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VXI Pentium® Controller

Hardware Installation and Configuration Guide

HP E623xA HP VXI Pentium Controllers

Manual Part Number: E6232-90001
Printed in U.S.A. E0897

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Hardware Installation and Configuration Guide
Edition 2
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All Editions and Updates of this manual and their creation date are listed below. The first Edition of the manual is Edition 1. The Edition number increments by 1 whenever the manual is revised. Updates, which are issued between Editions, contain replacement pages to correct or add additional information to the current Edition of the manual. Whenever a new Edition is created, it will contain all of the Update information for the previous Edition. Each new Edition or Update also includes a revised copy of this documentation history page.

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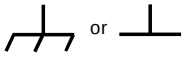
Safety Symbols



Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.



Indicates the field wiring terminal that must be connected to earth ground before operating the equipment—protects against electrical shock in case of fault.



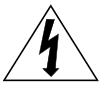
Frame or chassis ground terminal—typically connects to the equipment's metal frame.



Alternating current (AC)



Direct current (DC).



Indicates hazardous voltages.

WARNING Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

CAUTION Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

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according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:	Hewlett-Packard Company Loveland Manufacturing Center
Manufacturer's Address:	815 14th Street S.W. Loveland, Colorado 80537

declares, that the product:

Product Name:	HP VXI Pentium® Controller
Model Number:	HP E623*x*A
Product Options:	All

conforms to the following Product Specifications:

Safety:	IEC 1010-1 (1990) Incl. Amend 1 (1992)/EN61010-1 (1993) CSA C22.2 #1010.1 (1992) UL 3111-1 (1994)
EMC:	CISPR 11:1990/EN55011 (1991): Group1 Class A IEC 801-2:1991/EN50082-1 (1992): 4kVCD, 8kVAD IEC 801-3:1984/EN50082-1 (1992): 3 V/m IEC 801-4:1988/EN50082-1 (1992): 1kV Power Line .5kV Signal Lines

Supplementary Information: The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (inclusive 93/68/EEC) and carries the "CE" mark accordingly.

Tested in a typical configuration in an HP C-Size VXI mainframe.

August, 1997

Jim White, QA Manager

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Notes:

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Contents

Warranty 1
Safety Symbols 2
WARNINGS 2
Declaration of Conformity 3

Chapter 1
Introduction 11
About this Manual 11
Overview 13
Major Components 14
Front Panel 15
Where to Go Next 16

Chapter 2
Installing and Configuring the Hardware 17
About this Chapter 17
Before You Begin 17
Verify the Product Package 18
Check the Installation Location 19
Gather the Equipment Needed 19
Installing the Controller in the VXI Card Cage 20
Installing Other Interfaces 20
Connecting the Peripherals 22
Powering Up the Controller 23
Pre-power Checklist 23
Turning on the Power 23
Setting the Controller's Internal Clock 23
Customizing the Controller's BIOS 24
Where to Go Next 25
Software Installation and Configuration 25

Chapter 3
Using the BIOS Setup Utility 27
About this Chapter 27
Accessing BIOS Setup 27
Navigating BIOS Setup Menus 27
Main BIOS Setup Menu 28
IDE Adapter 0 Sub-Menus 29
Memory Cache Sub-Menu 31
Memory Shadow Sub-Menu 32
Boot Sequence Sub-Menu 33
Keyboard Features Sub-Menu 34
Advanced Menu 35
Integrated Peripherals Sub-Menu 36
Advanced Chipset Control Sub-Menu 37
Power Management Menu 39
EXM Menu 42
Exit Menu 43

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Chapter 4
Troubleshooting 45
About this Chapter 45
Abnormal LED Indicator States 45
BIOS Error Messages 46
Problems After Configuring the BIOS 48

Appendix A
LEDs on the Front Panel 49

Appendix B
I/O, Memory, and IRQ Details 51
VGA Video Controller 51
SCSI Controller 51
Ethernet Controller 52
Memory Map 52
IRQs (Interrupt Request Lines) 53

Appendix C
Specifications 55
Environmental 55
Electrical 56

Appendix D
Installing BIOS Software 57
Overview 57
Jumper Installation Procedure 58
Tools Required 58
Installation Steps 58
Booting the Special BIOS Boot Diskette 59

Appendix E
Installing Additional DRAM Memory 61
Memory Specifications 62
Ordering HP Memory 62
Referenced Memory Parts 63
Ordering Referenced Memory 63
Installation Procedure 64
Tools Required 64
SO DIMM Installation Requirements 64
Installation Steps 64

Appendix F
POST Beep Codes 67
Phoenix NuBIOS Checkpoints 67

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List of Figures

Figure 1-1. The HP VXI Pentium Controller 13
Figure 1-2. The Front Panel of the VXI Pentium Controller 15
Figure 3-1. Main BIOS Setup Menu 28
Figure 3-2. IDE Adapter 0 Sub-Menus 29
Figure 3-3. Memory Cache Sub-Menu 31
Figure 3-4. Memory Shadow Sub-Menu 32
Figure 3-5. Boot Sequence Sub-Menu 33
Figure 3-6. Keyboard Features Sub-Menu 34
Figure 3-7. Advanced Menu 35
Figure 3-8. Integrated Peripherals Sub-Menu 36
Figure 3-9. Advanced Chipset Control Sub-Menu 37
Figure 3-10. Power Management Menu 39
Figure 3-11. EXM Menu 42
Figure 3-12. Exit Menu 43
Figure D-1. Jumper-Pin Connector Blocks 58

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List of Tables

Table 1-1.	Ports on the Front Panel	16
Table 4-1.	Abnormal LED Indicator States	45
Table 4-2.	BIOS Error Messages	46
Table A-1.	LED Indicators	49
Table B-1.	Memory Map	52
Table B-2.	IRQs (Interrupt Request Lines)	53
Table C-1.	Environmental Specifications	55
Table C-2.	VXI Pentium Controller Power Requirements	56
Table E-1.	Memory Specifications	62
Table E-2.	HP Memory Upgrade Kits	62
Table E-3.	DRAM Memory Parts List	63
Table F-1.	Phoenix NuBIOS Checkpoint Codes	67
Table F-2.	Phoenix NuBIOS Auxiliary Checkpoint Codes	70
Table F-3.	Phoenix NuBIOS Boot Block Checkpoint Codes	71

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Chapter 1
Introduction

About this Manual

Welcome to the *HP VXI Pentium® Controllers: Hardware Installation and Configuration Guide.* This guide explains how to install the VXI Pentium Controller hardware, including any peripherals you wish to connect to the controller. This guide then explains how to power up the controller and customize the controller's configuration if the default, factory-set configuration is not sufficient for your controller's specific hardware setup.

Note This guide does *not* explain how to configure the VXI Resource Manager, VXI/VME hardware, or other supported instrument I/O interfaces. Those subjects are addressed in the *HP VXI Pentium® Controllers: E623x Controller Users's Guide* for your particular product.

This first chapter provides an overview of the controller. In addition, this guide contains the following chapters:

- **Chapter 2 - Installing and Configuring the Hardware** explains how to set up the controller hardware, including connecting external peripherals, power up the controller, and configure the controller's interfaces within the software. This chapter then explains how to further customize the controller, if needed.
- **Chapter 3 - Using the BIOS Setup Utility** explains how to set hardware configuration values in the BIOS Setup utility for the controller, if needed.
- **Chapter 4 - Troubleshooting** helps you resolve any error messages or other common problems you may encounter while installing or configuring the controller.

This guide also contains the following appendices:

- **Appendix A - LEDs on the Front Panel** explains the meaning of each LED indicator on the front panel of the controller.
- **Appendix B - I/O, Memory, and IRQ Details** provides more detailed technical descriptions of the VXI Pentium Controller's VGA video and SCSI controllers (including their BIOS extensions), Ethernet controller, memory map, and IRQs (interrupt request lines).

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- **Appendix C - Specifications** lists the environmental and electrical specifications for the controller.
- **Appendix D - Installing BIOS Upgrades** explains how to reflash the system BIOS from the floppy disk drive.
- **Appendix E - Installing Additional DRAM Memory** explains how to install more SO DIMM DRAM in an HP VXI Pentium controller.
- **Appendix F - POST Beep Codes** lists the Power-on Self-tests checkpoint codes and audible beeps codes issued if a failure is detected.

This guide also includes an **Index**.

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Overview

This guide supports several HP products in the HP VXI Pentium Controller family. The specific HP product number is marked on the side of the controller.

The HP VXI Pentium Controller is an Intel Pentium-based, dual-slot, C-size computer which is PC-compatible and is designed to interface to the VXIbus and the EXMbus.

The controller is configured with one of several different speed Intel Pentium CPUs. Refer to the HP Technical Specifications data sheet for the speed of the CPU in your product.

The controller is configured with varying amounts of DRAM. Refer to the Main BIOS Setup Menu to verify the amount of memory installed in your controller.

The controller is shipped pre-loaded with either the Microsoft® Windows 95®, Microsoft Windows NT®, or LynxOS operating system as well as the HP I/O Libraries software for that operating system.



Figure 1-1. The HP VXI Pentium Controller

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Major Components

The VXI Pentium Controller includes three major components:

- An I/O base board, which contains integrated PCI peripherals for graphics, SCSI, Enhanced IDE, and Ethernet. The I/O base board also supports an RS-232 serial port, a parallel port, a keyboard, and a mouse.
- The CPU submodule which contains the Pentium computer chip and the SO DIMM sockets. The CPU submodule connects to the I/O base board.
- An Enhanced IDE disk drive module, which supports 2.5-inch hard disk drive densities of 1 GB and larger.

