DIGITAL HiNote
VP 700 Series

Service Quick Reference Guide

Digital Equipment Corporation

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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.

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Preface *P*

This Service Quick Reference Guide describes how to test, troubleshoot, and remove and replace the DIGITAL HiNote VP 700 Series 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.

Preface

Overview *1*

Introduction

This chapter introduces the DIGITAL HiNote VP 700 series notebook computer. It provides a system overview and describes the controls, indicators, and hot keys.

System Overview

The DIGITAL HiNote VP 700 series notebook computer is a high-performance portable computer designed for the mobile professional.

CPU

The DIGITAL HiNote VP 700 series notebook computer supports the notebook version of the P55C 166MHz and beyond Intel Pentium processors mounted on an MMO daughter card.

The following is a list of the general features of these processors:

- Low power consumption operating at 1.8V.

- Full System Management Interrupt (SMI) support.

Overview

- Fully static - support Stop Grant and Stop Clock states.

- 32-bit address bus.

- 64-bit data bus.

- 32KB internal write-back cache (L1).

- Capable of executing two instructions per clock cycle using two pipelined integer units.

- Multimedia extension (MMX) register set.

Chip Set

The Intel 430TX PCI chip set is used to implement the core functions of the system.

- The 430TX System Controller, 82439TX, provides core system functions.

  - Support for all Intel Pentium processors since P54C.

  - Integrated L2 Cache Controller featuring support for Write-Back cache policy for cache sizes 256KB and 512KB, DIRECT Mapped Organization (Write-Back only), Cache Hit Read/Write cycle timings @ 3-1-1-1, and back-to-back Read/Write cycles @ 3-1-1-1-1-1-1-1.

  - Fully synchronous, Minimum Latency 30/33MHz PCI bus interface supporting five PCI bus Masters, a 10 Dword PCI-to-DRAM Read Prefetch buffer, an 18 Dword PCI-to-DRAM Post Buffer, and a Multiple Transaction timer to support multiple short PCI transactions.

- 64-bit host and DRAM bus interface with an integrated DRAM controller with 64Mbit DRAM/SDRAM Technology and programmable-strength for DRAM interface.

- Integrated PCI bus arbiter.

- Advanced Power Management features.

- Support for USB.

- The PCI ISA IDE Xcelerator, PIIX4, provides the PCI to ISA bridge interface.

  - Integrated IDE Controller supporting up to 4 drives, PIO Mode 4 transfers up to 14Mbytes per second, and integrated 8x32 buffers for IDE PCI Burst transfers.

  - Enhanced DMA Controller supporting two 8237 DMA controllers supporting PCI DMA with 3PC/PCI channels and Distributed DMA protocols.

  - Interrupt Controller with support for 15 interrupts and independently programmable for Edge/Level sensitivity.

  - Support for full Positive Decode or Subtractive Decode.

  - Advanced Power Management features.

  - Support for two USB ports for serial transfers at 12Mbit/s or 1.5Mbit/s.

Memory

The system comes with 16MB of on-board SDRAM for system memory and 256KB or 512KB of L2 cache memory depending on the model purchased.

Overview

System memory can be upgraded to a total of 144MB. The
upgrade is performed by installing any combination of 16MB,
32MB and 64MB SDRAM SO-DIMMs. There are two slots for
additional memory. Memory can be upgraded one module at a
time. Either slot can be populated first.

BIOS

The system has a 256KB Flash ROM for system BIOS (Phoenix BIOS 4.0 Release 6). BIOS provides support for the following:

- Suspend to RAM.

- Save to Disk

- Full APM 1.2 supported.

- Password protection (Boot and System options).

- Auto-configured with module and docking options.

- Windows 95 ready with PnP.

- 32KB ROM for 51SL keyboard controller.

- Gas-gauge for battery status information

- Various hot-keys for system control.

PCI Bus Devices

The internal PCI bus and PCI components operate at 3.3V. The PCI bus is also available to supported docking options.

Cardbus Controller

Cardbus support is provided by the TI1131 controller. This chip provides the following functions:

- Support for Zoomed Video.

- Support for two PC Card/Cardbus slots with hot removal/insertion.

- Uses burst transfers to maximize data throughput on the PCI/Cardbus bus.

- Support for serialized ISA IRQs.

- Support for 16-bit distributed DMA.

- Support for Ring Indicate.

Video Controller Chip

Video support is provided by theNeo Magic 2160 Controller Chip. This chip provides the following functions:

- 128-bit memory interface.

- 2MB 3.3V High Speed Video DRAM.

- Support for Zoomed Video.

- Simultaneous display supported.

- VESA DDC1 support for external monitors.

- Advanced power management features minimize power consumption during:

  - Normal operation

  - Standby mode

  - Panel-off

- High resolution panel:

  - TFT displays support XGA (1024x768) at a maximum of 64K colors.

  - DSTN displays support XGA (1024x768) at a maximum of 64K colors.

ISA Bus Devices

The ISA bus interface is provided by the Intel 430TX PCIset System Controller.

Audio

Audio support is provided by the Crystal CS4237B chip. This chip provides the following functions:

- Integrated SRS® 3D sound technology

- Enhanced full-duplex operation.

- Dual Type-F DMA support.

- Advanced MPC3-Compliant input/output mixer.

- Hardware master volume control

- Advanced Power Management..

- Support for 16-bit Stereo, FM Synthesizer, and MPU-401 MIDI.

- Enhanced digital gameport.

Wavetable (Optional)

Wavetable support is provided by the Crystal CS9236 chip. This chip provides the following functions:

- High quality MIDI sample set including 128 melodic instruments and 47 percussion sounds.

- Receives standard serial MIDI data stream and outputs stereo 16-bit digital audio stream at 44.1kHz.

- Independent reverb and chorus levels for each MIDI channel.

- General MIDI (GM) compliant.

Overview

- Fully static power down capability.

BIOS

The system BIOS is implemented using the Intel 28F002BX-T 2MB Boot block Flash ROM.

Super I/O

I/O support is provided by theSMC EDC37C669FR chip. This chip supports the following functions:

- 2.38MB Super I/O Floppy Disk controller supporting two floppy drives and offering Japanese floppy support.

- Floppy Disk available on Parallel port pins.

- Two high speed NS 160550 compatible UARTs Serial Ports.

- Integrated Infrared Communications controller supporting SIR (115Kbps) and FIR (4Mbps) data transfers.

- Multi-Mode Parallel Port – IEEE 1284 compliant.

- Full Plug-and-Play support.

- Game Port Select Logic

Components, Controls and Indicators

This section shows the locations and provides detailed description of the different components, controls, and indicators on your DIGITAL HiNote VP 700 Series notebook computer.

Front and Side Components (Panel Closed)

	Component	Description
❶	Lid Release	Slide this latch to the right to open the LCD panel.
❷	Main Battery Module	Removable battery module that can be replaced with a charged battery.
❸	Expansion bay	Supports the 20X CD-ROM/FDD Combination module and optional lithium-ion secondary battery module.
❹	Minidock Locking Tab	Used to secure the notebook to the Minidock.
❺	Power/Charge LED	Indicates the power and charge status of notebook. System plugged into AC Power • LED solid, battery is charging. • LED blinking (fast), battery not charging. System running on Battery Power • LED blinking (slow), notebook is in suspend.

Overview
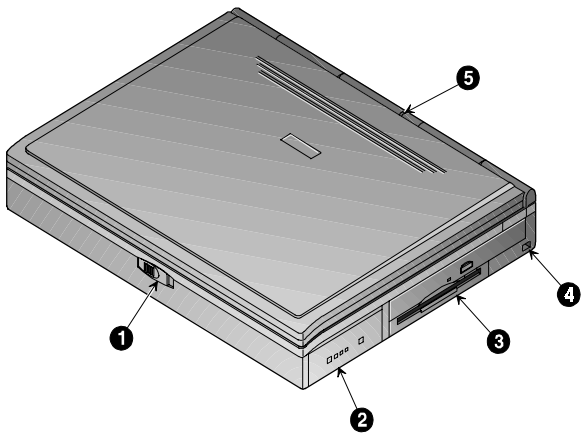
DEC01350

Figure 1-1: Right Front View (Panel Closed)

Rear View

	Component	Description
❶	Fast Infrared Interface	Allows wireless high speed data transfer between the notebook and other IR devices.
❷	Universal Serial Bus (USB) Port	A USB device, such as a mouse, digital camera, keyboard, or scanner, connects to this port.
❸	Serial (COM) Port	A serial device connects to this port.
❹	Parallel LPT Port	A parallel device, such as a printer, connects to this port.
❺	Reset Button	Using a pen or paper clip, press this button to reboot the system. All unsaved data will be lost.
❻	External Display Port	An external monitor connects to this port.
❼	Minidock Port	This 240-pin port allows you to connect the notebook to the Minidock.
❽	Rear Panel Port Cover	Open this cover to expose the Serial, Parallel, and VGA Ports.
❾	External Keyboard or PS/2 Mouse Port	An external PS/2 keyboard or PS/2 mouse connects to this port. To connect both a PS/2 keyboard and PS/2 mouse, use the PS/2 Y-connector cable packaged with notebook.

Overview
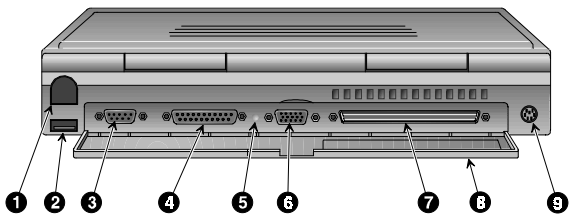
Figure 1-2: Rear View

Left Side Components

	Component	Description
❶	Minidock Locking Tab	Used to secure the notebook to the Minidock.
❷	PC Card Sockets	Insert either two Type II or one Type III PC Card into this socket.
❸	PC Card Eject Buttons	Upper button ejects a PC Card Type II from the upper socket and the lower button ejects a PC Card Type II or III from the lower socket.
❹	Line-in Port	Connect an external audio source to this port.
❺	External Mic Port	Connect an external microphone to this port.
❻	Line-out Port	Connect external speakers or headphones to this port.
❼	AC Power Port	The AC Adapter connects to this port.
❽	Security Lock Port	Connect a Security Lock cable to this port. This assists in safeguarding the notebook, HDD and RAM against theft.

Overview
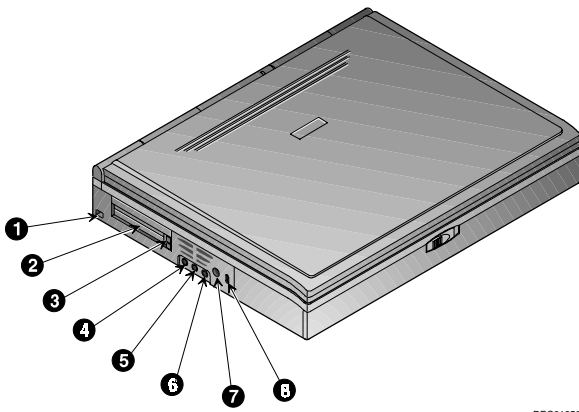
DEC01352

Figure 1-3: Left Front View (Panel Closed)

Right Front View (Panel Open)

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

Overview
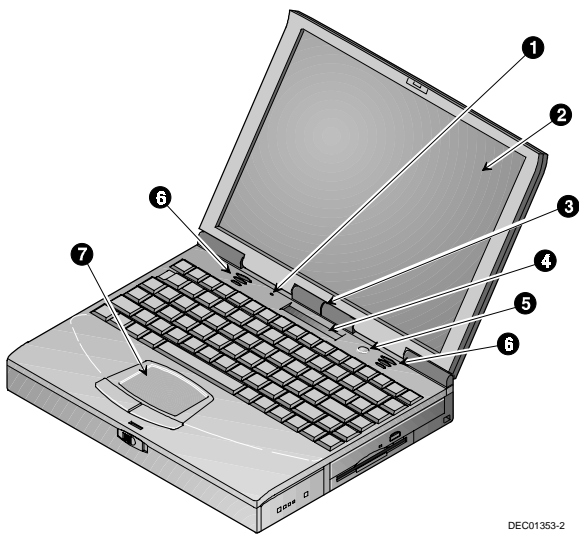
DEC01353-2

Figure 1-4: 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.
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.

