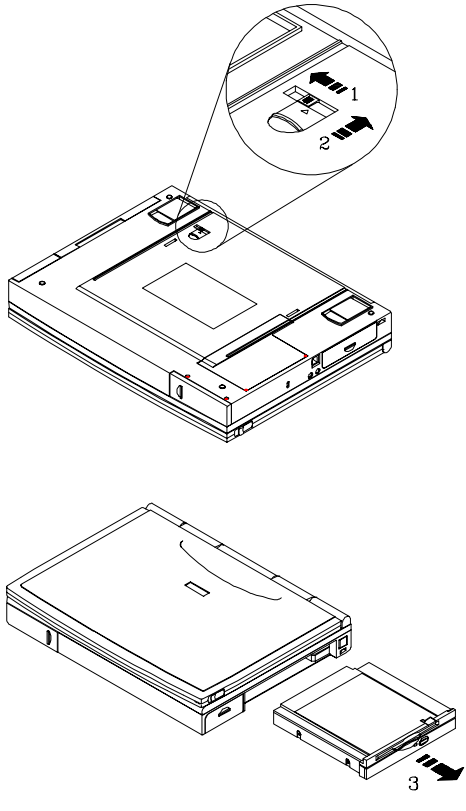


Figure 5-3. Removing the FDD /CD Module or Supplementary Battery

Removing the HDD Assembly

To remove the HDD:

1. Slide the HDD module plastic cover (1) in the direction shown (Figure 5-4).
2. Remove the two Philips head screws (2) located on the bottom of the notebook computer. They secure the HDD assembly in the system unit and prevent it from being damaged.
3. Gently remove the HDD from its housing, by pulling on its handle in the direction shown (3).

NOTE: If the HDD assembly is installed upside down, the screws on the assembly may get caught on some plastic inside the system. To remove the drive slide a piece of paper (yellow sticky) between the unit and the plastic and slide the HDD assembly out of the system.

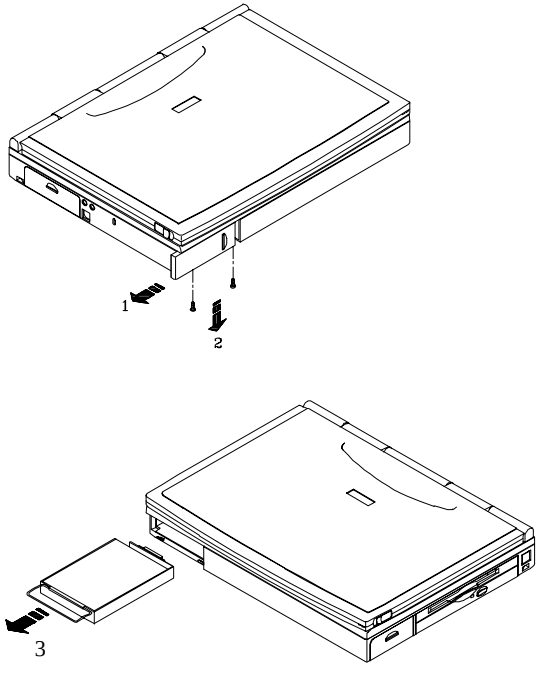


Figure 5-4. Removing HDD

Removing the Keyboard

To remove the keyboard:

1. Remove the keyboard screw caps by pulling them toward the front of the system and then up as shown (Figure 5-5).
2. Remove the two screws that hold the keyboard in place.
3. Lift the keyboard up and rotate it toward the LCD display. The keyboard cable is removed in step 5.

CAUTION: Be careful not to damage the keyboard cable when lifting up the keyboard.

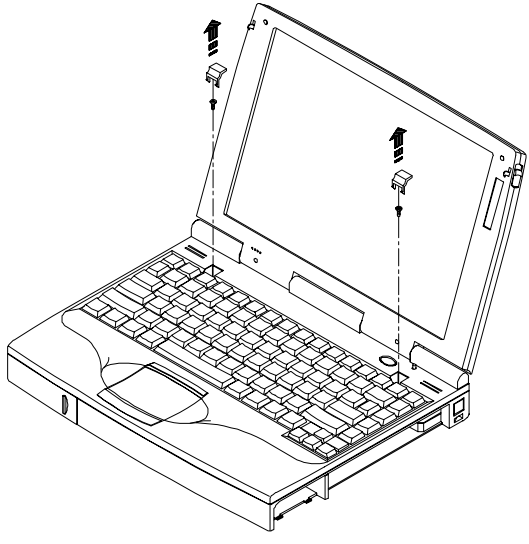


Figure 5-5. Removing Keyboard Screw Caps and Screws

4. Remove the heatsink (Figure 5-6).

    a. Remove the two screws that hold the heatsink in place.

    b. Carefully lift the heatsink up and remove it from the system by sliding the keyboard cable through the slot in the heatsink.