In addition to the integrated peripherals, the VXI Pentium Controller supports two EXMbus slots and a 3.5-inch floppy disk drive.

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Front Panel

As shown below, the front panel of the VXI Pentium Controller spans two VXI slots.

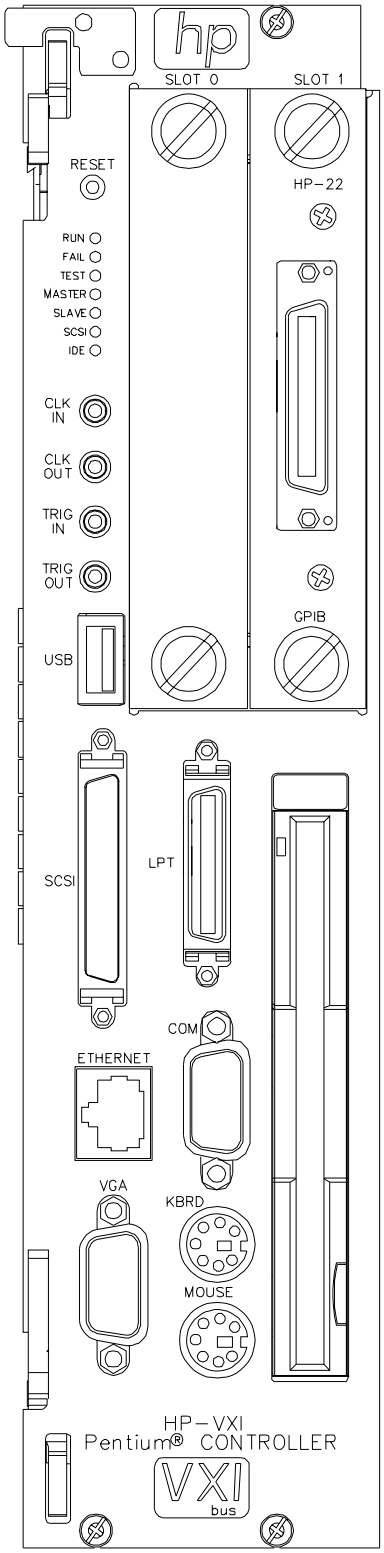


Figure 1-2. The Front Panel of the VXI Pentium Controller

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The front panel of the controller contains the following:

- Recessed hardware reset switch (push-button).
- 7 LED indicators. (For more information about the meaning of the LEDs, see Appendix A, “LEDs on the Front Panel.”)
- 4 SMB connectors, including: CLK10 IN, CLK10 OUT, TRIGGER IN, and TRIGGER OUT.
- 2 EXMbus slots. (Note that an HP-22 GPIB card is pre-installed in Slot 1.)
- 3.5-inch floppy disk drive.
- 9 ports, as listed in the following table.

Table 1-1. Ports on the Front Panel

Label	Port Type	Connector
COM	RS-232 Serial	DB9 pin-type
LPT	IEEE 1284 Parallel	Mini-D36
VGA	Video	VGA 15-pin, socket-type D-shell
SCSI	SCSI	Mini-D, 50-pin SCSI II
KBRD	Keyboard	PS/2-style, 6-pin circular mini-DIN
MOUSE	Mouse	PS/2-style, 6-pin circular mini-DIN
ETHERNET	LAN	10-base-T RJ45
USB	USB Master Host[a]	USB
GPIB	HP-22 GPIB	GPIB

a.The USB Master Host port is not supported at this time.

Where to Go Next

Now that you have a better understanding of the VXI Pentium Controller, you are ready to begin installing the controller hardware. Please go on to the next chapter, “Installing and Configuring the Hardware,” for instructions on how to set up the hardware.

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Chapter 2
Installing and Configuring the Hardware

About this Chapter

This chapter contains step-by-step instructions to help you set up the HP VXI Pentium Controller hardware. To install and configure the controller hardware, you need to complete the following steps.

1. First, before you begin the actual installation:

- Verify the contents of the controller's product package to ensure you received all the items for your order.
- Check the location where the controller will be installed to ensure the environmental conditions meet the controller's specifications and to ensure future accessibility to the controller.
- Gather the appropriate equipment so it is ready to install.

2. Install the controller in the VXI card cage.
3. Install any other interface card(s) in the controller (other than the HP-22 GPIB card pre-installed in Slot 1.)
4. Connect the peripherals to the controller.
5. Refer to the appropriate *HP VXI Pentium Controllers: E623x Controller User's Guide* for your particular controller for further instructions on configuring the controller.

The following sections explain how to complete these installation and configuration steps.

Before You Begin

This section explains what steps you should complete before you begin the actual installation of the VXI Pentium Controller hardware.

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Verify the Product Package

Your VXI Pentium Controller product is shipped with the following items. Once you have unpacked the package, ensure that you received all the following items with your product order.

- One HP VXI Pentium controller.
- The installation software CD-ROMs and diskettes for the particular operating system installed on your controller.

Note The Windows or the LynxOS operating system software, the appropriate HP I/O Libraries software, and the controller drivers and utilities software are all pre-loaded on the controller's hard disk. Therefore, the following software CD-ROMs and floppy diskettes are included in your product package merely as a contingency, in case you ever need to re-install the software for any reason.

Note If you also ordered a keyboard, mouse, monitor, other interface card(s), and/or a CD-ROM drive to use with the VXI Pentium Controller, these other products (including their documentation and any software, as appropriate) will be shipped separately to you.

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Check the Installation Location

Next, ensure that the environmental conditions where you will install the VXI Pentium Controller will consistently meet the conditions listed in Appendix C, “Specifications.”

Also, you may want to choose an installation location where you can easily access the controller for future updates or changes to the hardware. For example, upgrading the DRAM memory or setting any jumpers in the controller will require removing the controller from the VXI card cage, and then removing the side cover of the controller. (However, setting jumpers is only required if reflashing the BIOS for a system BIOS upgrade, which is rarely, if ever, done.)

Gather the Equipment Needed

Before you begin the installation, you should also have the following equipment ready to use:

- VXI card cage.
- Optionally, any other interface card(s) you wish to install in the controller (such as the RADI-EX22/HP-22 GPIB interface, RADI-EX10 LAN interface, or RADI-EX07 RS-232 interface.)
- PS/2-style or compatible keyboard.
- PS/2-style or compatible mouse, or a serial mouse.
- VGA or better monitor.
- Optionally, a SCSI II CD-ROM drive (such as the HP C2944D CD-ROM drive.) (See the following Note.)

Note

Since the VXI Pentium Controller comes pre-loaded with a Microsoft Windows or the LynxOS operating system, HP I/O Libraries for Windows or HP SICL for LynxOS, and controller drivers and utilities software, you do *not* need to connect a CD-ROM drive to the controller unless you need to re-install the software for some reason.

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Installing the Controller in the VXI Card Cage

Caution **You *must* power down the VXI card cage before installing the VXI Pentium Controller in the card cage. You must also leave the card cage powered-down until you have finished installing any other interface card(s) in the controller (if needed) and connecting the peripherals to the controller, as explained in the next two sections of this chapter.**

To begin the hardware installation, you must first install the VXI Pentium Controller in the VXI card cage. To do this, first *power down* the VXI card cage by turning off the power switch on the card cage. Then insert the controller into two adjacent, open slots of your VXI card cage (typically, slots 0 and 1.)

Leave the VXI card cage *powered down* while you complete the hardware installation steps explained in the next two sections of this chapter. You may power up the VXI card cage (and thereby power up the VXI Pentium Controller) *only* after you have completed installing the rest of the hardware as explained in the following two sections.

Installing Other Interfaces

Note If you have no other, separately-purchased interface card(s) to install in the VXI Pentium Controller, simply skip this section and continue with the next section, “Connecting the Peripherals.”

The VXI Pentium Controller includes one HP-22 GPIB interface card which is pre-installed in Slot 1 of the controller. If you purchased any other interface card(s) you wish to use with the controller, then follow the documentation provided with each interface product now to install the other interface card(s) in the controller.

Here are some simple reminders for installing any other interface card(s) in the VXI Pentium Controller:

- Note that the existing HP-22 GPIB card was pre-installed in Slot 1 (rather than in Slot 0) to provide better cable clearance for the HP-22 card’s connector on the front panel of the controller. Therefore, if you wish to install only one more interface card, you may want to leave the existing HP-22 card in Slot 1 and install the new card in Slot 0.

- When removing either the face plate covering Slot 0, or the HP-22 GPIB interface card in Slot 1, loosen the two thumb screws on the face plate or interface’s connector plate. If the screws will not loosen by hand, use a flat-bladed screw driver to gently turn the screw in the counter-clockwise direction.

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- Be careful when handling an interface card. Hold the interface only by its exterior connector plate. Never touch any other part of the interface, particularly the connector itself. Also, protect the interface from static electricity, since static electricity can damage an interface.

- To insert an interface card into Slot 0 or 1, find the interface card guides just inside the slot opening, and then slide the interface card into the controller slot on top of these guides. To seat the card in the slot, place your thumbs on either side of the exterior connector plate and press firmly until the card "clicks" into the slot. The connector plate will be flush with the front panel of the controller when the interface is completely seated. Then tighten the screws on the interface's exterior connector plate with your fingers *only.* Do *not* use a wrench or any other tool to tighten these screws, as they are meant to be tightened *by hand* only.