LCD Status Display

Icon	When Displayed Indicates...
	Caps Lock is enabled.
	Num Lock is enabled. If you are using the notebook's keyboard, the embedded keypad must also be enabled to use the embedded keypad as a numeric keypad.
	Embedded Numeric Keypad is enabled. On external keyboards, the embedded keypad functions as a cursor control keypad. When displayed in conjunction with the Num Lock icon, the embedded keypad on both internal and external keyboards functions as a numeric keypad.
	Scroll Lock is enabled.
	Hard Disk Drive/CD-ROM is being accessed by the system.
	Floppy Disk Drive is being accessed by the system.
	PC Card socket is being used by the system.
	AC adapter is being used to power the system.
	Battery(ies) is installed. See the following section, Battery Charge Gauge, for status details.

Battery Charge Gauge (in LCD Status Display)

Icon	When Displayed, Indicates…
	Battery status - shows available battery power. Each line represents approximately 10% battery charge. The upper triangle corresponds to the main battery and the lower triangle corresponds to secondary battery. If the triangle is flashing, its corresponding battery is in use or charging. If both batteries are installed, the battery life will be calculated based on the charge sum of both batteries.
	When the lines within the battery icon are rotating, it indicates that the battery is being charged. When the rotating stops, the battery is fully charged.
	51% to 60% battery operating time remaining.
	Low battery. 1% to 10% 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.
	Critical low battery. The system will automatically save all data and application information to the hard disk (Save-to-Disk), then power down the notebook. If system is in Suspend mode when power low is reached, the system will resume, then complete down.
	System has ceased charging the battery. The core of the battery has reached its maximum temperature, indicating that charging has stopped.

Keyboard Hot Keys (US Keyboard)

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	Function
fn + esc	Places the computer in Standby Mode.
fn + F	All open data and system settings are Saved to Disk.
fn + A	Place the computer in Suspend Mode.
fn + F1	Decreases brightness level.
fn + F2	Increases brightness level.
fn + B	Displays the second battery gauge if the optional LiIon battery is installed in the expansion bay.
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 the system beep which indicates low battery. The system will emit a beep when the audio output is enabled.

continued

[fn] +		Function
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.
fn + F9 num lock		Toggles Num Lock on and off. Used by itself, fn+F9 enables an external keyboard numeric keypad.
fn + F10 scroll lock		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 + pr scr sys req		Determined by application software.
fn + ▲		Increases the audio volume.
fn + ▼		Decreases the audio volume.

Overview

General Battery Information

All batteries have limited life span. A battery's *life span* is measured by the number of charging and draining cycles it can undergo before it can no longer be charged. The amount of time that your system can be operated by battery power before the battery is drained is referred to as battery *run time*.

Nickel Metal Hydride Battery Care

Nickel-Metal Hydride (NiMH) batteries are extremely common in many types of portable systems, such as cellular phones, camcorders and portable computing devices.

Memory Effect

A NiMH battery in poor condition may begin to exhibit characteristics of memory effect. Memory effect will occur when a user does not allow the battery to fully drain before charging it again. For example, if you use the battery for 20 minutes at a time and then recharge it, the battery will tend to "remember" that it only needs to operate 20 minutes per charge. As a result, during the charging process, the battery will only receive a portion of its charge capacity.

NiMH Battery Life

Memory effect has a direct impact on the battery's life span. NiMH batteries have a typical life of up to 800 (charge/drain) cycles. If the battery is used an average of 30 minutes per cycle, you can expect a total life of 400 hours. If you use the battery 3 hours per cycle, you can expect a total life of 2,400 hours. Therefore, it is advantageous to use the battery as much as possible during each cycle.

However, in attempts to prevent the memory effect, it may not always be practical to continuously use your notebook until the battery drains to its minimum level. As a solution, Digital recommends that you periodically *form* or condition the battery. When a battery is formed, it is put through a series of charging and draining cycles. A battery which is formed will perform better and last longer than a battery which has not been formed.

If your system will not be in use for more than 30 days, Digital recommends that you remove the NiMH Battery from the system. When a NiMH battery is removed from the system, it has a shelf life of approximately 90 days before a charge cycle is required.

Forming a Battery

Action	Instructions and Information
Forming a battery	Charge it to its full capacity. The notebook's battery charge LED will turn off.
	Use the notebook until the battery is completely drained.
	Charge the battery to full capacity a second time and drain it again.
	Charge the battery to full capacity. The battery is now formed.
Draining the battery	Software is available to assist in the draining process. Please consult your Digital notebook dealer for information about the kinds of software.
	Lacking software: To expedite the draining process, enter the Setup Program and disable all power management functions. Increase the screen brightness to its highest setting.

continued

Action	Instructions and Information
When to form a battery	Form all new batteries, including the one which came with you system.
	Form batteries which do not provide as much run time as they used to.
	Form a battery to achieve maximum battery life.
	Form the battery if you are receiving questionable readings from the battery icon gauge in the LCD Status Display.
Required time	Assuming it takes 2 hours to fully drain the battery, forming a battery requires approximately 10 hours.
	To charge a battery with the system off requires approximately 2 hours. To fully charge a battery with the system on requires approximately 4 hours.
	Depending upon your power management settings, to fully drain a battery requires approximately 2 hours.

LiIon Battery

Lithium-ion batteries have an average life span than of approximately 1,000 complete charge/discharge cycles. In actual use, the number is larger due to the fact that most users will not fully discharge the battery during daily usage. Unlike the nickel-metal hydride battery, there is no need to be concerned with fully discharging the battery before charging it again since lithium-ion technology is not susceptible to memory effect.

If your system will not be in use for more than 30 days, DIGITAL recommends that the LiIon Battery Pack be removed from the system. When a lithium-ion battery is removed from the system, it has a shelf life of approximately 90 days before a charge cycle is required.

CAUTION: There is a danger of explosion if a lithium battery is incorrectly replaced. Lithium batteries must be replaced with the same or equivalent type recommended. Replace the main system battery only with DIGITAL HiNote VP 700 series series of rechargeable Lithium Ion battery packs.

Recycle or dispose of batteries contained in this product properly, in accordance with local regulations for battery type as marked on the battery. Prior to disposal or recycling, protect batteries against accidental short circuiting by affixing non-conductive tape across battery terminals and conductive surfaces.

WARNING: When transporting the battery pack, make sure that the metal terminals on the battery pack do not come in contact with other metal surfaces (such as loose coins, paper clips, etc.). An electrical discharge can occur which may cause injury or damage.

Smart Battery Operation

Your DIGITAL HiNote VP 700 Series notebook uses a Smart Battery. The battery has circuitry that reports the amount of charge in the battery to the system.

Initial Use – To properly initialize the circuitry that reports the state of the battery charge, you should:

1. Fully charge the battery.

2. Fully discharge the battery. To fully discharge the battery, use the notebook computer on battery power until the computer enters suspend mode because of a *critically low battery state*.

3. Fully charge the battery.

Regular Use – To help maintain the accuracy of the circuitry that reports the state of the battery charge, it is recommended that you allow the battery to go through a full charge and discharge cycle at periodic intervals.

Power Management Modes

Your notebook computer is factory-configured with preset power management values. If you are not an advanced user, start by using the factory-configured power management settings. If you find that the factory settings do not fit your specific needs, enter the Setup Program and make the needed changes. Please refer to chapter 3 for details.

If you choose to set your own power saving features, you should understand how it affects battery run time and system performance before changing a setting.

Three power management modes are supported: Standby, Suspend, and Save to Disk.

Standby Mode

In this mode, components such as the HDD, FDD and CD-ROM drive and the LCD back-lit display are powered down and the CPU speed is reduced. Other components, transparent to the user, are put in their lowest active states.

Standby Mode is entered:

- Automatically when the system remains idle for the period of time specified in the Standby Time-out field of the Setup Program.

- Manually by pressing the [fn + esc] key combination.

Standby Mode is exited by any of the following actions:

- Modem ring (if Resume on Modem ring is enabled in the Setup Program.)

- Pressing any key on the keyboard

- Touch pad or externally connected PS/2 mouse activity

- PC Card activity

Suspend Mode

Suspend Mode saves power by cutting power to the DMA clocks, suspending the math co-processor, turning the video off, and turning off all controllable peripheral devices.

When the system suspends, the following events take place:

- A system beep notifies you that suspend mode has been entered.

- The caps lock, number lock, embedded keypad lock, and scroll lock icons in the LCD Status Display begin to rotate.

- If AC power is not connected, the Power/Charge LED will blink approximately once every four seconds.

Overview

Suspend Mode is entered by:

- Pressing the Suspend/Resume button.

- Pressing the [fn+A] or [fn+Q] hot key combination.

- Closing the LCD display lid (Lid Switch field in the Setup Program must be set to Suspend)

- When the system has been in Standby for the period of time specified in the Suspend Time-out field of the Setup Program.

- Software aided within Windows 95 by clicking on the Start button and then Suspend.

Suspend Mode is exited by:

- Pressing the Suspend/Resume button.

- When the clock time specified in the Resume Date and Resume Time fields have arrived.

- Modem Ring (Resume on Modem Ring must be set to enabled in the Setup Program)

Save to Disk Mode

Save to Disk is a dual purpose feature. When controlled by the Setup Program, it transparently functions as a safeguard against accidental loss of data due to low battery power. When initiated by the user, it provides the greatest power saving capabilities. Upon entering/initiating Save to Disk, the notebook will save all data and system settings to a pre-created DOS file, then turn off the system. If, in the future, you purchase a second hard drive for expansion or backup purposes, you will need to create a DOS file on the drive in order to take advantage of the Save to Disk feature. Please refer to User's Guide Addendum for details on creating a Save to Disk DOS file. In the Save to Disk mode, all system logic (except for the battery charger) is turned off. During the Save to Disk mode, the DRAM and video memory are saved to the hard disk and are restored when the system is resumed.

Save to Disk Mode is initiated by:

- Pressing the [fn+F] hot key combination

- Automatically when the battery reaches a critical low power level. If the notebook is in Suspend when a critical low power level is reached, the system will turn back on for a moment and enter Save to Disk.

Save to Disk Mode is exited as follows:

- If entered by pressing [fn+F], press the Suspend/Resume button.

- If entered by critical low battery, first connect the AC adapter, then press the Suspend/Resume button.

Related Information

Documentation

DIGITAL HiNote VP 700 Series User's Guide	ER-PJ1WW-UA
DIGITAL HiNote VP 700 Series Addendum	ER-PJ1WW-AA (Windows 95)
	ER-PJ1WW-FA (Windows NT 4.0)
DIGITAL HiNote VP 700 System CD	AGR87WB-BH (Windows 95)
	AGR8F2A-BH (Windows NT 4.0)

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:

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

System Restoration *2*

Introduction

This chapter provides information on how to restore the operating system and drivers on DIGITAL HiNote VP 700 series notebook computer. It provides instructions on how to restore the system using the bootable floppy or the DIGITAL HiNote System CD.