5. Disconnect the keyboard cable (Figure 5-6).

    a. Release the cable latch by flipping it up. The latch is located across the back of the connector.

    b. Pull the cable out of the connector.

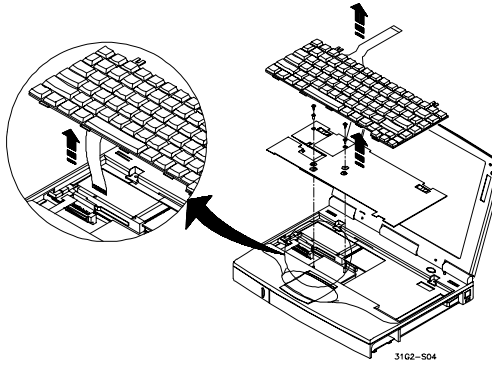


Figure 5-6. Removing Heatsink and Keyboard

Removing the CPU

The CPU daughter card is located under the heatsink. To remove the CPU daughter card:

Remove the keyboard and heatsink (Figure 5-6).

NOTE: When replacing the CPU heatsink, the torque of the heatsink screws should be set to 2.3~3.0kg of force per cm^2.

2. Pull up on the CPU daughter card to remove if from the system (Figure 5-7).

NOTE: When installing the CPU daughter card, align each of the connectors with the mating connector on the motherboard.

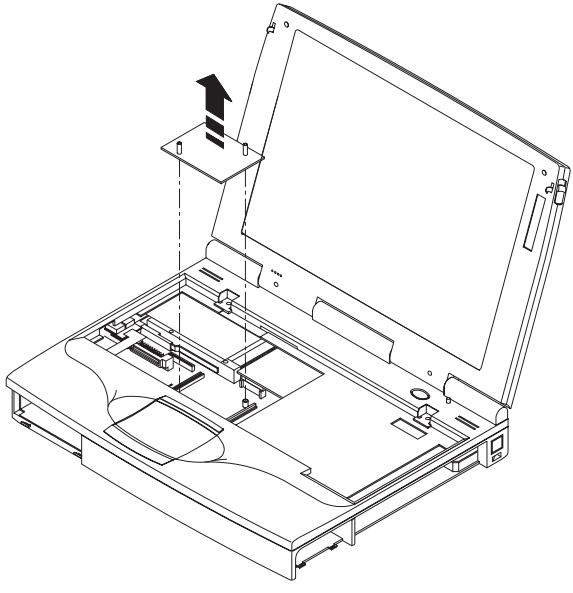


Figure 5-7. Removing the CPU Daughter Card

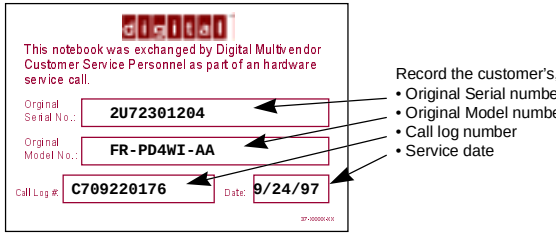
Shell Installation Instructions

IMPORTANT: This notice contains information that is important for configuring a replacement HiNote VP500 series “Shell” at a customer site.

The HiNote VP500 series notebook computer “shell,” also known as a replacement foundation, is supplied for field use. It minimizes field disassembly of a customer system, allowing efficient onsite repair. Refer to the previous FRU replacement procedures for complete information.

Prior to Disassembly

1. A paper label is supplied on the bottom of your replacement “Shell.” Edit the label by adding the appropriate information from the customer’s system. This information is necessary for warranty, service and tracking purposes.



2. Attach a field failure tag to the failed “Shell” identifying the failure mode and return it complete, for repair using normal procedures.

Disassembly Instructions

The following parts will be removed from the customer’s system and retained for installation in the replacement “Shell” (see Figure 5-8).

1. Remove the primary battery.
2. Remove the combo FDD and CD drive assembly.
3. Remove the HDD assembly.
4. Remove the keyboard screw covers and screws.
5. Remove the keyboard.
6. Remove the 2 screws that hold down the CPU heat sink, and remove it.

7. Remove the CPU daughter card.
8. Remove any additional PCMCIA and memory daughter cards.
9. On the replacement “Shell,” in reverse order, add all the parts that were removed from the defective “HiNote VP.