- Because the system BIOS for the controller is pre-configured for an HP-22 GPIB interface card in Slot 1 only, you will need to change the BIOS configuration if you make *any* interface card installation changes. For example, if you do any of the following, you will need to change the BIOS configuration:

  -- Add another interface card to Slot 0.

  -- Move the existing HP-22 GPIB card from Slot 1 to Slot 0.

  -- Remove the existing HP-22 GPIB card from slot 1.

  -- Remove the existing HP-22 GPIB card from Slot 1 and replace it with some other interface card.

You will need to make any such BIOS configuration changes after you have completed installing the VXI Pentium Controller hardware and have powered up the controller. Therefore, please continue with the next three sections of this chapter now. You will then be told to reconfigure the BIOS for any interface card additions or changes at the end of this chapter (in the "Customizing the Controller" section.)

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Connecting the Peripherals

Caution **Do NOT power up the VXI card cage and the VXI Pentium Controller until you make all connections to the peripherals, as explained in this section.**

Caution **Use extreme caution when connecting peripheral cables to the controller. The I/O base board of the VXI Pentium Controller provides power for peripheral devices through different pins. Making incorrect connections can damage the board and may damage the peripheral device being connected.**

The VXI Pentium Controller supports several standard, PC-compatible I/O peripherals, including a keyboard, mouse, and monitor. Before you power up the controller, you must connect the peripherals as explained in the following list. Note that you can connect the peripherals in any order.

- Connect a PS/2-style or compatible keyboard (6-pin, mini-DIN connector) to the KBRD connector.
- Connect a PS/2-style or compatible mouse (6-pin, mini-DIN connector) to the MOUSE connector.
- Optionally, connect a serial mouse to serial port COM1.
- Connect a VGA or better monitor (15-pin, D-shell connector) to the VGA connector.
- Optionally, connect an HP C2944D CD-ROM drive to the SCSI port.

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Powering Up the Controller

Pre-power Checklist

Before you power up the VXI Pentium Controller, ensure that you have completed the following steps.

1. Installed any other EXM interface card(s) in the controller, if needed.
2. Connected all peripherals (including a keyboard, mouse, and monitor) to the controller.
3. Turned on the power to the monitor so that it will be warmed up and ready to display messages before power is applied to the controller.
4. Checked that the power supply to the VXI card cage in which the controller is installed is connected.

Turning on the Power

When you have completed the previous steps, power up the controller by simply turning on the power switch to the VXI card cage in which the controller is installed.

Note Please refer to Chapter 4, “Troubleshooting,” if the RUN LED on the front panel of the controller is not lit or the TEST LED is still lit after you power up the controller.

Setting the Controller’s Internal Clock

The controller has an internal clock the value of which is maintained in battery-backed memory when power is removed from the system. The setting of this clock as entered by the factory will probably not match your local time. You are advised to reset the internal clock the first time you boot the controller.

Note Setting the internal clock is best done from within your operating system. However, it may also be set from the Main BIOS Setup Menu. Skip the following procedure if you choose to set the time from within your operating system.

The following line will display at the bottom of the first page of the system boot messages:

```
Press <F2> to enter SETUP
```

The first time you boot the system, press the **F2** function key while this message is visible in order to set the `System Time` and `System Date` to your local values.

1. On the Main BIOS Setup Menu, use the up and down cursor keys to highlight the `System Time` field.

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2. Use the **Tab** key to position to the hour, minute, or second fields of the time.

3. Type in the current local time values in each field.

4. Use the Down cursor key to highlight the `System Date` field.

5. Use the **Tab** key to position to the month, day, or year fields of the date.

6. Type in the current local date values in each field.

7. Once the time and date are correct, you may change other BIOS settings (see the following section, “Customizing the Controller’s BIOS”) or simply accept the new clock values.

8. To accept the new clock values, use the right and left cursor keys to change to the Exit Menu, highlight the `Save Changes & Exit` line, and press the `Enter` key. Press the `Enter` again to continue booting.

Customizing the Controller’s BIOS

Note If you have changed or added to the VXI Pentium Controller’s hardware in any way or the default BIOS settings for your controller are not acceptable, you will need to customize your controller’s BIOS.

There may be BIOS customization steps that you still need to complete, depending on your controller’s particular hardware configuration. If either of the conditions listed below apply to your configuration, you must access the BIOS Setup Utility during the system boot process.

1. If you installed any other EXMbus interface card(s) in the controller (other than the HP-22 GPIB card pre-installed in Slot 1.)

2. If any default configuration value in the system BIOS is not suitable for your controller’s particular hardware setup.

To access the BIOS Setup Utility, you must press the **F2** function key during the system boot process once power has been applied to the controller. Then go to Chapter 3, “Using the BIOS Setup Utility,” to set the appropriate BIOS configuration values for your system.

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Where to Go Next

Once you have set the current local time and date and completed configuring the VXI Pentium Controller's interfaces, if needed, in BIOS, you are ready to complete the first boot or your system and to begin configuring the instrument I/O interfaces (namely, VXI, GPIB, and RS-232C) to the appropriate VXI Resource Manager and HP SICL library for your controller. The following subsections list the manual you should use next to complete the configuration of each controller.

Software Installation and Configuration

To continue the installation of the HP VXI Pentium Controller, please refer to the *HP VXI Pentium Controllers: E623x Controller User's Guide* for the particular controller you are installing.

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Chapter 3
Using the BIOS Setup Utility

About this Chapter

This chapter explains the various menus, sub-menus, and fields in the BIOS (Basic Input/Output System) Setup utility that you can use to configure the HP VXI Pentium Controller hardware. Since the controller is shipped with all BIOS Setup values pre-configured, you only need to use this chapter if you want to make changes to the pre-configured, default BIOS value settings.

This chapter presents each configuration menu, sub-menu, and field in the sequence that you would encounter it for the first time. Note that on-line help is also available in the **`Item Specific Help`** area of each menu and sub-menu.

Accessing BIOS Setup

Nonvolatile CMOS RAM in the controller maintains the BIOS settings that you save. The BIOS uses these settings to initialize the hardware. You can access BIOS Setup only during the system reset process. To access BIOS Setup, press the **F2** function key as the system boots.

Navigating BIOS Setup Menus

Within BIOS Setup, use the cursor (arrow) keys to navigate from menu to menu and to move between fields in a menu. Use the up and down cursor keys to move from field to field in a menu. Use the right and left cursor keys to move from menu to menu, as listed in the menu bar at the top of the BIOS Setup screen. If you leave a menu and then return, the active field is always at the top of the menu. If you select a sub-menu and then return to the main menu, note that you return to that sub-menu heading.

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Main BIOS Setup Menu

The Main BIOS Setup Menu is shown below.

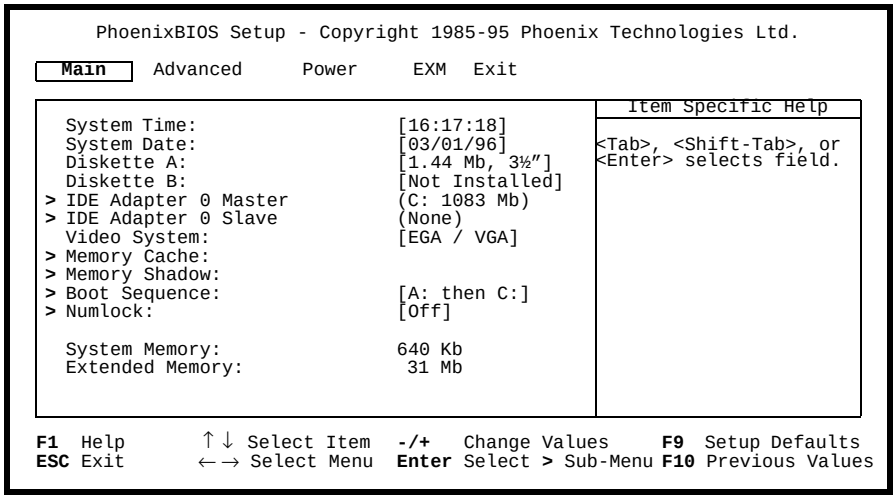


Figure 3-1. Main BIOS Setup Menu

The fields in this menu and its various sub-menus are as follows.

System Time: and System Date:

To change the values for these fields, simply move to each field and type in the desired entry. Use the **Tab** key to move from hour to minutes to seconds, or from month to day to year.

Diskette A: and Diskette B:

These fields identify the type of 3.5-inch disk drive installed as the A: and B: drives. The BIOS defaults to **1.44 Mb**, **3 ½"** for drive A:, and **Not Installed** for drive B:. Other possible values are: **360 Kb**, **720 Kb**, **1.2 Mb**, and **2.88 Mb**.

IDE Adapter 0 Master: and IDE Adapter 0 Slave: Sub-Menus

These fields are headings for sub-menus that allow you to enter complete disk drive information. Once the information is entered for the drive, the entry in the Main Menu shows the drive selected. For more information, see the "IDE Adapter 0 Sub-Menus" subsection later in this chapter.

Video System:

This field identifies the type of CRT monitor attached to the system. The possible values are:

EGA / VGA (default)
CGA 80x25
Monochrome

Memory Cache Sub-Menu

The term "Memory Cache" refers to the technique of caching BIOS images. For more information, see the "Memory Cache Sub-Menu" subsection later in this chapter.