Reinstalling and Installing Drivers

Reinstalling Drivers

The procedures for reinstalling certain drivers over an existing installation are 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

To restore the system to its original DIGITAL factory-shipped configuration, you must install the HiNote VP 700 Series audio, video, and touchpad (Windows 95 only) drivers. If you have installed WinNT, you will also want to install the EPM (Enhanced power Management) driver, located in the Driver\WinNT directory. 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. For Windows 95, these drivers can be found on DIGITAL HiNote Windows 95 System CD, AG-R87WB-BH. For Windows NT 4.0, these drivers can be found on DIGITAL HiNote Windows NT 4.0 System CD, AG-R8K2A-BH.

1. Boot to Windows.

2. Insert the DIGITAL HiNote System CD into the CD-ROM drive.

3. Click on Start and then Run. In the Run Command box type X:\CDinstall (X:\ represents the drive letter of your CD-ROM).

4. At the Welcome screen, click on Next. Then at the Choose Desired category screen, click on Drivers.

5. USB (Windows 95 only), IR and PC Card drivers can be installed automatically by clicking on the corresponding box next to the driver's name.

6. Audio, Video, and Touch Pad require manual installation. Clicking on their corresponding box will open a text file containing detailed installation instructions. Print this file and refer to it during the driver installation. These drivers must be installed in the following order:

    - Audio

    - Video

System Restoration

- Touch Pad (Windows 95 only)

System Restoration

Creating a Bootable Floppy

A Bootable Floppy is necessary in order to restore a Windows 95 system to its DIGITAL factory configuration. To create a bootable floppy, perform the following:

1. Boot to Windows. Insert the DIGITAL HiNote VP 700 System CD into the CD-ROM drive. Click the Start button on the Windows 95 Task bar and then on Programs. Click on Windows Explorer. Click on the CD-ROM drive and then double-click CDINSTALL.EXE.

2. Click through the Welcome screens until the Choose Desired Category screen appears. From this menu you will be able to install documentation, applications, drivers and utilities.

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 700 Series Bootable Floppy.

Windows 95 System Restoration

This section details the following:

- Re-installing Windows 95

- System Restoration Using Existing Partitions

- Complete System Restoration

- RAM Increases Over 80MB Total

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

In order to restore your system, you will need the following:

- DIGITAL HiNote VP 700 System CD AG-R87WB-BH

- Bootable Floppy (created from the DIGITAL HiNote VP 700 System CD)

- Microsoft Windows 95 Operating System CD

System Restoration

Re-installing Windows 95

In the event that Windows informs you of corrupt or missing operating system drivers, or you encounter unresolvable system conflicts, you may need to re-install the Windows 95 Operating System on top of the current Windows 95 Operating System on your hard drive. Perform the following to reinstall the Windows 95 OS.

1. Run the Setup program in the Windows\Options\Cabs directory and follow the on-screen instruction. If Setup is unavailable for any reason, proceed with the following instructions.

2. Insert the HiNote VP 700 Boot Floppy into the Disk Drive and power on the system. A list of choices appear.

    NOTE: To exit this menu and go to DOS prompt, press 1. To re-enter this menu from DOS prompt, type MENU and press the Enter key.

3. Place the Windows 95 CD into the CD-ROM drive.

4. From the bootable floppy Main Menu, choose Option 2, (Re-install Microsoft Windows OS).

5. Follow the on-screen instructions to complete the installation.

6. Once Windows has been reinstalled, you must load the drivers, enhancements and updates, and desired applications as described in the Installing Software section of this addendum.

System Restoration Using Existing Partitions

If you want to remove all files from your C:\ drive and re-install Windows 95 Operating System but NOT remove your 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 DOS prompt, press 1. To re-enter this menu from DOS prompt, type MENU and press the Enter key.

2. Choose Option 3. This Option will Format your hard disk's C: drive and then create a 86016 KB Save-to-file.bin file. This file is created by the PHDISKF Utility and enables you to use your notebook's Save to Disk feature.
    If you have over 80MB of RAM installed on your notebook, you must use the PHDISKF utility to create a larger Save-to-file.bin file after this process is complete. See the section entitled RAM Increases Over 80MB Total of this addendum for detailed instructions.

3. Insert the Windows 95 CD into the CD-ROM drive.

4. Choose Option 2 (Re-install Microsoft Windows OS) from the HiNote VP 700 Boot Floppy Main Menu. This will run Windows SETUP program from the Windows 95 CD. SETUP runs SCANDISK and then installs the OS. Follow the on-screen instructions to complete Windows 95 installation.

5. Remove the Windows 95 CD and insert the DIGITAL
    HiNote VP 700 System CD. Run CDInstall. Click on
    the Next buttons until the Choose Desired Category
    screen appears.

6. Click on the Drivers box. Re-install all drivers. Please
    refer to the sections earlier in this document for
    information.

7. Return to the Choose Desired Category screen of the
    CDInstall Program and install the desired applications.
    Please refer to the section earlier in this document for
    information on installing applications.

Complete System Restoration

If you have purchased a new hard drive or you want to remove
all files and re-partition your hard drive and then install a
Windows 95, please perform the following:

1. Insert the HiNote VP 700 Boot Floppy into the Disk
    Drive. Power on the system. A list of choices appear.

    NOTE: To exit this menu and go to DOS prompt, press
    1. To re-enter this menu from DOS prompt, type
    MENU and press the Enter key.

2. Choose Option 5 from the Boot Floppy Main Menu. This
    will initialize the hard disk using FDISK. Running FDISK
    will erase all data from your hard drive.

When running FDISK, you will be prompted whether or not to enable large disk (FAT32) support. Choose Yes to enable large disk (FAT32) support. Choose No to enable FAT16. If you choose Yes to enable large disk support (FAT32) and want to install WinNT or a WIN95 non-SR2 operating system at a later time, you will have to repeat the Complete System Restoration procedure and enable FAT16. Also make sure you set the Active Partition flag to make it bootable.

3. Choose Option 3. This Option will Format your C: drive and then create a 86016 KB Save-to-file.bin file. This file was created by the PHDISKF Utility and enables you to use your notebook's Save to Disk feature. If you have over 80MB of RAM installed on your notebook, you must use the PHDISKF utility to create a larger Save-to-file.bin file after this process is complete. See the section entitled RAM Increases Over 80MB Total of this addendum for detailed instructions.

4. Insert the Windows 95 CD into the CD-ROM drive.

5. Choose Option 2 (Re-install Microsoft Windows OS) from the Boot Floppy Main Menu. This will run Windows SETUP program from the Windows 95 CD. SETUP runs SCANDISK and then installs the OS. Follow the on-screen instructions to complete Windows 95 installation.

6. Remove the Windows 95 CD and insert the DIGITAL HiNote VP 700 System CD. Run CDInstall. Click on the Next buttons until the Choose Desired Category screen appears.

7. Click on the Drivers box. You should now re-install all drivers. Some of the drivers can be automatically executed, while some require manual installation. Please refer to the sections earlier in this document for information.

System Restoration

8. Return to the Choose Desired Category screen of the CDInstall Program and install the desired applications. Please refer to the section earlier in this document for information on installing applications.

RAM Increase Over 80MB Total

Your system RAM can be increased to 144MB. Your Save-to-File.bin file, which enables you to use your notebook's Save to Disk feature, needs to reflect the increase in memory. Shipped from the factory, your system has approximately an 84MB Save-to-File bin. The DOS file can be created before or after you install your operating system. Creating the DOS file after the installation of your operating system will NOT erase any data from the hard drive. To increase the size of your Save-to-File bin, please refer to the following:

1. Run ScanDisk to ensure there are no disk errors. Then defrag your hard drive to ensure you have enough contiguous free space to create the Save-to-File.bin file.

2. Insert the DIGITAL HiNote VP 700 Series System CD into the CD-ROM drive and boot the system.

3. At the DOS prompt, type: **PHDISKF   /create XXXXX**, where XXXXX is the size of the new Save-to-File.bin file in KB. Note that there needs to be a space between "PHDISKF" and "/create" and a space between "/create" and "XXXXX".

> **NOTE**: To determine the proper value of "XXXXX", use the following equation: XXXXXKB=1024 x (Total MB Installed + 4MB Overhead). For example, to support Save to Disk on a system with 80MB of RAM, the Save-to-File.bin file would have to be 86016KB in size.

4. Press [Enter].

Windows NT 4.0 System Restoration

This section details the following:

- Creating an Emergency Repair Disk

- System Recovery Using an Emergency Repair Disk

- Windows NT 4.0 System Restoration

- NTFS Conversion

- Creating a Save-to-File (FAT16 Only—Non NTFS)

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

In order to restore your system, you will need the following:

- DIGITAL HiNote VP 700 System CD AG-R8K2A-BH

- Microsoft Windows NT 4.0 Operating System CD

Creating an Emergency Repair Disk

An Emergency Repair Disk allows you to restore Windows NT Registry settings in the event that the system becomes unstable. To create an Emergency Repair Disk:

1. Log in Windows a user with Administrative Privileges.

2. Click on the [Start] button located on the Windows Task bar, then click [Run].

3. In the Open field, enter rdisk and click [OK].

4. When the Repair Disk Utility window appears, click on [Create Repair Disk].

5. When prompted, label a disk "Emergency Repair Disk" and insert it into Drive A:, then click [OK].

6. When Windows is finished creating the Emergency Repair Disk, click on [Exit].

7. Eject the Emergency Repair Disk and enable write protection. Please refer to Chapter 7 in your User's Guide for tips on floppy diskette care and storage.

    NOTE: The Emergency Repair Disk should be updated after each major software or hardware configuration change. To update the Emergency Repair Disk, insert the disk into the Floppy Drive and run rdisk. Then click [Update Repair Info] and follow the on-screen instructions.

System Recovery Using an Emergency Repair Disk

This process should only be done as a last resort when you have exhausted all other options, such as restoring from tape backups or accessing Last Known Configuration by holding down the Space bar as your computer starts.

1. Place the Windows NT 4.0 CD into the CD-ROM drive.

2. Boot the system. The system will boot from the Windows NT 4.0 CD.

3. When the Windows NT Welcome screen appears, press [R] to select the "To repair a damaged Windows NT version 4.0 installation" option.

4. A Windows NT Workstation Setup screen will appear informing you that Windows will perform all tasks indicated with an "X". Deselect the "Verify Windows NT System files" option, then cursor down to the Continue option and press the [Enter] key.

5. Setup will inform you that it is going to detect all mass storage devices, press [Enter] to continue.

6. Setup will search for all mass storage devices then list the storage device that were recognized by the system. Press [Enter] to continue.

7. When prompted that you must insert the Emergency Repair Disk, press [Enter].

8. Insert the Emergency Repair Disk into the Floppy Disk Drive and press [Enter].

9. Windows will then inform you that it will restore the registry files for each option marked with "X". Use the up and down arrows to move cursor and press [Enter] to mark the appropriate options. When finished marking the registry options to be restored, cursor down to the Continue option and press [Enter]. If you are not sure which options to mark for repair, refer to the on-line help which is activated by pressing [F1].

10. When Windows prompts you stating it has completed making the necessary repairs, remove the Emergency Repair Disk and Windows NT 4.0 CD, and reboot the system.

Windows NT 4.0 System Restoration

This section details how to prepare a new or existing hard drive for Windows NT 4.0 installation and how to install drivers and software applications. To complete the process you must have the DIGITAL HiNote VP 700 System CD and Windows NT CD which were packaged with your notebook.

1. Place the Windows NT CD into the CD-ROM Drive and boot the system. The system will boot from the Windows NT CD and Windows NT Setup Program interface will appear.

2. Install Windows NT as described in the Microsoft
    Windows NT Workstation user's guide that was
    packaged with your system. Ensure that you select
    FAT16 as the Windows NT file structure.

3. Create a Save-to-File as described in Creating a Save-
    to-File section of this addendum.

4. When Windows loads insert the DIGITAL HiNote VP
    700 System CD. Click on Start then Run and type
    X:\CDInstall, where X is drive letter assigned to the CD-
    ROM drive. Follow the on-screen instructions to install
    the desired applications, interactive User documentation
    and all system drivers.