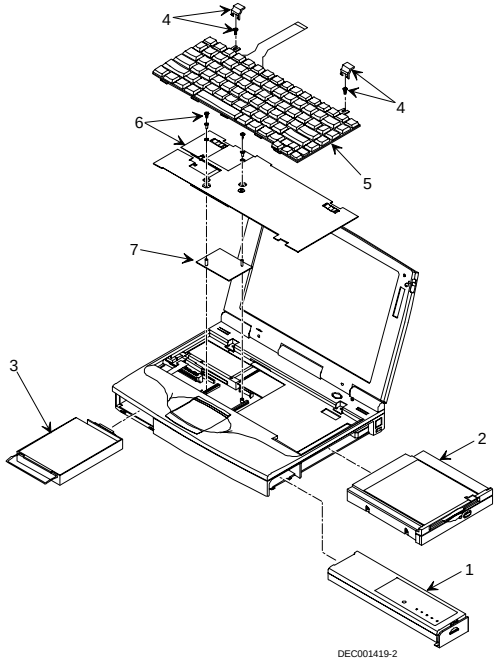


Figure 5-8. DIGITAL HiNote VP 550-575

Specifications A

Base Unit

	Model			
Feature	**VSS5120 1.08GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1GB drive, 16 MB RAM, 12.1" SVGA TFT**
CPU	P54 CSLM Pentium (120 MHz to 10 MHz supported	P54 CSLM Pentium (120 MHz to 10 MHz supported	P54 CSLM Pentium (120 MHz to 10 MHz supported	P55 Pentium MMX (133 MHz to 166 MHz supported
CPU Speed	120 MHz	133 MHz	150 MHz	166 MHz
Cache L1	16 KB Internal	16 KB Internal	16 KB Internal	32 KB Internal
Cache L2	N/A	256 KB on daughter card	256 KB on daughter card	256 KB on daughter card

continued

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Architecture (Mobile Triton)	PCI	PCI	PCI	PCI
Standard RAM	16 MB (EDO)	16 MB (EDO)	16 MB (EDO)	16 MB (EDO)
Maximum RAM	80 MB	80 MB	80 MB	80 MB
RAM Upgrade	Dual DIMM	Dual DIMM	Dual DIMM	Dual DIMM
PC95A Compliant	Yes	Yes	Yes	Yes
Diskette and CD-ROM Combo drive	3.5" floppy 12X CD-ROM 250 ms access 1500 Kbps transfer rate	3.5" floppy 12X CD-ROM 250 ms access 1500 Kbps transfer rate	3.5" floppy 12X CD-ROM 250 ms access 1500 Kbps transfer rate	3.5" floppy 12X CD-ROM 250 ms access 1500 Kbps transfer rate
Diskette supports Japanese Mode	Yes	Yes	Yes	Yes
HDD Size	2.5" 12.5 mm height	2.5" 12.5 mm height	2.5" 12.5 mm height	2.5" 12.5 mm height
HDD (user upgradable)	1.08 GB	1.08 GB	1.44 GB	2.1 GB
Integrated Pointing Device	Trackpad	Trackpad	Trackpad	Trackpad

Ports

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Keyboard/ Mouse Port	PS/2	PS/2	PS/2	PS/2
External Video Interface	SVGA	SVGA	SVGA	SVGA
External Video, Maximum Resolution	1024x768 256 Colors	1024x768 256 Colors	1024x768 256 Colors	1024x768 256 Colors
External Video, Refresh in simultaneous mode	60 Hz	60 Hz	60 Hz	60 Hz
Serial Port	Yes	Yes	Yes	Yes
Parallel Port	ECP/EPP	ECP/EPP	ECP/EPP	ECP/EPP
Serial IR link	Fast IR	Fast IR	Fast IR	Fast IR
Microphone Jack	Yes	Yes	Yes	Yes

Audio

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Audio	16-bit Stereo	16-bit Stereo	16-bit Stereo	16-bit Stereo
Audio Controller	ESS 1878	ESS 1878	ESS 1878	ESS 1878
Audio Compatibility	WSS and SoundBlaster with OPL3 Compatibility	WSS and SoundBlaster erwith OPL3 Compatibility	WSS and Sound-Blaster with OPL3 Compatibility	Wave table, WSS and SoundBlaster with OPL3 Compatibility
Audio Volume Control	Hot Key	Hot Key	Hot Key	Hot Key
Built-in Microphone	Yes	Yes	Yes	Yes
Built-in Stereo Speakers	Yes	Yes	Yes	Yes

LCD Display

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Display Type	12.1" SVGA DSTN Color	12.1" SVGA DSTN Color	12.1" SVGA TFT Color	12.1" SVGA TFT Color
Video Processor	NM2093	NM2093	NM2093	NM2093
Video Accelerator	BitBLT Hardware	BitBLT Hardware	BitBLT Hardware	BitBLT Hardware
Video RAM	1.1 MB	1.1 MB	1.1 MB	1.1 MB
Graphic Resolution	800x600	800x600	800x600	800x600
Colors	64,000	64,000	64,000	64,000
Zoom Video	Yes	Yes	Yes	Yes

PCMCIA (PCI)