Memory Shadow Sub-Menu

The term "Memory Shadow" refers to the technique of copying information from an extension ROM into DRAM and accessing it in this alternate memory location. The controller restricts what memory is available for shadowing because of the special requirements for SCSI and the Universe™

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PCI/VME bridge. For more information, see the “Memory Shadow Sub-Menu” subsection later in this chapter.

Boot Sequence: Sub-Menu

The Boot Sequence Sub-Menu allows you to change the boot delay and boot sequence, and to disable several displays during the boot process, such as the SETUP prompt, POST (power-on self-test) errors, floppy drive check, and summary screen. Once the boot sequence has been set, it is displayed in this field of the Main Menu. For more information, see the “Boot Sequence Sub-Menu” subsection later in this chapter.

Numlock: Sub-Menu (Keyboard Features)

This sub-menu enables or disables various keyboard features, including enabling the **Num Lock** key, enabling the key click, and setting the keyboard’s auto-repeat rate and delay. The Numlock setting is displayed in this field in the Main BIOS Setup Menu. For more information, see the “Keyboard Features Sub-Menu” subsection later in this chapter.

System Memory:

This field is read-only (not editable) and displays the amount of conventional memory (below 1 MB). No user interaction is required. Note that the amount is actually less than 640 KB since some memory is used for the Extended BIOS Data Area, which is required for PS/2 mouse usage.

Extended Memory:

This field is also read-only and displays the amount of extended memory (above 1 MB). No user interaction is required.

IDE Adapter 0 Sub-Menus

There are two IDE Adapter 0 Sub-Menus for the primary and secondary hard disk controllers, each having a master and slave drive screen. The detailed characteristics of the drive connected to the adapter is available in the IDE Adapter 0 Sub-Menu, which is shown below.

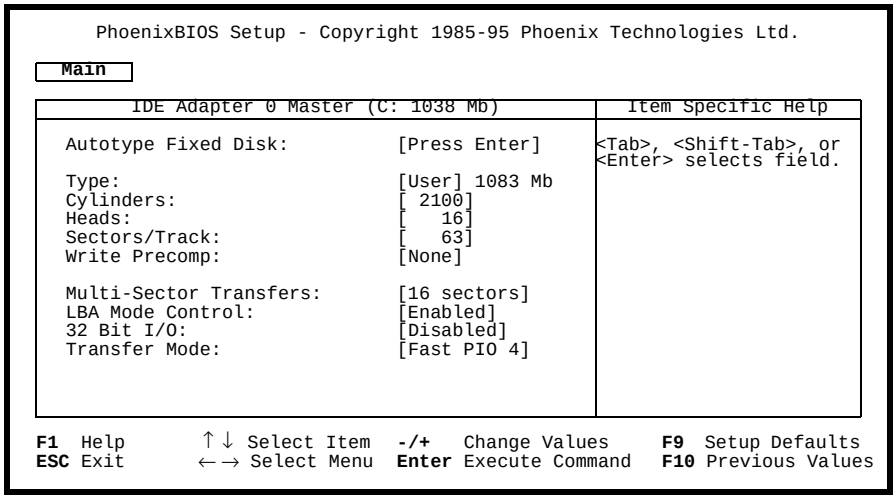


Figure 3-2. IDE Adapter 0 Sub-Menus

Autotype Fixed Disk:

This is a function which is used when setting up new disks. It allows BIOS Setup to determine the proper settings of the disk based on information on the disk. This information is detected by Setup for drives that comply with ANSI specifications. Press the **Enter** key to invoke this function.

Existing (formatted) disks must be set up using the same parameters that were used originally when the disk was formatted. If necessary, the specific

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Cylinder, Head, and Sectors/Track information, as listed on the label attached to the drive at the factory, must be entered manually on this sub-menu using the **User** Type, which is described below.

Type: Select **None** if there is no IDE hard disk drive for this adapter. In the case where there is an IDE disk but the **Autotype** function (above) cannot be employed, then select the **User** type and enter the correct drive values for Cylinders, Heads, Sectors/Track, and Write Precomp (precompensation) for the drive.

Multi-Sector Transfers: This field allows you to configure the System BIOS to read ahead by the specified number of sectors whenever a disk access is performed. This has the effect of reading more data at once to reduce the absolute number of discrete disk reads performed by the operating system, which may increase system performance. The possible values are: **Disabled**, or **2**, **4**, **8**, or **16 sectors** (default). Note that autotyping may change this value if the hard disk reports that it supports block accesses.

LBA Mode Control: When enabled, this field allows the System BIOS to reference hard disk data as logical blocks instead of using the traditional Cylinders/Heads/Sectors (CHS) method. The **Enabled** value can only be used if both the hard disk being configured and the operating system support Logical Block Addressing (LBA). If disabled, then CHS mode is used. Note that autotyping may change this value if the hard disk reports that it supports LBA. The default is **Enabled**.

32-bit I/O: When enabled, this field allows the System BIOS to access the hard disk controller with 32-bit I/O accesses, increasing system performance. This field is not affected by autotyping. The default is **Disabled**.

Transfer Mode: This field sets the mode that the System BIOS uses to access the hard disk. The possible values are:

Standard
Fast PIO 1
Fast PIO 2
Fast PIO 3
Fast PIO 4 (default)
Fast DMA

Older hard disks only support the **Standard** setting. Newer hard disks adhering to Fast ATA or Enhanced IDE specifications may support the **Fast PIO** (programmed I/O) modes. The **Fast DMA** mode makes full use of the onboard bus mastering hard disk controller and should yield the highest performance when used in conjunction with multi-tasking operating systems that support it. Note that autotyping may change this value depending on the transfer modes that the hard disk reports it supports.

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Memory Cache Sub-Menu

This sub-menu controls the cachability of certain memory regions, as well as the settings of the Level 2 (L2) cache. The Memory Cache Sub-Menu is shown below.

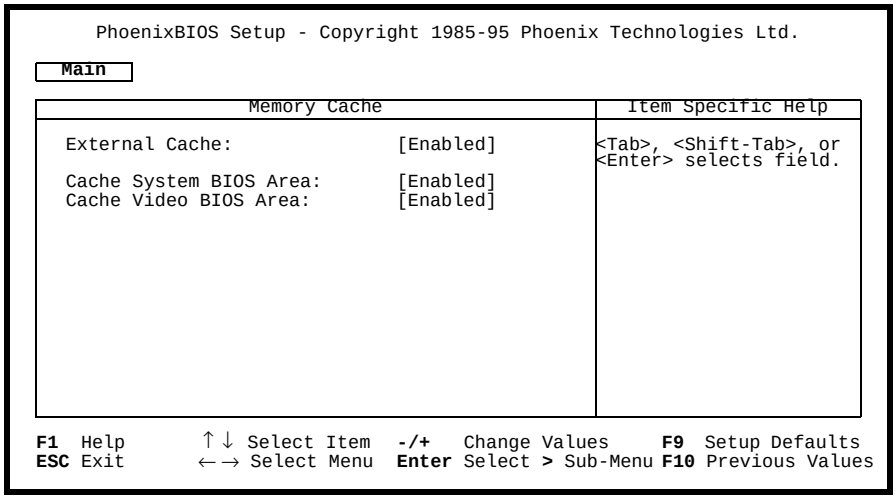


Figure 3-3. Memory Cache Sub-Menu

External Cache: This field enables or disables the Level 2 (L2) cache. If this cache is disabled, system performance will suffer. The default is **Enabled**.

Cache System BIOS Area: This field enables or disables caching of the System BIOS area in the 0E4000H through 0FFFFFH DRAM area. If this cache is disabled, system performance will suffer. The default is **Enabled**.

Cache Video BIOS Area: This field enables or disables caching of the VGA BIOS area in the 0C0000H through 0C7FFFH region. If this cache is disabled, system performance will suffer. The default is **Enabled**.

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Memory Shadow Sub-Menu

The term “shadowing” refers to the technique of copying code, such as BIOS extensions, from ROM into DRAM and accessing them from DRAM. This allows the CPU to access the BIOS extensions faster and generally increases system performance if many calls to the BIOS extensions are made. The Memory Shadow Sub-Menu is shown below.

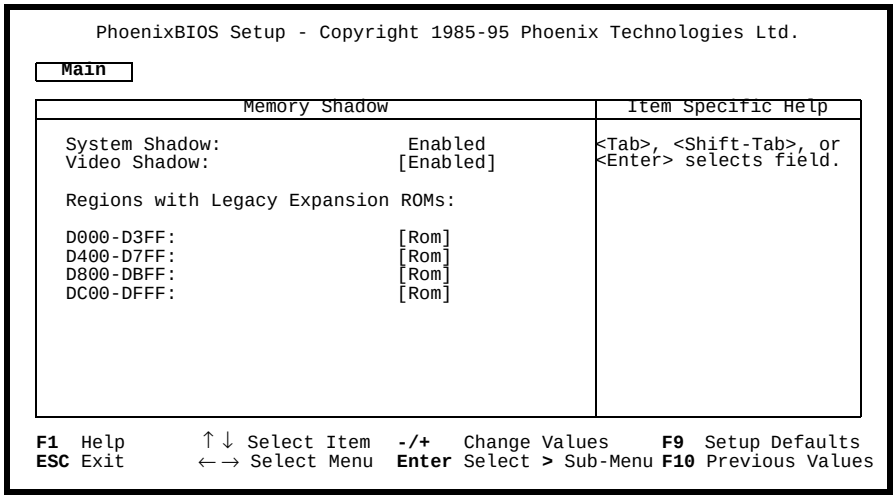


Figure 3-4. Memory Shadow Sub-Menu

System Shadow: This field is read-only (not editable) since the System BIOS is always shadowed.