    NOTE: Internet Explorer is not included on the System
    CD. If you wish to install this application, it can be
    download from Microsoft's web site:
    www.microsoft.com.

NTFS Conversion

The NTFS conversion process described below includes the
creation of a non-DOS partition to be utilized by the Save-to-
Disk feature.

CAUTION: This process will erase all information on
your Hard Disk drive.

1. Insert the DIGITAL HiNote VP 700 System CD into the
    CD-ROM Drive and boot the system.

2. Run the FDISK utility and remove all disk partitions.

3. Reboot the system.

System Restoration

4. At the DOS prompt type: **PHDISK /create 151552**. This will create a 148MB non-DOS partition to be used for Save-to-Disk operations. Note that there must be a space between "PHDISK " and "/create" and a space between "/create" and "151552".

5. Remove the DIGITAL HiNote VP 700 System CD and place the Windows NT 4.0 CD into the CD-ROM drive, then reboot the system.

6. Follow the on-screen instructions ensuring that when prompted to choose the file structure that you specify NTFS.

7. When Setup is complete, remove the Windows NT CD and insert the DIGITAL HiNote VP 700 System CD. Click on Start then Run and type X:\CDInstall, where X is drive letter assigned to the CD-ROM drive. Follow the on-screen instructions to install the desired applications, interactive User documentation and all system drivers.

Creating a Save-to-File (FAT16 Only—Non NTFS)

Shipped from the factory, your system has approximately an 84MB Save-to-File.bin file which enables you to use your notebook's Save-to-Disk feature. If you increase the RAM over 80MB total or complete the Windows NT 4.0 System Restoration process, you need to create a DOS Save-to-File.bin file which matches the amount of RAM installed.

To create the Save-to-File.bin file, please refer to the following:

1. Run ScanDisk to ensure there are no disk errors. Then defrag your hard drive to ensure you have enough contiguous free space to create the Save-to-File.bin file.

2. Insert the DIGITAL HiNote VP 700 Series System CD into the CD-ROM drive and boot the system.

3. At the DOS prompt, type: **PHDISKF   /create XXXXX**,
    where XXXXX is the size of the new Save-to-File.bin file
    in KB. Note that there needs to be a space between
    "PHDISKF" and "/create" and a space between "/create"
    and "XXXXX".

    > **NOTE**: To determine the proper value of "XXXXX",
    > use the following equation: XXXXXKB=1024 x (Total
    > MB Installed + 4MB Overhead). For example, to
    > support Save to Disk on a system with 80MB of RAM,
    > the Save-to-File.bin file would have to be 86016KB in
    > size.

4. Press [Enter].

5.   Remove DIGITAL HiNote VP 700 Series System CD
     from the CD-ROM drive and reboot the system.

System Restoration

System BIOS 3

Introduction

This chapter provides information related to the System BIOS and its Setup Program.

BIOS Setup Program

The 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 notebook is configured with the values found in CMOS.

System BIOS

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. If the CMOS battery is completely drained, you will be prompted with a CMOS Checksum Error message during bootup and given the choice of selecting F1 to resume or F2 to enter the Setup Program. Select F2, then reset the System Time and System Date fields, and load the default settings from the Exit menu. Then select Save Changes and Exit to save the new configuration and exit the Setup Program. Connect the AC adapter to the notebook for 24 hours to recharge the CMOS battery.

By activating user friendly Setup Program 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 Programs options and to make settings appropriate for the way you use the notebook.

Navigating through the Setup Program

When turning on the notebook for the first time you may get a message prompting you to run the 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 enter the 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 Setup Program

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

System BIOS

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.

System Devices 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 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 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	Alt + X	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.
F5	**-** (minus key)	Scrolls backwards through the values of the highlighted field.
F6	+ (plus key) <space bar>	Scrolls forward through the values of the highlighted field.
F9		Sets the fields for the active menu to their default values.
F10		Saves the new configuration and exits the Setup Utility.
Press Enter		Executes commands, selects submenus, selects fields, or displays available options.

System BIOS

Launching Submenus

Notice that a pointer symbol appears next to selected fields in the menu screens. For example, see the Hard Disk option in the Main menu. The symbol indicates the existence of a submenu that can be launched for more advanced configuration 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 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 provides a description of all the keys with their corresponding alternates and functions which are used to navigate the Setup Program.

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 ($\uparrow\downarrow$) 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 Setup Program.

Field	Settings	Description
System Time	Enter current time: hour, minute, second format	Sets the system to specified time.
System Date	Enter current date: month, day, year format	Sets the system to specified date.
Floppy Drive	1.44 MB, 3 ½"* Disabled	Enables/Disables support for the Floppy Disk Drive Module.
Hard Disk	Submenu	Displays the Hard Drive size. Press Enter to access the Hard Disk submenu.
Video Display Device		Sets the Video mode.
	CRT Mode	Allows viewing of externally connected monitor only.
	LCD Mode*	Allows viewing of the notebook's LCD only.
	Simul Mode	Allows simultaneous viewing of externally connected monitor (CRT) and the notebook's LCD display.
System Memory	Display only field	Indicates the amount of conventional memory used by the system.
Extended Memory	Display only field	Indicates the amount of RAM, minus conventional memory (640 KB) and high memory (360 KB), installed in the system.

* Default value.

System BIOS

```
                    PhoenixBIOS Setup Utility
Main  System Devices  Security  Power  Boot   Exit

                                                 ┌─────────────────────────┐
   System Time:           [03:01:25]             │   Item Specific Help     │
   System Date:           [08/15/1997]           │                          │
                                                 │ <Tab>, <Shift-Tab>, or   │
   Floppy Drive           [1.44 MB, 3 1/2"]      │ <Enter> selects field.   │
 ▶ Hard Disk              [4100 MB]              │                          │
   Video Display Device:  [Simul Mode]           │                          │
                                                 │                          │
   System Memory:         640 KB                 │                          │
   Extended Memory:       15 MB                  │                          │
                                                 │                          │
                                                 │                          │
                                                 └─────────────────────────┘

 F1  Help   ↑↓  Select Item  F5/F6     Change Values   F9  Setup Defaults
 ESC Exit   ←→ Select Menu   Press Enter Select ▶Sub-Me F10 Save and Exit
```

Figure 3-1. The Setup Main Menu

The Hard Disk Submenu

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

Field	Settings	Description
Type		Select the type of hard drive installed in the system.
	Auto*	Automatically detects and configures all parameters, except 32 Bit I/O, for the type of hard drive installed.
	1-39	Choose from 39 predefined hard drive types.
	None	No hard drive is installed in the system or hard drive is of an unknown type.
	User	Manually configure the hard drive parameters. Consult the hard drive documentation for more information on making the correct settings.

*Default value.

NOTE: Auto is the recommended setting for most hard drive types. If your hard drive is not recognized by the system, consult the hard drive documentation for information on the appropriate settings.

The System Devices Menu

Select System Devices from the menu bar the display the
following menu.

```
                    PhoenixBIOS Setup Utility
Main  System Devices  Security  Power  Boot   Exit
┌─────────────────────────────────────┬──────────────────────────┐
│                                      │   Item Specific Help     │
│ PS/2 Mouse          [Auto]           │                          │
│ IDE Controller      [Both]           │                          │
│ FDD Controller      [Enabled]        │ Selecting 'Disabled'     │
│                                      │ prevents any installed   │
│ Serial Port         [PnPOS]          │ PS/2 mouse from          │
│ Infrared Port       [PnPOS]          │ functioning, but frees   │
│   Mode:             [IrDA]           │ up IRQ 12.               │
│ Parallel Port       [PnPOS]          │ Selecting 'Enabled'      │
│   Mode:             [ECP]            │ allows the OS to         │
│   DMA channel:      [DMA 3]          │ determine whether to     │
│                                      │ enable or disable the    │
│ Audio               [PnPOS]          │ mouse.                   │
│   1st DMA channel:  [DMA 1]          │                          │
│   2nd DMA channel:  [DMA 0]          │                          │
└─────────────────────────────────────┴──────────────────────────┘

F1  Help  ↑↓  Select Item  F5/F6     Change Values  F9  Setup Defaults
ESC Exit  ←→  Select Menu   Press Enter Select▶Sub-Me F10 Save and Exit
```

Figure 3-2.   The System Devices Menu

The following settings are available in the System Devices Menu screen of the Setup Program.

Field	Settings	Description
PS/2 Mouse	Auto	Configured automatically by the BIOS.
	Disabled	Disables the touch pad and PS/2 mouse and frees IRQ 12.
	Enabled*	Allows the OS to determine whether or not to enable the mouse.
IDE Controller	Primary	Enables the primary IDE channel.
	Both*	Enables both the primary and secondary IDE channels. This field must be set to Both to use both an IDE hard drive and an IDE CD-ROM.
	Disabled	Disables the all IDE devices.

*Default value.

continued

System BIOS

Field	Settings	Description
FDD Controller	Enabled* Disabled	Enables the floppy disk controller.
Serial Port		Enables/Disables, configures or disables the serial port.
	Auto*	Configured automatically by the BIOS.
	PnPOS	Configured automatically by the Plug and Play OS.
	Disabled	Disables the serial port.
	Enabled	Manually configures the serial port Base I/O Address. Available configurations are: 3F8-IRQ4*, 2F8-IRQ3, 3E8-IRQ4, 2E8- IRQ3.

*Default value.

Field	Settings	Description
Fast Infrared		Enables, configures or disables the Fast Infrared port.
	Auto*	Configured automatically by the BIOS.
	PnPOS	Configured automatically by the Plug and Play OS.
		Disables the infrared module.
	Disabled	Manually configure the infrared
	Enabled	port Base I/O Address. Available configurations are: 3F8-IRQ4, 2F8-IRQ3*, 3E8-IRQ4, 2E8-IRQ3.

*Default value.

continued

System BIOS

Field	Settings	Description
Mode	IrDA* ASK-IR FIR	Choose the default setting for this field or refer to the IR device User's manual.
DMA channel	DMA 0 DMA 2 DMA 3*	Appears only when mode is set to FIR. Define the DMA channel to be used by the FIR serial port
Parallel Port		Enables, configures or disables the parallel port.
	Auto*	Configured automatically by the BIOS.
	PnPOS	Configured automatically by the Plug and Play OS.
	Disabled	Set the parallel port to disable in order to increase the battery run time.
	Enabled	Manually configure the parallel port Base I/O Address (278, 3BC, or 378) and Interrupt (IRQ5 or IRQ7*).

*Default value.

Field	Settings	Description
Parallel Port Mode	Normal mode Bi-directional mode ECP* EPP	Choose the default setting for this field or refer to the parallel device User's manual.
		To take advantage of ECP (Extended Capabilities Port) and EPP (Enhanced Parallel Port) mode, the parallel device must be ECP/EPP aware. See your parallel device user's guide.
DMA channel	DMA 0 DMA 2 DMA 3*	Appears only when the Parallel Port Mode is set to ECP. Define the DMA channel to be used by the parallel port.
Audio		Enables, configures or disables the sound device.
	Auto*	Configured automatically by the BIOS.
	PnPOS	Configured automatically by the Plug and Play OS.
	Disabled	Disables the sound device.
	Enabled	Manually configure the sound device SB,WSS and AdLib I/O addresses. The defaults are 220h, 530-534h, and 388h respectively.

*Default value.

continued

Field	Settings	Description
1st/2nd DMA channel	DMA 0* DMA 1* DMA 3	Define the DMA channels to be used by the sound device. DMA 1 is the default for the 1st channel and DMA 0 is the default for 2nd channel.
Interrupt	IRQ 5* IRQ 7 IRQ 9 IRQ 11	In use when Audio is set to Enabled.