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
PCMCIA Type II/III Support	2 type I or 1 Type II	2 type I or 1 Type II	2 type I or 1 Type II	2 type I or 1 Type II
Revision Support	3.0	3.0	3.0	3.0
Controller	Cirrus 6832	Cirrus 6832	Cirrus 6832	Cirrus 6832

BIOS Support

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Supplier	Phoenix 4.05	Phoenix 4.05	Phoenix 4.05	Phoenix 4.05
PC '95A Compliant	Yes	Yes	Yes	Yes
Flash ROM Size	256 KB	256 KB	256 KB	256 KB
Suspend to RAM	Yes	Yes	Yes	Yes
Suspend to Disk	Yes	Yes	Yes	Yes
Password	On boot, On resume	On boot, On resume	On boot, On resume	On boot, On resume

Battery, Status Display, Keyboard

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Main Battery	ENiMH 32.4 WHr			ENiMH 42 WHr
Battery recharge with system OFF	2 hours for single battery			3 hours for single battery
Battery recharge with system ON	3.5 hours for single battery			5 hours for single battery
Real time clock/ calendar	Yes	Yes	Yes	Yes
Status LCD	Battery Gas Gauge, HDD/CD Activity, FDD Activity, CRT/LCD/SIMUL, Caps Lock, NUM Lock, OVR, Scroll Lock, LED for AC and Battery charging			
Standard Keyboard	83 Keys + 2 Win 95 Keys			
Japanese Keyboard	85 Keys + 2 Win 95 Keys			

Physical

	Model			
Feature	**VSS5120 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VSS5133 1.08 GB drive, 16 MB RAM, 12.1" SVGA DSTN**	**VTS5150 1.44 GB drive, 16 MB RAM, 12.1" SVGA TFT**	**VTS5166 2.1 GB drive, 16 MB RAM, 12.1" SVGA TFT**
Dimensions WxDxH inches	11.8x8.9x 2.06	11.8x8.9x 2.06	11.8x8.9x 2.06	11.8x8.9x2.06
Weight with FDD	7.3 lbs	7.3 lbs	7.2 lbs	6.9 lbs
Weight with CD-ROM	7.5 lbs	7.5 lbs	7.3 lbs	7.2 lbs
Weight with CD-ROM/ FDD Combo	7.7 lbs	7.7 lbs	7.6 lbs	7.4 lbs

Device Mapping B

Memory Map

Range	Name	Function
0h to 9FFFFh	640KB System Memory	System Memory Space
A0000h to BFFFFh	128K Video Memory	Graphics Display Memory Buffer
C0000h to C7FFFh	32KB Video BIOS ROM	Shadow BIOS of VGA
C8000h to DFFFFh	96KB I/O Expansion ROM	Reserved ROM Space for I/O Adapter
E0000h to FFFFFh	128KB System ROM	BIOS of System and VGA
100000h to 27FFFFFh	Additional Memory Space	Extended Memory Space, Size from 8 MB up to 40 MB

DMA Channel Assignments

Channel	Controller	Function
0	1	Not used
1	1	Sound
2	1	Diskette controller
3	1	Not used
4	2	Cascade DMA
5	2	Not used
6	2	Not used
7	2	Not used

Notebook Computer Interrupt Levels

IRQ	Normal Assignments (FIS)
0	System Timer
1	Keyboard
2	Programmable Interrupt Controller
3	Serial Port Com2
4	Serial Port Com1
5	Audio
6	Floppy Disk Controller
7	Parallel Port LPT1
8	CMOS/Real time clock
9	Available
10	Available
11	Available
12	Track Pad
13	Numeric data processor
14	Hard disk controller
15	Available

IR port assignment if enabled

I/O Address Map

Range (hexadecimal)	Function
000 - 00F	DMA controller A
020 - 021	Master interrupt controller
024	Index register - system board
026	Data register - system board
040 - 043	Interval timer
060 - 06F	Keyboard controller
070 - 07F	Real-time clock (RTC), NMI
080 - 08F	DMA page register
0A0 - 0A1	Slave interrupt controller
0C0 - 0CF	DMA controller B
0F0	Clear math coprocessor
0F1	Reset math coprocessor
0F8 - 0FF	Math coprocessor
1F0 - 1F7	IDE controller
220-22F	On-board sound (1688)
278 - 27F*	LPT2
2E8 - 2EF*	COM4

continued

Range (hexadecimal)	Function
2F8 - 2FF*	COM2
378 - 37F*	LPT1
3B0 - 3DF	Mono VGA registers
3BC - 3BE*	LPT3
3C0 - 3DF	Mono VGA
3D0 - 3DF	Color VGA registers
3E8 - 3EF*	COM 3
3F0 - 3F7*	Diskette controller
3F6 - 3F7*	IDE controller (alt status, device address)
3F8 - 3FF*	COM1

* Enabled and disabled using the Setup Utility or Windows 95