Video Shadow: While it is advisable to leave video shadowing enabled, it is possible to disable video shadowing for system performance reasons. The default is **Enabled**.

Regions with Legacy Expansion ROMs: These fields enable a ROM or disable shadowing for the associated memory region. There are four 16 KB areas where expansion ROMs can be shadowed:

D000 - D3FF
D400 - D7FF
D800 - DBFF
DC00 - DFFF

The default for each of these is **ROM**.

The shadow regions should be used only if an EXMbus card is installed in the system that contains a BIOS extension (ROM), although there is no effect on the system if a region is shadowed that does not contain a BIOS extension. Note that each shadow region in the Setup menu is 16 KB in size. Multiple shadow regions may have to be enabled if the BIOS extension to be shadowed is larger than 16 KB.

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Boot Sequence Sub-Menu

The Boot Sequence Sub-Menu allows you to change options for the boot sequence. This sub-menu is shown below.

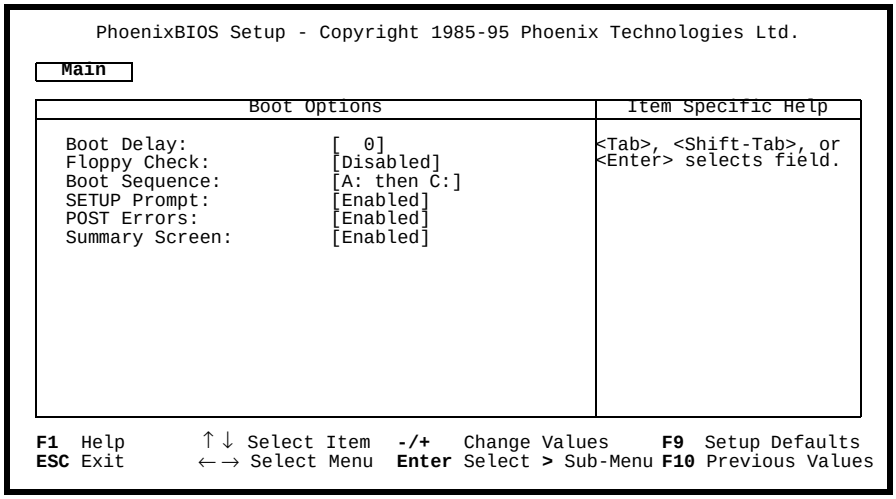


Figure 3-5. Boot Sequence Sub-Menu

Boot Delay: This field sets the system to delay booting for a time period in seconds. This allows for long start-up times on boot devices that spin up slowly. The default is **0** (zero) seconds.

Floppy Check: This field enables or disables the floppy (3.5-inch disk) drive search during the boot. To speed up booting, the floppy check should be disabled. It is still possible to boot from the A: drive even with the floppy check disabled. The default is **Disabled**.

Boot Sequence: This field defines how the system treats the floppy A: drive when booting. Booting can occur either from a floppy disk in the A: drive, or directly from the C: fixed disk drive. To reduce the amount of time required to boot, set the boot sequence to **C: only**. Note that the C: drive may be either an IDE or SCSI drive. The possible values are:

- **A: then C:** (default) Used to boot from the floppy drive or, if no floppy disk is present in the A: drive, to boot from the C: drive. This is useful for troubleshooting the operating system if a boot disk is in drive A:.
- **C: then A:** Used to boot from the C: drive or, if not present, to boot from the A: drive.
- **C: only** Used to boot from the C: drive without searching for an A: drive.

SETUP Prompt: This field enables or disables the message **Press F2 to enter Setup**. Even if the message is disabled, you can still press the **F2** function key at the appropriate time to enter the Main BIOS Setup Menu. To speed up booting, disable the SETUP Prompt. The default is **Enabled**.

POST Errors: When enabled, this field is used to stop progress during the boot process if the POST (power-on self-test) encounters errors. Otherwise, the system

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continues to attempt to boot despite any start-up error messages that are displayed. Note that this field only affects those errors that are configured at build-time to halt the system. The default is **Enabled**.

Summary Screen: This field is used to enable or disable a summary of the system configuration, which is displayed before the operating system starts to load. To speed up booting, disable the Summary Screen. The default is **Enabled**.

Keyboard Features Sub-Menu

This sub-menu, which is accessed from the Numlock: field in the Main BIOS Setup Menu, enables or disables various keyboard features. The Keyboard Features Sub-Menu is shown below.

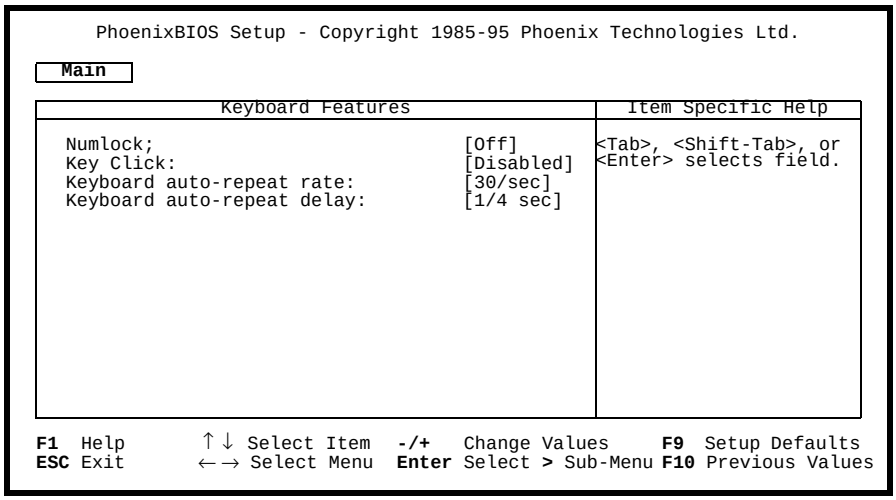


Figure 3-6. Keyboard Features Sub-Menu

Numlock: This field enables or disables the Numlock feature of the keyboard at boot time. When enabled, Numlock permits the use of the keypad numbers on the keyboard. The default is **Off**, which disables the Numlock key at boot time.

Key Click: This field enables or disables the key click feature on the keyboard. When enabled, the system produces an audible click each time a key is pressed. The default is **Disabled**.

Keyboard auto-repeat rate: This field sets the auto-repeat rate when a key is held down on the keyboard. The rates range from 2-30 per second. The default rate is **30/sec**.

Keyboard auto-repeat delay: This field sets the delay between when a key is pressed and when the auto-repeat feature begins. Options are **1/4**, **1/2**, **3/4**, and **1** (one) second. The default delay is **1/4 sec**.

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Advanced Menu

The Advanced Menu contains settings for integrated peripherals, memory shadow, cache, and large disk access mode. The Advanced Menu is shown below.

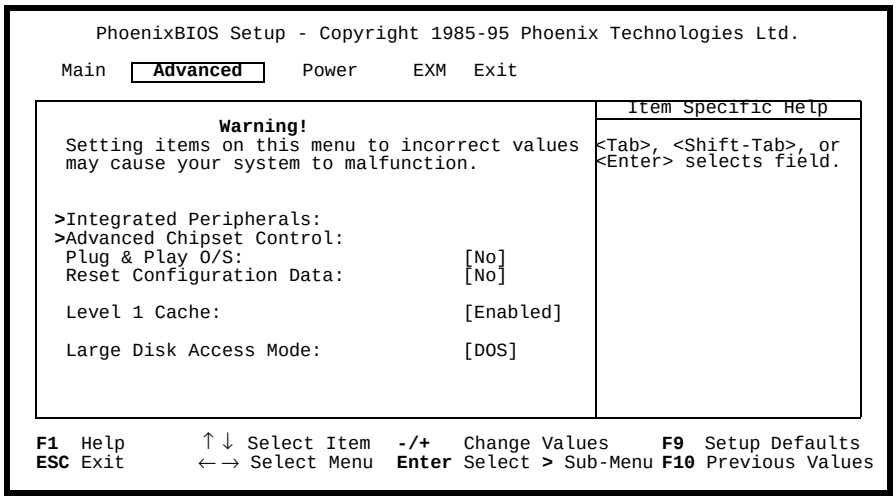


Figure 3-7. Advanced Menu

Integrated Peripherals Sub-Menu

This sub-menu is used to configure the onboard serial (COM) and parallel (LPT) ports, as well as the onboard disk controllers. For more information, see the "Integrated Peripherals Sub-Menu" subsection later in this chapter.

Advanced Chipset Control Sub-Menu

This sub-menu is used to configure the chipset. For more information, see the "Advanced Chipset Control Sub-Menu" subsection later in this chapter.

Plug & Play O/S:

If enabled, this field informs the System BIOS that the operating system which is booted supports Plug and Play. This forces the Plug and Play portion of the System BIOS to only configure motherboard devices and those peripherals that are necessary for booting (display, hard disk, and so forth), the rest being left to the operating system to configure. The default is **No** (disabled).