* Default value.

The Security Menu

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

```
                    PhoenixBIOS Setup Utility
 Main  System Devices  Security  Power  Boot    Exit
┌─────────────────────────────────────────┬──────────────────────┐
│                                          │   Item Specific Help │
│  System password is   Disabled           │                      │
│                                          │                      │
│  Set System Password  [Press Enter]       │  Supervisor Password │
│                                          │  controls access to the│
│  Password On Boot     [Disabled]          │  setup utility.      │
│  Password On Resume   [Disabled]          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
│                                          │                      │
└─────────────────────────────────────────┴──────────────────────┘
 F1  Help   ↑↓  Select Item  F5/F6      Change Values   F9  Setup Defaults
 ESC Exit   ←→  Select Menu   Press Enter Select ▶Sub-Me  F10 Save and Exit
```

Figure 3-3. The Setup Security Menu

Field	Settings	Description
System Password is Disabled	Display only field	Indicates whether or not a password is enabled.
Set System Password	[Press Enter]	Upon pressing Enter, the system will prompt you to enter a new password and to verify it. Once set, this password must be entered to access the Setup Program.
Password on Boot	Enabled Disabled *	When enabled, the system will require the Password during system boot. In order to enable Password on Boot, you must have a System Password set.
Password on Resume	Enabled Disabled *	When enabled, the system will require the Password when resuming from suspend. In order to enable Password on Resume, you must have a System Password set.

* Default value.

> **NOTE**: Passwords take effect immediately upon confirmation. The password will remain in effect if you exit the Setup Program without saving the new configuration settings.

System BIOS

Setting System Password

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

Set System Password		
Enter New Password:	[	]
Re-enter New Password:	[	]

1. Type in your password and press <Enter>. The password can be up to eight 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 System Password

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

Deleting System Password

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

1. Open the System Password dialogue box.

2. Enter the current password.

3. The cursor will move to the Enter New Password field, press <Enter>.

4.   The cursor will move to the Re-enter New Password field. Press <Enter> again.

5.   When the Notice dialogue box appears notifying you that changes have been saved, press <Enter> a third time. The password has been deleted.

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.

```
                    PhoenixBIOS Setup Utility
Main  System Devices  Security  Power  Boot   Exit
┌─────────────────────────────────────┬──────────────────────┐
│                                      │   Item Specific Help │
│ Power Management Mode  [Customize]   │                      │
│                                      │ Select Power Management
│ Smart CPU Mode:       [On]           │ Mode. Choosing modes │
│ Standby Time-out:     [2 Minutes]    │ changes system power │
│ Suspend Time-out:     [8 Minutes]    │ management settings. │
│                                      │ Maximum Power Savings│
│ Hard Disk Time-out:   [6 Minutes]    │ conserves the greatest
│ Video Time-out:       [Disabled]     │ amount of system power
│ Lid Switch Action:    [Suspend]      │ while Maximum         │
│ Resume On Modem Ring: [Disabled]     │ Performance conserves│
│ Resume Date:          [Disabled]     │ power bvut allows    │
│ Resume Time:          [00:00:00]     │ greatest system      │
│ Resume Date:          [07/01/1997]   │ performance. To alter│
│                                      │ these settings, choose
│                                      │ Customize. To turn off
│                                      │ power management,    │
│                                      │ choose Disable.      │
└──────────────────────────────────────┴─────────────────────┘

 F1  Help  ↑↓  Select Item  F5/F6      Change Values   F9  Setup Defaults
 ESC Exit  ←→  Select Menu   Press Enter Select▶ Sub-Me F10 Save and Exit
```

Figure 3-4. The Setup Power Menu

System BIOS

Field	Settings	Description
Power Manage- ment Mode		Sets the Power Management Mode.
	Disabled	Disables all Power Management
	Customized *	Allows you to customize the Power Management fields (Smart CPU Mode, Standby, Suspend Disk Time-out, Video Time-out) to suit your individual work needs.
	Max. Power Savings	Power Management fields will be set with pre-defined values to ensure maximum battery run time.
	Max. Performance	Power Management fields will be set with pre-defined values to provide best system performance with some power conservation.

*Default value.

Field	Settings	Description
Smart CPU Mode	Off On	If enabled, the CPU slows down during periods when the system is not busy thus conserving battery power.
Standby Time-out	Disabled 1, 2* Min. 4 Min.	Indicates the amount of time the system needs to be idle before entering Standby mode. In order to make changes to this field, Power Management Mode must be set to Customize.
Suspend Time-out	Disabled 4, 8* Min. 16 Min.	Indicates the amount of time the system needs to be idle before entering Suspend mode. Power Savings must be set to Customize in order to change these values.
Hard Disk Time-Out	Disabled 30 Seconds 1 Min. 2, 4, 6*, 8, 10, 15 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 Management Mode must be set to Customize.

*Default value.

continued

System BIOS

Field	Settings	Description
Video Time-out	Disabled* 1 Min. 2, 4, 6, 8, 10, 15 Min.	Indicates the amount of time input devices, such as the keyboard, need to be idle before the LCD is turned off.
Lid Switch Action	Suspend* CRT	Allows you to determine whether or not the system will suspend or switch to CRT display when the LCD is closed.
Resume on Modem Ring	Disabled* Enabled	If enabled, a modem ring will resume the system from suspend mode.
Resume Date	Disabled* Enabled	If enabled, the system will automatically resume from the Suspend Mode as defined by the Resume Time and Resume Date fields described below.
Resume Time	Enter resume time: hour, minute, second format.	Allows you to specify the time the system will resume. The Resume Date field above must be set to Enabled for the system to resume.
Resume Date	Enter resume date: month, day, year format.	Allows you to specify the date the system will resume. The Resume Date field above must be set to Enabled for the system to 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.
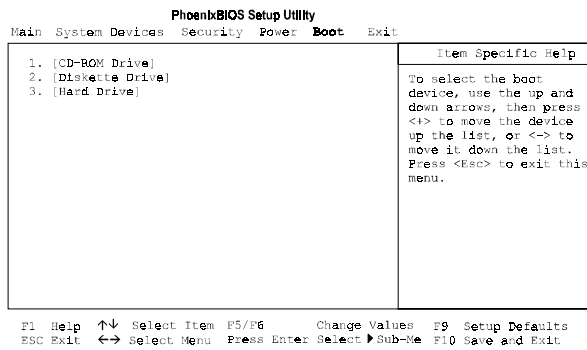
Figure 3-5. The Setup Boot Menu

Field		Description
1.	[CD-ROM Drive]	These fields allow you to define the order of devices in which the system looks for an OS. To change the order, move the highlighted cell to the field to be moved. Press F5 to move the field to a lower priority. Press F6 to move the field to a higher priority.
2.	[Diskette Drive]	
3.	[Hard Drive]	

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 Setup Program.
Discard Changes & Exit	<Enter>	Discards the current changes and exits the Setup Program.
Get Default Values	<Enter>	Loads the factory default values for each of the fields in the Setup Program.
		To keep default values and exit the 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 Setup Program through this field.