Reset Configuration Data:

If enabled, this field updates the Extended System Configuration Data (ESCD) block residing in FBD main block #2. This is necessary the first time a system is turned on or if the ESCD becomes corrupted. The default is **No** (disabled). This field is automatically reset to **No** after the ESCD is updated.

Level 1 Cache:

When enabled, this field speeds up the processor by enabling the Level 1 (L1) cache. If the L1 cache is disabled, system performance will suffer. The default is **Enabled**.

Large Disk Access Mode:

If a hard disk larger than 528 MB is being used, this field should be set either to **DOS** if running MS-DOS, or to **Other** if using a different operating system. Setting this field to **DOS** causes the system BIOS to perform cylinder/head translation if the drive is configured in BIOS Setup to have more than 1024 cylinders. This allows MS-DOS systems to use hard disks up to 8 GB (1024C X 255H X 63S) in size without special drivers or LBA.

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Integrated Peripherals Sub-Menu

This sub-menu is used to configure the onboard serial (COM) and parallel (LPT) ports, as well as the onboard disk controllers. The Integrated Peripherals Sub-Menu is shown below.

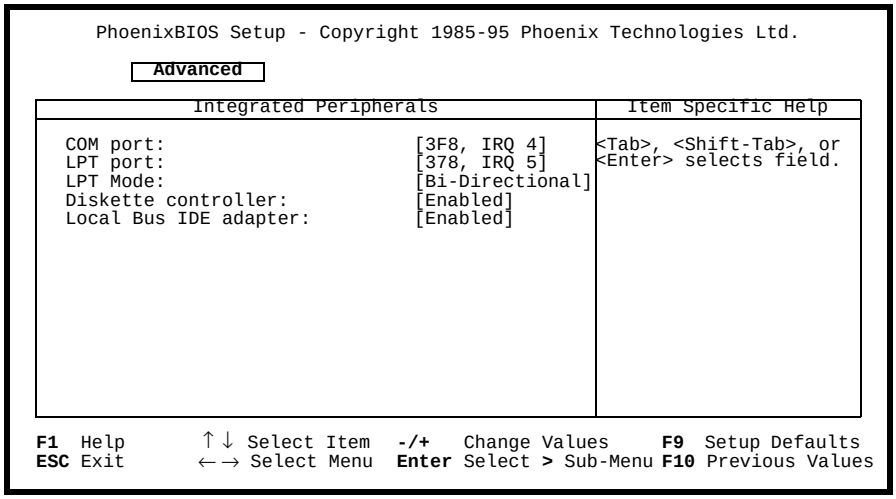


Figure 3-8. Integrated Peripherals Sub-Menu

COM port: This field configures the serial port labeled "COM1" on the front panel. The defaults for this COM port are I/O base **3F8H** and **IRQ4**.

LPT port: This field configures the parallel port labeled "LPT" on the front panel. The defaults for this LPT port are I/O base **378H** and **IRQ5**.

LPT Mode: This field sets the mode under which the LPT port operates. The selections are:

Output only
Bi-Directional (default)
ECP

Diskette Controller: This field enables or disables the onboard 3.5-inch disk (floppy) drive controller. The default is **Enabled**.

Local Bus IDE adapter: This field enables or disables the onboard PCIbus IDE hard disk controller. The default is **Enabled**.

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Advanced Chipset Control Sub-Menu

This sub-menu allows you to control selected settings for the chipset that affect performance or function. The Advanced Chipset Control Sub-Menu is shown below.

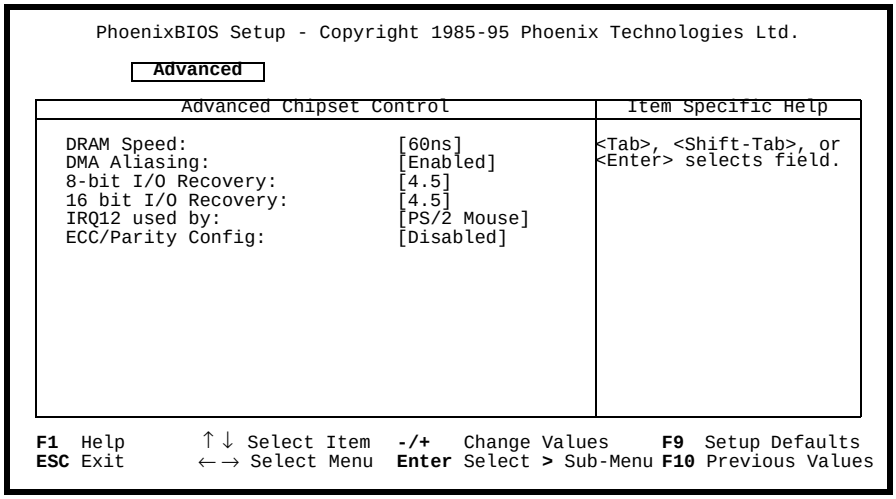


Figure 3-9. Advanced Chipset Control Sub-Menu

DRAM Speed: This field sets the speed of the installed DRAM SODIMMs. Selecting 70 ns for 60 ns SODIMMs decreases performance. Selecting 60 ns for 70 ns SODIMMs is invalid. The default is **60ns**.

DMA Aliasing: This field allows I/O accesses to the range 90-9FH (except 92H) to alias to 80-8FH. If an ISAbus device uses the address range 90-9FH, then this field must be disabled to access the device. The default is **Enabled**.

8-bit I/O Recovery: This field selects the number of ISAbus SYSCLKs to be inserted by the chipset between 8-bit back-to-back I/O accesses. Increasing the number of clocks decreases I/O performance but may allow slow devices to be accessed properly. Values can range from **3.5** through **11.5** SYSCLKs, in 1 SYSCLK increments. The default is **4.5** SYSCLKs.

16-bit I/O Recovery: This field selects the number of ISAbus SYSCLKs to be inserted by the chipset between 16-bit back-to-back I/O accesses. Increasing the number of clocks decreases I/O performance but may allow slow devices to be accessed properly. Values can range from **3.5** through **7.5** SYSCLKs, in 1 SYSCLK increments. The default is **4.5** SYSCLKs.

IRQ 12 used by: This field selects the routing of IRQ12. For systems without a PS/2 mouse, this field may be set to **ISA bus** to allow an ISAbus peripheral to use this interrupt line. Systems using a PS/2 mouse must have this field set to **PS/2 Mouse** (the default) for the mouse to operate correctly.

ECC/Parity Config: This field configures the DRAM controller to use no parity (**Disabled**), parity (**Parity**), or Error Checking and Correction (**ECC**) when accessing DRAM. Use of parity or ECC may improve system reliability since DRAM errors are likely to be detected by the chipset. Use of ECC allows for the detection of single and dual bit errors and the correction of single bit errors during DRAM reads. The parity and ECC selections require that all SODIMMs be x36 instead of x32. The no parity (disabled) selection can use

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either x32 or x36 SODIMMs. The default is **Disabled**. (Note that the VXI Pentium Controller is shipped with non-parity x32 DRAM.)

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Power Management Menu

This menu provides control over the power management facilities. As shown below, only about one-half of the Power Management Menu fields are visible at any one time; however, for completeness, all of the menu fields are listed and explained in this section. Use the **Page Up** and **Page Down** keys to display the other page of fields.

Note that the supported states for system BIOS Power Management are: Fully On, Standby Mode (partial power reduction), and Suspend Mode (maximum power reduction). Also note that the Power Management features are not implemented in the default setups.

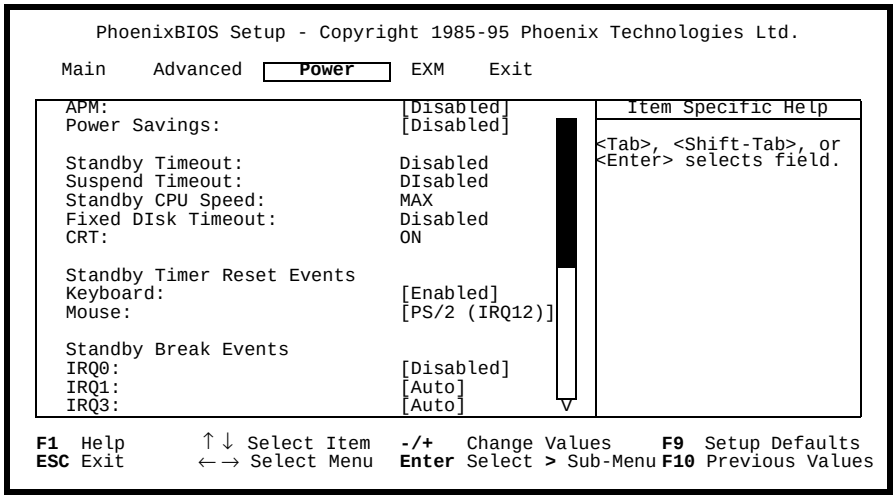


Figure 3-10. Power Management Menu

APM: This field enables or disables Advanced Power Management (APM). The default is **Disabled**.

Power Savings: This field enables and selects the kind of power management, or it disables power management. The possible values are:

Disabled (default)
Customize
Maximum
Medium
Minimum

Standby Timeout: This field enables and sets the inactivity duration required to elapse before the system is placed into Standby Mode, or it disables the Standby Timeout. The possible values are:

Disabled (default)
2 minutes
15 minutes
30 minutes
1 hour
2 hours

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3 hours
4 hours

Suspend Timeout: This field enables and sets the inactivity duration required to elapse before the system is placed into Suspend Mode from Standby Mode, or it disables the Suspend Timeout. The values are the same as for the Standby Timeout, listed above. The default is **Disabled**.