System BIOS

```
                    PhoenixBIOS Setup Utility
Main  System Devices  Security  Power  Boot   Exit

                                        ┌─────────────────────────┐
                                        │    Item Specific Help    │
   Save Changes and Exit                │                         │
   Discard Changes and Exit             │ Exit System Setup and   │
   Get Default Values                   │ save your changes to    │
   Load Previous Values                 │ CMOS.                   │
   Save Changes                         │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        │                         │
                                        └─────────────────────────┘

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

Figure 3-6. The Setup Exit Menu

System BIOS

Troubleshooting *4*

Introduction

This chapter provides a systematic method of isolating problems with the DIGITAL HiNote VP 700 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 to shut down the system (Figure 1-2) then power back on the system. 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.

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 system operating on battery power. • The system starts POST then automatically shuts down.	• Check to ensure that there is ample charge remaining in the battery. If the battery is critically low, the system will automatically shut down. • System hung possibly hung after using a screen saver. Press the Reset button located on the back on the unit . • Check the DRAM connections to be sure that they are secure. • Check the LCD connections. • Check the system board power circuit.
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 could be experiencing a hang. Press the Reset button located on the back on the unit (Figure 1-2). • 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.

LCD Panel Failure

Problem	Troubleshooting Procedure
You turn on the computer and one of the following conditions apply:	• Make sure that the LCD cable is securely connected to the Motherboard.
• The system is working, but there is no LCD panel display.	• Make sure that the LCD power cable is securely connected to the inverter.
• The system is working, but the LCD panel display vertical or horizontal lines.	• If the cables are securely connected and the LCD still doesn't work, replace the LCD panel and test the system again.
• The backlight comes on, but there is no display.	• 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.
• There is a display, but you have garbled characters on the screen.	

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:	• Make sure the CRT output is enabled.
	• Make sure that the CRT's power is on and the power cables are securely connected.
• The notebook computer's LCD panel is working.	• 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.
• 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 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 has not been damaged due to excessive bending and is securely connected into the keyboard connector.
• Incorrect characters are displayed on the screen.	• Check the keyboard circuit.
• One stroke of a key produces too many characters on the screen.	• Replace the keyboard and check again.
	• Replace the keyboard controller BIOS chip.

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:	• Check to make sure that the BIOS settings are correct. Refer to Chapter 3 for BIOS information.
• There is a message indicating that the HDD doesn't exist.	• Make sure that the HDD connection is secure.
• You can't read from the HDD.	• Install the HDD into another HiNote VP 700 series notebook computer and test it.
• You can't write to the HDD.	• 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.	• Check to ensure that the FDD Controller option in the BIOS is enabled. • 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 , and the LED 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	POST Routine Description
02h	Verify Real Mode.
03h	Disable Non-Maskable Interrupts.
04h	Get CPU type. Save CPU type in NVRAM.
06h	Initialize system hardware.
08h	Initialize chip set registers to the Initial POST Values.
09h	Set in-POST flag in CMOS.
0Ah	Initialize CPU registers
0Bh	Enable CPU cache.
0Ch	Set the initial POST values of the cache registers.
0Fh	Enable the local bus IDE.
10h	Initialize Power Management.
11h	Set initial POST values for other hardware devices defined in the register tables.
12h	Restore the contents of the CPU control word whenever the CPU is reset.
13h	Early reset of PCI devices required to disable bus master.
14h	Test 8742 keyboard controller.
16h	Verify that the ROM BIOS checksums to zero
17h	Initialize external cache before autosizing memory.

Code	POST Routine Description
18h	8254 timers initialization.
1Ah	Initialize DMA command register.
1Ch	Initialize the 8259 interrupt controller.
20h	Verify that DRAM refresh is operating by polling the refresh bit in PORTB.
22h	Test 8742 Keyboard Controller.
24h	Set segment-register addressibility to 4 GB
28h	Autosize DRAM.
29h	Initialize the POST Memory Manager
2Ah	Zero the first 512K of RAM
2Ch	Test 512K base address lines
2Eh	Test first 512K of RAM.
2Fh	Initialize external cache before shadowing.
32h	Compute CPU speed.
34h	Test CMOS
35h	Load alternate registers with initial table values.
37h	Re-initialize chipset registers.
38h`	Shadow the system BIOS.
39h	Reinitialize the external cache.
3Ah	Autosize external cache.
3Ch	Load chipset registers with values from CMOS.
3Dh	Load alternate registers with CMOS values.

continued

Troubleshooting

Code	POST Routine Description
42h	Initialize interrupt vectors.
44h	Initialize BIOS interrupts.
46h	Verify the ROM copyright notice
47h	Initialize PCI Option ROM manager.
48h	Check video configuration against CMOS.
49h	Initialize PCI bus and devices.
4Ah	Initialize all video adapters in system
4Ch	Shadow video BIOS ROM.
4Eh	Display copyright notice.
50h	Display CPU type and speed
51h	Initialize EISA slots.
52h	Test keyboard.
54h	Initialize keystroke clicker.
56h	Enable keyboard.
58h	Test for unexpected interrupts.
5Ah	Display prompt "Press F2 to enter SETUP"
5Bh	Disable CPU cache.
5Ch	Test RAM between 512K and 640K.
60h	Test extended memory.
62h	Test extended memory address lines.
64h	Jump to UserPatch1. See "The POST Component.".

continued

Code	POST Routine Description
66h	Set cache registers to their CMOS values if CMOS is valid, unless auto configuration is enabled, in which case load cache registers from the Setup default table.
68h	Enable external cache and CPU cache if present. Configure non-cacheable regions if necessary. NOTE: Hook routine must preserve DX, which carries the cache size to the DisplayCacheSizeJ routine.
6Ah	Display external cache size on the screen if it is non-zero. NOTE: Hook routine must preserve DX, which carries the cache size from the cacheConfigureJ routine.
6Ch	Display shadow message
6Eh	Display the starting offset of the non-disposable segment of the BIOS
70h	Check flags in CMOS and in the BIOS data area for errors detected during POST. Display error messages on the screen.
72h	Check status bits to see if configuration problems were detected. If so, display error messages on the screen.
74h	Verify the Real Time Clock is running if the battery has not lost power. If the RTC is not running or the battery has lost power then set the incorrect time bit in Register E of the CMOS. (**Obsolete in Rel. 6. Now perfomed by postSetInPostFlagJ**).

Code	POST Routine Description
76h	Check status bits for keyboard-related failures. Display error messages on the screen.
7Ch	Initialize the hardware interrupt vectors from 08 to 0F and from 70h to 77H. Also set the interrupt vectors from 60h to 66H to zero.
7Eh	The Coprocessor initialization test. Use the floating point instructions to determine if a coprocessor exists instead of the ET bit in CR0.
80h	Disable onboard COM and LPT ports before testing for presence of external I/O devices..
81h	Run late device initialization routines.
82h	Test and identify RS232 ports
83h	Configure Fisk Disk Controller
85h	Display any ESCD read errors and configure all PnP ISA devices.
86	Initialize onboard I/O and BDA according to CMOS and presence of external devices.
87h	Initialize motherboard configurable devices.
89h	Enable non-maskable interrupts.
8Ah	Initialize Extended BIOS Data Area and initialize the mouse.
8Bh	Setup interrupt vector and present bit in Equipment byte.

continued

Code	POST Routine Description
8Ch	Initialize both of the floppy disks and display an error message if failure was detected. Check both drives to establish the appropriate diskette types in the BIOS data area.
8Fh	Count the number of ATA drives in the system and update the number in bdaFdiskcount.
90h	Initialize hard-disk controller. If the CMOS ram is valid and intact, and fixed disks are defined, call the fixed disk init routine to intialize the fixed disk system and take over the appropriate interrupt vectors.
91h	Configure the local bus IDE timing register based on the drives attached to it.
92h	Jump to UserPatch2. See "The POST Component".
93h	Build the MPTABLE for multi-processor boards
94h	Disable A20 address line.
95h	Check CMOS for CD-ROM drive. Activate CD-ROM drive
96h	Reset segment-register addressibility from 4GB to normal 64K by generating a Shutdown 8.
97h	Create pointer to MP table in Extended BDA.
98h	Search for option ROMs. Rom scan the area from C800h for a length of BCP_ROM_Scan_Size (or to E000h by default) on every 2K boundry, looking for add on cards that need initialization.

continued

Code	POST Routine Description
9Ah	Shadow miscellaneous ROMs if specified by Setup and CMOS is valid and the previous boot was OK.
9Ch	Set up Power Management. Initiate power -management state machine.
9Dh	Initialize Security Engine.
9Eh	Enable hardware interrupts
9Fh	Check the total number of Fast Disks (ATA and SCSI) and update the bdaFdiskCount.
9Ah	Shadow miscellaneous ROMs.
A0h	Verify that the system clock is interrupting.
A2h	Setup Numlock indicator. Display a message if key switch is locked.
A4h	Initialize typematic rate
A8h	Overwrite the "Press F2 for Setup" prompt with spaces, erasing it from the screen.
AAh	Scan the key buffer to see if the F2 key was struck after keyboard interrupts were enabled. If an F2 keystroke is found, set a flag.

ACh	Enter SETUP.
	  If (F2 was pressed)
	     go to SETUP
	  Else if (errors were found)
	     display "Press F1 or F2" prompt
	     if (F2 is pressed)
	        go to setup
	     else if (F1 is pressed)
	        boot
	  Else boot

continued

Code	POST Routine Description
AEh	Clear ConfigFailedBit and InPostBit in CMOS.

B0h	Check for errors.
	  If (errors were found)
	    beep twice
	    display "F1 or F2" message
	    if (F2 keystroke) go to SETUP
	    if (F1 keystroke) go to BOOT

B2h	Change status bits in CMOS and/or the BIOS data area to reflect the fact that POST is complete.
B4h	One quick beep

B5h	Turn off <Esc> and <F2> key checking.
	  IF (VGA adapter is present)
	    IF (OEM screen is still up)
	      Note OEM screen is gone.
	      Fade out OEM screen.
	      Reset video: clear screen, reset cursor, reload DAC.
	    ENDIF
	  ENDIF

B6h	If password on boot is enabled, a call is made to Setup to check password. If the user does not enter a valid password, Setup does not return.
B8h	Clear global descriptor table
B9h	Clear all screen graphics before booting.
BAh	Initialize the DMI header and sub-structures.
BCh	Clear parity-error latch
BDh	Display Boot First menu if MultiBoot is installed.

continued

Troubleshooting

Code	POST Routine Description
BEh	If BCP option is enabled, clear the screen before booting.
BFh	Check virus and backup reminders. Display System Summary.
C0h	Try to boot with INT 19
C1h	Initialize the Post Error Manager.
C2h	Write PEM errors.
C3h	Display PEM errors.

FRU Replacement 5

Introduction

This chapter provides detailed procedures for replacing the DIGITAL HiNote VP 700 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.

FRU Replacement

Required Tools

You will need the following tools to remove and replace the
HiNote VP 700 series FRUs:

- #0 and #1 Phillips Head Screwdrivers

- 3/16 inch and 7/32 inch Nut Drivers

- Tweezers

FRU Replacement

Key No.	Option Part Number	Orderable Spare Part	Mfg Part No.	Description
1	FR-PCPQJ-AA	30-49017-01		Main spare battery, Li-Ion, VP7h
2		30-49222-01	7102701A02Q	HDD, 2.1 GB, 2.5" x .5" H (IBM) w/ bracket assy
		30-49048-01	7102710A05V	HDD, 4.0 GB, 2.5" x .5" H (IBM) w/ bracket assy
3		30-49081-01	7102651A02P	Keyboard, US, VP7h
4		30-49026-01	7102301A04S	Assy, LCD Display, 13.3" TFT NEC
5		30-49068-01	7102621A01M	Combo module (CDR/FDD) VP7h
6		74-52747-01	7102611A01T	Assy, speaker cover
7		30-49057-01	7102481A01M	Assy, LCD Status Module w/o cable
*	FR-PCPZJ-AB	30-49015-01		Airline/car power adapter, VP700
*	FR-PCPHF-AB	30-49199-02		Airline/car adapter cable, VP700
*	FR-PCPQJ-AB	30-49018-01		Second battery module, Li-Ion, VP7h
*	FR-PCPM7-AB	30-49193-01		16MB Memory Module, SODIMM
*	FR-PCPM7-AC	30-49194-01		32MB Memory Module, SODIMM
*	FR-PCPM7-AD	30-49195-01		64MB Memory Module, SODIMM
*	FR-PCPDJ-BW	30-49013-01	7102811A02N	AC Adapter module only VP700

continued

FRU Replacement

Key No.	Option Part Number	Orderable Spare Part	Mfg Part No.	Description
*		30-49117-01		Spare main battery, NiMH HiNote VP7h
*		30-49069-01	7102631A01S	CD-ROM, 20 x (Sanyo)
*		17-04105-01	N/A	Power cord, US
*		74-52783-01	7102821A01V	Hinge cover, plastic
*		30-49064-01	7102561A01S	Assy, memory door
*		74-52736-01	7102661A01L	Tilt leg (L/R)
*	FR-PCPHJ-AA	30-49016-01		Battery charger VP700
*	FR-PCPEF-AA	30-49006-01	7102801A02U	Minidock port replicator w/o cardbus VP7h
*	FR-PCPEF-AB	30-49007-01	7102801A01L	Minidock port replicator w/ cardbus VP7h
*		29-xxxxx-xx	PJ2WIS	166 MMX replacement on-site shell
*		29-xxxxx-xx	PJ4WKS	233 MMX replacement on-site shell

* Not Illustrated

FRU Replacement
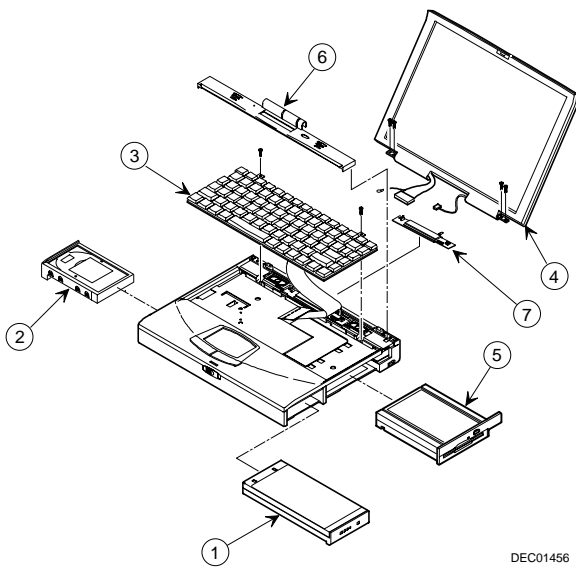
DEC01456

Figure 5-1. DIGITAL HiNote VP 700 Series

FRU Replacement

Removing the Battery Pack

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

To remove the battery pack:

1. Slide the locking button in the direction of the arrow shown.
    (Figure 5-2, step 1) This will unlock the Module Release latch.

2. Slide the Module Release latch in the direction of the arrow shown.
    (Figure 5-2, step 2) The battery will eject approximately a quarter of an inch from its bay.

3. Slide the battery module out of its bay. (Figure 5-2, step 3)
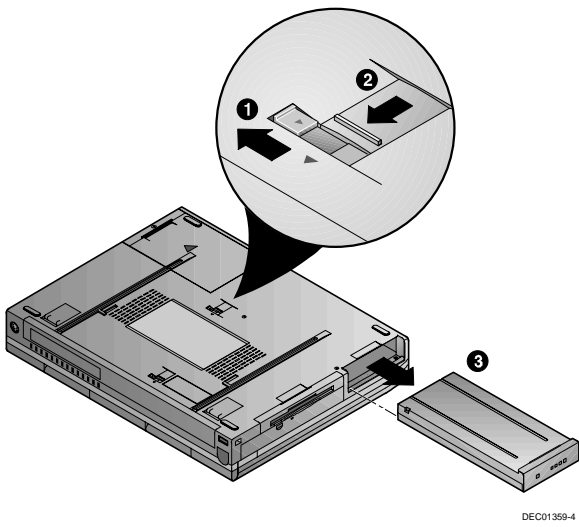
DEC01359-4

Figure 5-2. Removing the Battery Pack

Removing the 20x CD/FDD Combination Module and Supplementary Battery

To remove the 20x CD/FDD Combination module or supplementary battery:

1. Slide the locking button in the direction of the arrow shown. (Figure 5-3, step 1) This will unlock the Module Release latch.

2. Slide and hold the Module Release latch in the direction of the arrow shown.
    (Figure 5-3, step 2)

3. Holding the Module Release latch in this position, slide the module out of the expansion bay. (Figure 5-3, step 3)

4. Install the desired module. Move the locking button back to its original position.
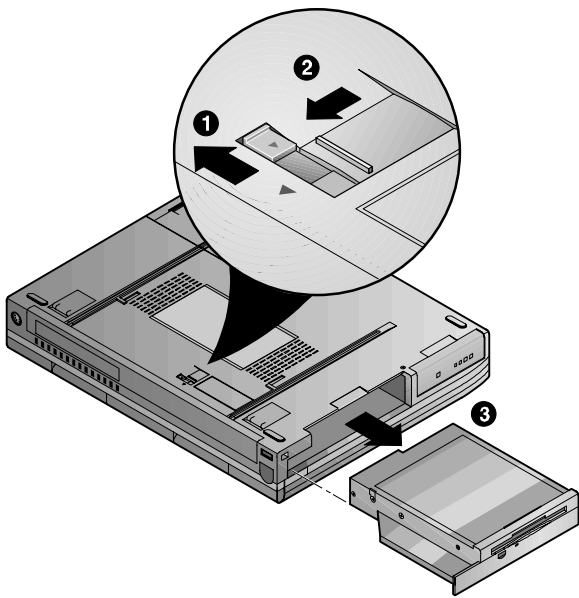
DEC01359-5

Figure 5-3. Removing the FDD /CD Module

Removing the HDD Assembly

To remove the HDD:

1. Turn off the notebook, disconnect the AC cord and any connected peripherals and remove the battery.

2. There is a single Phillips head screws located on the bottom of the notebook. It secures the HDD into the unit and prevents it from being damaged from vibrations. Remove this screw. (Figure 5-4, step 1)

3. Gently remove the HDD from its housing. (Figure 5-4, step 2)

4. Store your HDD in a safe, dry place away from direct sunlight or heat.
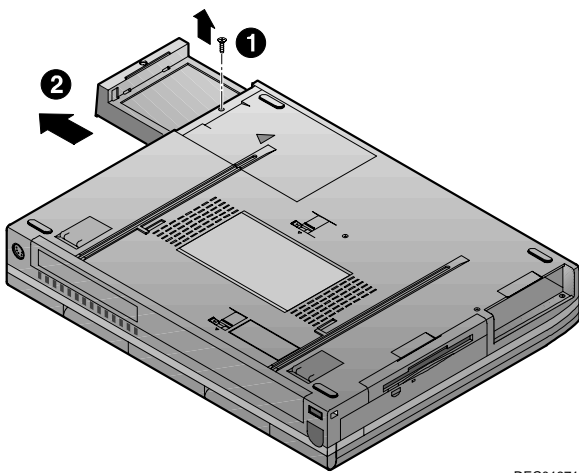
DEC01371

Figure 5-4. Removing HDD

FRU Replacement

Removing Memory Modules (DIMMs)

△ **CAUTION**: It is important to discharge the static electricity from your body before handling the DIMMs. Discharge your body's electricity by touching the metal shielding around the ports on the rear of the notebook computer for approximately five seconds.

To remove the memory modules:

1. Turn off the notebook, disconnect the AC cord and any connected peripherals and remove the battery.

2. The memory door is located on the underside of the notebook. To release the door, remove the Phillips head screw securing the HDD module (Figure 5-5, step 1).

3. Gently pull the HDD module about one inch from it housing to release the memory cover (Figure 5-5, step 2).

4. Remove the memory door to reveal the DIMM slots (Figure 5-5, step 3).

FRU Replacement
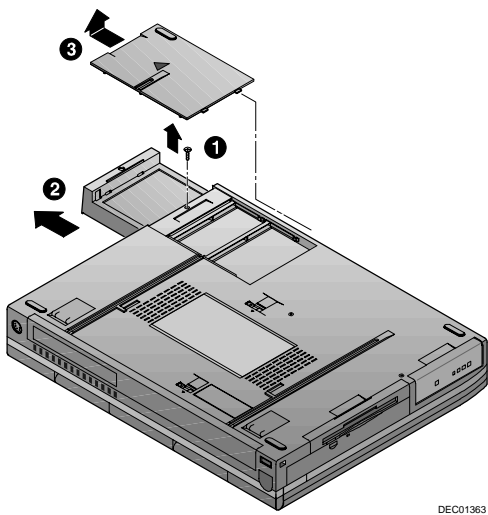
DEC01363

Figure 5-5. Removing Memory Door

FRU Replacement

5. Release the memory modules by pushing the side tabs
    away from the module. The module will pop up at a 45°
    angle (Figure 5-6, step 1).

6. Remove the memory module (Figure 5-6, step 2).
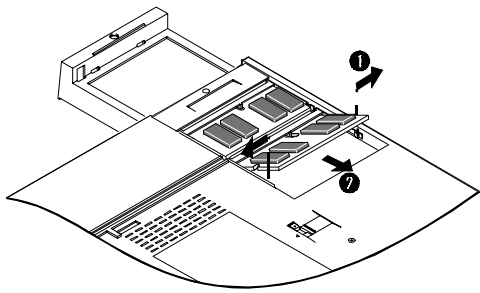
Figure 5-6. Removing DIMMs

FRU Replacement

Removing the Speaker Cover

To remove the speaker cover:

1. Turn off the notebook, disconnect the AC cord and any connected peripherals and remove the battery.

2. Remove the 20X CD-ROM Combination Module or Secondary Battery.

3. Remove the two hinge end caps by sliding them ¼ inch toward the outside the system unit and then up (Figure 5-7).

4. Open the LCD Display and remove the speaker cover by lifting both ends of the cover until free (Figure 5-8). Then run your thumbs along the inside edge towards the center of the cover to release the two inner tabs.
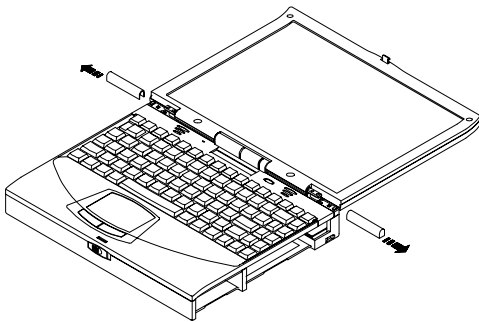
Figure 5-7. Removing the Hinge End Caps
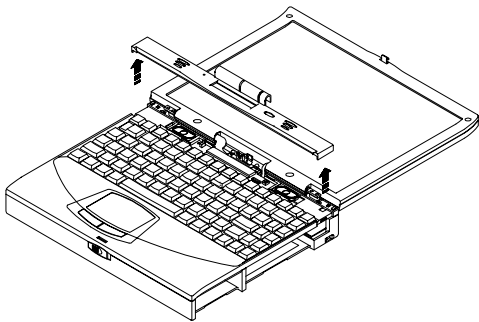
Figure 5-8. Removing the Speaker Cover

Removing the Keyboard

To remove the keyboard:

1. Turn off the notebook, disconnect the AC cord and any connected peripherals and remove the battery.

2. Remove the speaker cover (Figure 5-8).

3. Remove the two screws securing the keyboard to the deck (Figure 5-9).

4. Carefully lift the top of the keyboard up and rotate it toward the touch pad.

5. Using a bent paper clip or similar device, release the keyboard cable from the connector by lifting the connector head. Then slide the cable out of the connector (Figure 5-9).

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

FRU Replacement
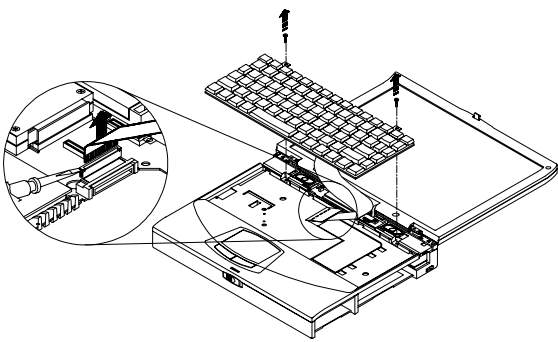
Figure 5-9. Removing Keyboard