Standby CPU Speed: This field enables or disables the changing of the CPU speed based upon the current power management state. The possible values are:

Disabled
LOW
MEDIUM
HIGH
MAX (default)

Fixed Disk Timeout: This field enables and sets the inactivity duration of fixed disk accesses required to elapse before the system shuts off the disk drive, or it disables the Fixed Disk Timeout. The possible values are: **Disabled** (default), or **1**, **2**, **3**, **4**, **5**, **10**, or **16** minutes.

CRT: This field enables or disables power management of the CRT during system entry or exit into or from Standby Mode. The possible values are: **OFF in Standby** and **ON in Standby**. The default is **ON**.

Standby Timer Reset Events This group of fields enables or disables whether or not activity from the specified device causes the Standby Timer to be reset or not. The default is **Enabled**.

Keyboard: This field enables or disables keyboard activity to reset the Standby Timer or not. The possible values are: **Enabled** (default) and **Disabled**.

Mouse: This field enables or disables mouse activity to reset the Standby Timer or not. The possible values are:

Disabled
PS/2 (IRQ12) (default)
COM1 (IRQ4)
COM2 (IRQ3)

Standby Break Events This group of fields enables or disables a Standby Break Event for the specified IRQ. A Standby Break Event allows the system to run at full speed for the duration of the specified IRQ. Note that no such event is associated with IRQ2.

IRQ0-15: Each of these fields enables or disables the Standby Break Event for each IRQ. The possible values are: **Disabled** and **Auto**. The default setting for IRQ 1, 3, 4, and 12 is **Auto**. The default setting for all other IRQs is **Disabled**.

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Standby Wakeup Events This group of fields enables or disables the keyboard or mouse to cause a Standby Wakeup Event -- that is, these fields allow keyboard or mouse activity to return the system to full speed.

Keyboard: This field enables or disables the Standby Wakeup Event for the keyboard. The possible values are: **`Enabled`** (default) and **`Disabled`**.

Mouse: This field enables and selects the IRQ that the mouse is bound to for the purposes of mouse activity detection for power management, or disables the Standby Wakeup Event for the mouse. The possible values are:

`PS/2 (IRQ12)` (default)
`COM1 (IRQ4)`
`COM2 (IRQ3)`
`Disabled`

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EXM Menu

The fields in this menu allow you to change the settings for the EXM module in the system. The HP VXI Pentium Controller comes with an HP-22 GPIB interface module installed in EXM Slot 1 by default. The EXM Menu is shown below.

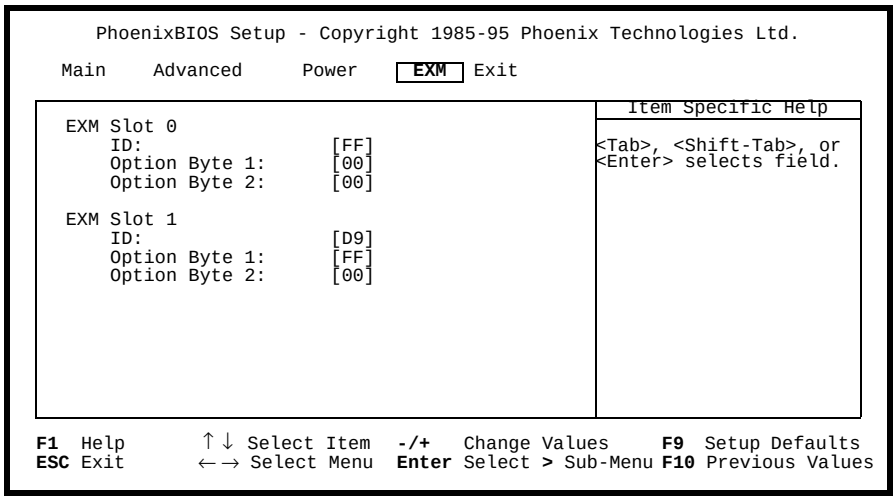


Figure 3-11. EXM Menu

ID: This field selects the EXM-ID for the HP-22 GPIB expansion module. The default is **FF** for Slot 0 and **D9** for Slot 1.

Option Byte 1: This field selects the I/O address selection for the HP-22. The default is **FF**, which corresponds to the I/O address 370-377, 770-777, B70-B77, and F70-F77. Other possible values are:

F9	250-257, 650-657, A50-A57 and E50-E57
FB	270-277, 670-677, A70-A77, and E70-E77
FD	350-357, 750-757, B50-B57, and F50-F57

To disable the HP-22, enter **00**.

Option Byte 2: This field is set to **00** (disabled/unused).

Caution **To configure a second HP-22 card in EXM Slot 0, make sure that it is not sharing the same I/O address as the first card pre-installed in EXM Slot 1. For information on configuring a second card, see the hardware reference manual shipped with the card.**

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Exit Menu

The fields in this menu allow you to save value settings and exit BIOS Setup, or abandon value changes and exit. The Exit Menu is shown below.

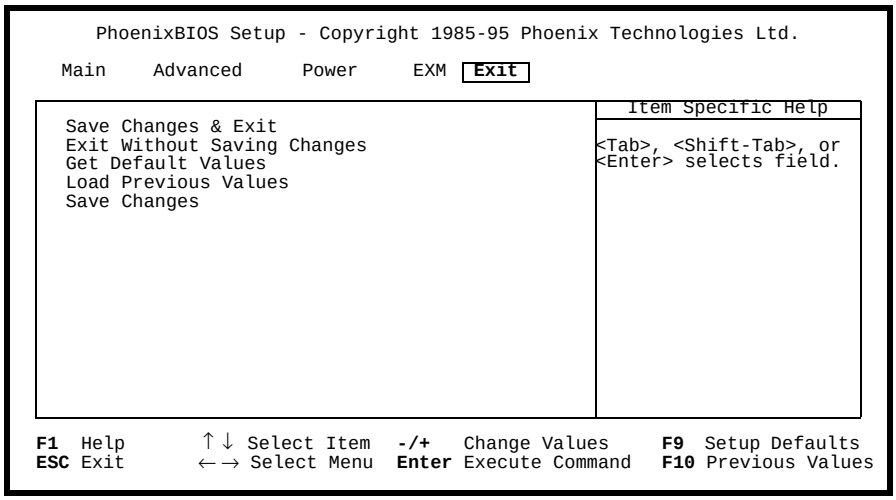


Figure 3-12. Exit Menu

Save Changes & Exit This field is used to save into CMOS the values that have been entered. The system then immediately reboots with the new values.

Exit Without Saving Changes This field is used to discard the changes just made and revert to the state when BIOS Setup was first entered. The system reboots with the old values.

Get Default Values This field is used to reset the BIOS Setup values to the original, default values that were set at the factory, before any suppliers or other end-users made changes. This is useful if you are having problems with the system and suspect changes made to the BIOS are the cause.

Load Previous Values This field is used to load the system with the previous values before an editing session started. This is useful if you lose track of edits and want to revert to the previous editing session, but not all the way back to the defaults.

Save Changes This field is used to save the edits made during a session. You do not exit, and you can continue to make changes.

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Chapter 4
Troubleshooting

About this Chapter

This chapter helps you resolve error messages or other common problems you may encounter while installing the VXI Pentium Controller hardware. This chapter contains the following troubleshooting sections:

- Abnormal LED Indicator States
- BIOS Error Messages
- Problems After Configuring the BIOS

Note For information on:

- The meaning of the LED indicators on the front panel of the controller, please see Appendix A.
- Using the BIOS Setup utility, please see Chapter 3.

Abnormal LED Indicator States

The state of the LEDs may indicate the following abnormal conditions.

Table 4-1. Abnormal LED Indicator States

LED	Abnormal State	Abnormal Condition
RUN	Not Lit	The CPU has halted. Blinking during operation is normal.
TEST	Stays Lit	The controller did not pass its power-on self-test (POST). This LED will normally be lit during the POST phase of the boot. Once POST is complete, it should go out.
SCSI	Stays Lit	SCSI port operation failed.
IDE	Stays Lit	IDE disk error.

Cycle the power to the controller to see if this problem rectifies itself. If the LED indicators are still in an abnormal state, please contact your HP Service and Support Center for assistance. See Appendix F, “POST Beep Codes”, for additional information that may be useful to service personnel.

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BIOS Error Messages

The following table lists the BIOS error messages you may encounter when powering up and using the VXI Pentium Controller and describes possible causes and fixes for the errors.

Note If a possible fix that is suggested in the following table requires you to run BIOS Setup, please see Chapter 3 for more information.