FRU Replacement

Removing the LCD Assembly

To remove the LCD assembly:

1. Turn off the notebook, disconnect the AC cord and any connected peripherals and remove the battery.

2. Remove the 20X CD-ROM Combination Module or Secondary Battery (Figure 5-2).

3. Open the LCD panel and remove the speaker cover (Figure 5-8).

4. Remove the screw that secures the LCD status module to the keyboard deck and disconnect the system window and IR cables (Figure 5-10).

FRU Replacement
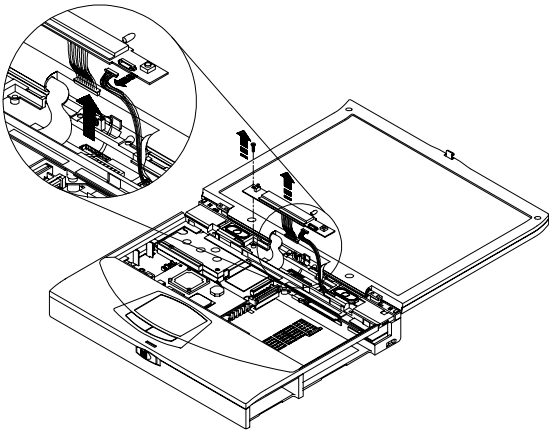
Figure 5-10. Removing the LCD Status Display Board

FRU Replacement

5. On 13.0" LCD models, disconnect the LCD signal cable from the Inverter/LVDS board by removing the two screws and lifting the connector board. On 13.3" LCD models, remove the screw that secures the LCD signal cable ground then disconnect the LCD signal cable from its connector on the Inverter/LVDS board. (Figure 5-11)

6. Disconnect the LCD power cable from the Inverter/LVDS board. (Figure 5-11)

7. Remove the four hinge screws. (Figure 5-11)
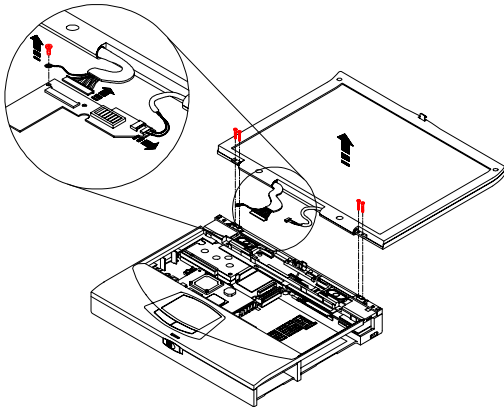
Figure 5-11. Removing the LCD Assembly

FRU Replacement

Shell Installation Instructions

IMPORTANT: This section contains information that is important for configuring a replacement HiNote VP 700 series "Shell" at a customer site.

The HiNote VP 700 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.

Record the customer's,
- Original Serial number
- Original Model number
- Call log number
- Service date

This notebook was exchanged by Digital Multivendor Customer Service Personnel as part of an hardware service call.

Orginal Serial No.: **2U72301204**

Orginal Model No.: **FR-PD4WI-AA**

Call Log #: **C709220176** Date: **9/24/97**

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 5-12).

1. Remove the primary battery.

2. Remove the combo FDD and CD drive assembly.

3. Remove the HDD assembly.

4. Remove memory modules.

5. Remove the speaker cover.

6. Remove the keyboard.

7. Remove the LCD status module.

FRU Replacement

8. Remove the LCD assembly.

9. Remove any additional PCMCIA cards.

10. On the replacement "Shell," in reverse order, add all the
    parts removed from the defective unit.
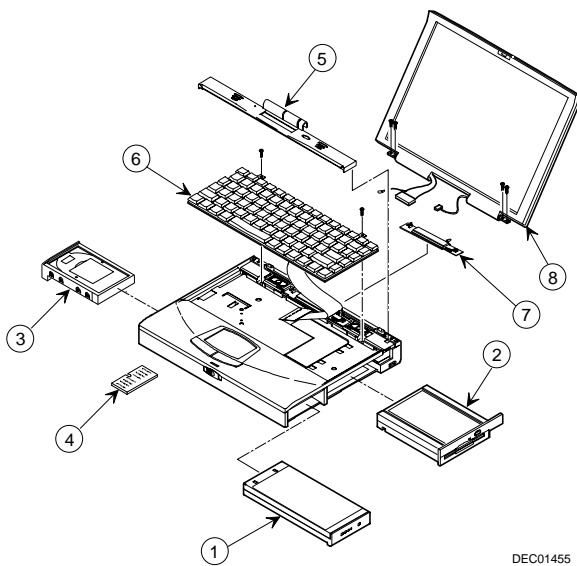
DEC01455

Figure 5-12. DIGITAL HiNote VP 700

Specifications *A*

Base Unit

Feature	Model		
	MSX5166M-2.1GB - 13.0"	**MTX5166M - 2.1GB - 13.3"**	**MTX5233M - 4.0GB - 13.3"**
CPU Intel Pentium	166 MHz MMX	166 MHz MMX	233 MHz MMX
LCD	13.0" XGA DSTN	13.3" XGA TFT	13.3" XGA TFT
HDD	2.16 GB	2.16 GB	4.0GB
Upgradeable HDD	Yes	Yes	Yes
L1 Cache	32KB Internal	32KB Internal	32KB Internal
L2 Cache	256KB	256KB	512KB (on MMO Module)
Architecture (Mobile Triton)	PCI	PCI	PCI
Base RAM	16MB SDRAM	32MB SDRAM (16MB installed in memory socket)	32MB SDRAM (16MB installed in memory socket)
Maximum RAM	144MB	144MB	144MB
RAM Expansion	144 pin SO–DIMM 3.3v self-refresh SDRAM	144 pin SO–DIMM 3.3v self-refresh SDRAM	144 pin SO–DIMM 3.3v self-refresh SDRAM

continued

Specifications

	Model		
Feature	MSX5166M-2.1GB - 13.0"	MTX5166M - 2.1GB - 13.3"	MTX5233M - 4.0GB - 13.3"
Battery	NiMH –37.4Whrs	LiIon – 40Whrs	LiIon – 40Whrs
Audio	Yes	Yes	Yes
CardBus/ Zoomed Video	Supported	Supported	Supported
Fast IR (4 Mbps)	Yes	Yes	Yes
USB	Yes	Yes	Yes
Diskette and CD-ROM Combo Drive	3.5" floppy 20X CD-ROM	3.5" floppy 20X CD-ROM	3.5" floppy 20X CD-ROM
Diskette supports Japanese Mode	Yes	Yes	Yes
Pointing Device	Touch pad	Touch pad	Touch pad
DIGITAL HiNote VP 700 Series Minidock	Optional	Optional	Optional
PC 97 Compliant	Yes	Yes	Yes

Ports

	Model		
Feature	**MSX5166M-2.1GB - 13.0"**	**MTX5166M -2.1GB - 13.3"**	**MTX5233M -4.0GB - 13.3"**
Keyboard/Mouse	PS/2	PS/2	PS/2
External Video Interface	XGA	XGA	XGA
External Video, Maximum Resolution	1024x768 256 Colors	1024x768 256 Colors	1024x768 256 Colors
External Video, Refresh Rate in 1024x768x256 Colors in Simultaneous Mode	60Hz	60Hz	60Hz
Serial	Yes	Yes	Yes
Parallel	ECP/EPP	ECP/EPP	ECP/EPP
Audio Line-in	Yes	Yes	Yes
Audio Line-out	Yes	Yes	Yes
Microphone	Yes	Yes	Yes
Infrared	Fast IR/Serial	Fast IR/Serial	Fast IR/Serial

Specifications

Audio

	Model		
Feature	**MSX5166M- 2.1GB - 13.0"**	**MTX5166M - 2.1GB - 13.3"**	**MTX5233M - 4.0GB - 13.3"**
Audio	3D Sound	3D Sound	3D Sound
Audio Compatibility	WSS and SoundBlaster with OPL3 Compatibility	WSS and SoundBlaster with OPL3 Compatibility	WSS and SoundBlaster with OPL3 Compatibility
Wavetable	NO	NO	Yes
Audio Volume	Hot Key	Hot Key	Hot Key
Internal Microphone	Yes	Yes	Yes
Built-in Stereo Speakers	Yes	Yes	Yes

LCD Display

Model		
Feature	**MSX5166M-2.1GB - 13.0"**	**MTX5166M - 2.1GB - 13.3"**	**MTX5233M - 4.0GB - 13.3"**
Display Type	13.0" XGA DSTN	13.3" XGA TFT	13.3" XGA TFT
Video Processor	NM2160	NM2160	NM2160
Video Accelerator	BitBLT Hardware	BitBLT Hardware	BitBLT Hardware
Video RAM (not upgrade-able)	2MB	2MB	2MB
Graphic Resolution	1024x768	1024x768	1024x768
Colors	64,000	64,000	64,000
Zoomed Video	Yes	Yes	Yes

Specifications

PCMCIA (PCI)

	Model		
Feature	MSX5166M- 2.1GB - 13.0"	MTX5166M - 2.1GB - 13.3"	MTX5233M - 4.0GB - 13.3"
PCMCIA Controller	TI1131	TI1131	TI1131
PCMCIA Type II/III Support	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Cardbus Revision Support	3.0	3.0	3.0

BIOS Support

	Model		
Feature	MSX5166M- 2.1GB - 13.0"	MTX5166M - 2.1GB - 13.3"	MTX5233M - 4.0GB - 13.3"
BIOS Supplier	Phoenix 4.06	Phoenix 4.06	Phoenix 4.06
PC '97 Compliant	Yes	Yes	Yes
Flash ROM Size	256KB	256KB	256KB
Suspend to RAM	Yes	Yes	Yes
Suspend to File	Yes	Yes	Yes
Password	On Boot & Resume	On Boot & Resume	On Boot & Resume

Specifications

Specifications

Power

	Model		
Feature	**MSX5166M- 2.1GB - 13.0"**	**MTX5166M - 2.1GB - 13.3"**	**MTX5233M - 4.0GB - 13.3"**
AC Power Supply/ Battery Charger	90/264V 47-63Hz	90/264V 47-63Hz	90/264V 47-63Hz
Main Battery	NiMH (37.4WHrs.)	LiIon (40WHrs.)	LiIon (40WHrs.)
Battery Life w/single battery	3.0Hrs. with PM Off	3.0Hrs. with PM Off	3.0Hrs. with PM Off
Battery recharge w/system OFF	3Hrs. for single battery	3Hrs.for single battery	3Hrs. for single battery
Battery recharge w/system ON	3.5Hrs. for single battery	3.5Hrs. for single battery	5Hrs. for single battery

Battery, Status Display, Keyboard

	Model		
Feature	MSX5166M- 2.1GB - 13.0"	MTX5166M - 2.1GB - 13.3"	MTX5233M - 4.0GB - 13.3"
Status LCD	Battery Gas Gauge, PCMCIA, HDD/CD-ROM, FDD, CRT/LCD/Simul, Caps Lock, NUM Lock, Embedded Key Pad Lock, Scroll Lock, LED for AC and Battery charging		
Standard Keyboard	83 Keys + 2 Win 95 Keys	83 Keys + 2 Win 95 Keys	83 Keys + 2 Win 95 Keys
Japanese Keyboard	83 Keys + 2 Win 95 Keys	83 Keys + 2 Win 95 Keys	83 Keys + 2 Win 95 Keys
Integrated Pointing Device	Synaptics Trackpad Version 4.3	Synaptics Trackpad Version 4.3	Synaptics Trackpad Version 4.3

Physical

	Model		
Feature	MSX5166M- 2.1GB - 13.0"	MTX5166M - 2.1GB - 13.3"	MTX5233M - 4.0GB - 13.3"
Size	11.9" x 9.3" x 2.1"	11.9" x 9.3" x 2.1"	11.9" x 9.3" x 2.1"
Weight (including Combo Drive)	7.4 lbs. (approximate)	7.4 lbs. (approximate)	7.4 lbs. (approximate)

Device Mapping *B*

Memory Map

Range	Name	Function
0h to 9FFFFh	640KB System Memory	System Memory Space
A0000h to BFFFFFh	128K Video Memory	Graphics Display Memory Buffer
C0000h to C9FFFh	40KB Video BIOS ROM	Shadow BIOS of VGA
CA000h to DFFFFh	96KB I/O Expansion ROM	Reserved ROM Space for I/O Adapter
E0000h to FFFFFh	128KB System ROM	BIOS of System & VGA
100000h to 4FFFFFFh	Additional Memory Space	Extended Memory Space, Size from 16MB up to 144MB

Device Mapping

DMA Channel Assignments

Channel	Controller	Function
0	1	Audio
1	1	Audio
2	1	Diskette controller
3	1	Parallel Port ECP (if enabled)
4	2	Reserved
5	2	Reserved
6	2	Reserved
7	2	Reserved

Notebook Computer Interrupt Levels

IRQ	Normal Assignments (FIS)
0	System Timer
1	Keyboard
2	Programmable Interrupt Controller
3	Serial Port Com2, PCMCIA Com2, Infrared
4	Serial Port Com1, PCMCIA Com 1
5	Audio
6	Floppy Disk Controller
7	Parallel Port LPT1
8	CMOS/Real time clock
9	Wavetable/Joystick
10	PCI INTB/USB
11	PCMCIA Card Insert/Remove Event (CardBus)
12	Track Pad, PS/2 Mouse
13	Numeric data processor
14	Primary fixed disk (HDD)
15	Secondary fixed disk (HDD)

I/O Address Map

Range (hexadecimal)	Function
0h-1h	DMA Channel 0
2h-3h	DMA Channel 1
4h-5h	DMA Channel 2
6h-7h	DMA Channel 3
8h-0Fh	DMA Controller 1
20h-21h	Interrupt Controller 1
40h-43h	Timer Counter
60h, 64h	Keyboard Controller
61h	Port 61
70h-71h	CMOS RAM
80h	Reserved
81h-83h	DMA Memory Address Mapper
84h-86h	Reserved
87h	DMA Memory Address Mapper
88h	Reserved
89h-8Bh	DMA Memory Address Mapper
8Ch-8Eh	Reserved
8Fh	DMA Memory Address Mapper
92h	Port 92
0A0h-0A1h	Interrupt Controller 2
0C0h-0C2h	DMA Channel 4
0C4h-0C6h	DMA Channel 5

Device Mapping

Range (hexadecimal)	Function
0C8h-0CAh	DMA Channel 6
0CCh-0CEh	DMA Channel 7
0D0h-0DEh	DMA Controller 2
0F0h-0FFh	Math Co-processor
1F0-1F7	Fixed Disk
220h*	Audio I/O Port
278h-27Ah*	LPT2
2F8h-2FFh*	Serial Control Port B
378h-37Ah*	LPT1
398-399	Super I/O Controller
3B0-3BA	VGA Registers
3BCh-3Beh*	LPT3
3C0-3DF	VGA Registers
3E0h-3E1h	PCMCIA
3F0h-3F5h*	Floppy Disk Controller
3F6h	Fixed Disk Register
3F7h*	Floppy Disk Controller
3F7h	Fixed Disk Decode
3F8h-3FFh*	Serial Controller Port A

* Enabled and disabled using the Setup Utility or Windows 95