Table 4-2. BIOS Error Messages

BIOS Error Message	Description
Diskette drive A error or **Diskette drive B error**	Drive A: or B: is present but fails the BIOS power-on self-test (POST) for the particular 3.5-inch disk drive. Check to see that the drive is defined with the proper disk type in BIOS Setup. Also, if the disk drive is an external drive (rather than the internal drive), ensure that the disk drive is correctly connected.
EXM Configuration Error	The EXM module is not configured properly, or the BIOS cannot locate the module. Run BIOS Setup Utility to correct the configuration.
Extended RAM Failed at offset: *nnnn*	The extended memory is not working or is not configured properly at offset *nnnn*. Contact your HP Service and Support Center for assistance.
Failing Bits: *nnnn*	The hexadecimal number *nnnn* is a map of the bits at the RAM address (in System, Extended, or Shadow memory) which failed the memory test. Each 1 (one) in the map indicates a failed bit. Contact your HP Service and Support Center for assistance.
Fixed Disk 0 Failure or **Fixed Disk 1 Failure** or **Fixed Disk Controller Failure**	The fixed disk (internal hard disk drive) is not working or is not configured properly. Run BIOS Setup to ensure the disk type is correctly identified. If this does not fix the problem, contact your HP Service and Support Center for assistance.
Incorrect Drive A type - run SETUP or **Incorrect Drive B type - run SETUP**	The disk type for drive A: or B: is not correctly identified in BIOS Setup. Run BIOS Setup to set the correct disk type.
Invalid NVRAM media type	There is a problem with NVRAM (CMOS) access. Contact your HP Service and Support Center for assistance.

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Table 4-2. BIOS Error Messages (continued)

BIOS Error Message	Description
Keyboard controller error	The keyboard controller failed a system test. You may have to replace either the keyboard or the keyboard controller. Contact your HP Service and Support Center for assistance.
Keyboard error - Keyboard not working **Keyboard error** *nn*	The system BIOS discovered a stuck key and displays the scan code *nn* for the stuck key.
Keyboard locked - Unlock key switch	Unlock the system to proceed.
Monitor type does not match CMOS - Run SETUP	The monitor type is not correctly identified in BIOS Setup. Run BIOS Setup to set the correct monitor type.
Operating system not found	The Windows operating system cannot be located on either drive C: or drive A:. Run BIOS Setup to ensure drive C: (fixed disk/internal hard disk drive) and/or drive A: (the 3.5-inch disk drive) are properly identified.
Parity Check 1	A parity error was found in the system bus. If the system BIOS located the address where the parity error occurred, it will also display that address on the screen. Contact your HP Service and Support Center for assistance.
Parity Check 2	A parity error was found in the I/O bus. If the system BIOS located the address where the parity error occurred, it will also display it on the screen. Contact your HP Service and Support Center for assistance.
Press <F1> to resume, <F2> to Setup	This is displayed after any recoverable error message. Press the **F1** function key to start the boot process or the **F2** function key to enter BIOS Setup and change any settings.
Press <F2> to enter SETUP	This is not an error message. Instead, it is an optional, informational message that is displayed during the controller's power-on self-test (POST). Note that the display of this message can be turned off in BIOS Setup.
Previous boot incomplete - Default configuration used	The previous power-on self-test (POST) did not complete successfully. The POST then loads the default BIOS configuration values and offers to run BIOS Setup. If the failure was caused by incorrect BIOS values that were set and they are not corrected, the next boot will also likely fail. Therefore, ensure that all configuration values are re-set correctly in BIOS Setup. This error should then be cleared the next time the controller is booted.

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Table 4-2. BIOS Error Messages (continued)

BIOS Error Message	Description
Real time clock error	The real-time clock failed the system BIOS test. This may require repair of the board. Contact your HP Service and Support Center for assistance.
Shadow Ram Failed at offset: *nnnn*	The shadow RAM failed at offset *nnnn* of the 64 KB block at which the error was detected. Contact your HP Service and Support Center for assistance.
System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Have the battery replaced (contact your HP Service and Support Center for assistance). Then run BIOS Setup to reconfigure the controller.
System cache error - Cache disabled	The RAM cache failed the system BIOS test, and BIOS then disabled the cache. Contact your HP Service and Support Center for assistance.
System CMOS checksum bad - run SETUP	The system CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. Run BIOS Setup and reconfigure the controller either by restoring the default values or the previous values and/or making your own selections.
System RAM Failed at offset: *nnnn*	The system RAM failed at offset *nnnn* of the 64 KB block at which the error was detected. Contact your HP Service and Support Center for assistance.
System timer error	The timer test failed. This requires repair of the system board. Contact your HP Service and Support Center for assistance.

Problems After Configuring the BIOS

If your controller either fails, does not work properly, or displays error messages after you make configuration changes in BIOS Setup, you may be able to correct the problem by entering BIOS Setup again and restoring either the original, default BIOS configuration values, or the previous values. This can be done via either the “Get Default Values” or the “Load Previous Values” selection in the Exit Menu of BIOS Setup.

If after restoring the default or previous BIOS configuration values, your controller is still not functioning properly, contact your HP Service and Support Center for assistance.

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Appendix A
LEDs on the Front Panel

There are seven LED indicators on the front panel of the VXI Pentium Controller which provide information about the state of the controller. The following table lists the label, color, and meaning of each LED indicator.

Table A-1. LED Indicators

Label	Color	Meaning
RUN	Green	Lit whenever a write access is made to DRAM. If not lit, either the CPU is executing entirely out of the on-chip cache, or the CPU is halted.
SYSFAIL	Red	Lit whenever the VME SYSFAIL line is asserted.
TEST	Yellow	Reflects the state of the PASS bit in the VXI registers. Normally lit during the boot process until the controller passes all of its self-tests. If it remains lit, then PASS is 0 (zero), and the controller has failed its self-test.
MASTER	Green	Lit when a VME access is made by this device as a master.
SLAVE	Green	Lit when another VME device accesses the memory of this controller.
SCSI	Green	Lit when the SCSI port is busy.
IDE	Green	Lit when the IDE disk is busy.

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Appendix B
I/O, Memory, and IRQ Details

This appendix provides more detailed technical descriptions of the following for the VXI Pentium Controller:

- VGA video controller, including its BIOS extension
- SCSI controller, including its BIOS extension
- Ethernet controller
- Memory map
- IRQs (interrupts)

VGA Video Controller

The VXI Pentium Controller contains a PCI-based, super-VGA compatible video graphics controller with 2 MB of display memory. The VGA video controller resides on the PCIbus and is PCI device number 1.

The Video BIOS extension is shadowed and write-protected in the region 0x0C0000 to 0x0C7FFF (32 KB) on any system reset or power-up. The features of the Video BIOS include:

- Standard VGA modes up to 640 X 480 resolution with 16.8 million colors.
- Super-VGA modes up to 800 X 600 resolution with 16.8 million colors.
- Extended video modes up to 1280 X 1024 resolution with 256 colors (non-interlaced).

SCSI Controller

The SCSI BIOS extension is automatically shadowed in system DRAM at memory location 0x0C8000 to 0x0CFFFF.

The SCSI device resides on the PCIbus and is mapped as PCI device number 3. The SCSI controller uses PCIbus interrupt INTC. The default I/O base address and interrupt is 0xC180 and IRQ11, respectively.

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Ethernet Controller

The Ethernet controller resides on the PCIbus and is mapped as PCI device number 2. It uses PCIbus interrupt INTB.

Network booting is *not* supported.

The Ethernet port supports only a 10-base-T interface.

Memory Map

Table B-1. Memory Map

Pentium Address Range[a]	Region	Cached
00000000-0009FFFF	DRAM	Yes
000A0000-000BFFFF	VGA Memory	No
000C0000-000C7FFF	Shadowed VGA BIOS	Yes
000C8000-000CFFFF	Shadowed SCSI BIOS	Yes
000D0000-000DFFFF	On-board EXMbus	No
000E0000-000E3FFF	VXI Interface Chip	No
00100000-07FFFFFF	DRAM If no DRAM, ISA memory	Yes No
08000000-0FFFFFFF	EXMbus	No
10000000-1FFFFFFF	Reserved	No
20000000-3FFFFFFF	Reserved	No
40000000-7FFFFFFF	Reserved	No
80000000-83FFFFFF	VXI Interface Chip Image 0	No
84000000-87FFFFFF	VXI Interface Chip Image 1	No
88000000-8BFFFFFF	VXI Interface Chip Image 2	No
8C000000-8FFFFFFF	VXI Interface Chip Image 3	No
90000000-93FFFFFF	VXI Interface Chip Image 4	No
94000000-EFFFFFFF	Reserved	No
F0000000-FFF7FFFF	EXMbus	No
FFF80000-FFFFFFFF	Flash Boot Device	No

a.All addresses are hexadecimal.

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IRQs (Interrupt Request Lines)

Table B-2. IRQs (Interrupt Request Lines)

Interrupt	Source
IRQ0	Timer
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupt Input
IRQ3	COM2 (Not externally available) Use for second HP-22 on Windows 95
IRQ4	COM1
IRQ5	ECP Printer Port (LPT1) Use for second HP-22 on Windows NT
IRQ6	3.5-inch Disk Drive
IRQ7	Reserved for HP-22
IRQ8	Real-time Clock
IRQ9	VXI Interface Chip
IRQ10	VXI Interface Chip
IRQ11	SCSI
IRQ12	Mouse
IRQ13	Numeric Co-processor
IRQ14	IDE
IRQ15	Ethernet
NMI	EXMbus I/O Channel Check Asserted
SMI	Power Management
INTA	VGA (not mapped)
INTB	Ethernet (mapped to IRQ15)
INTC	SCSI (mapped to IRQ11)
INTD	VXI Interface Chip (mapped to IRQ9)

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Appendix C
Specifications

This appendix lists the environmental and electrical specifications for the VXI Pentium Controller. See the Declaration of Conformity at the front of this manual for information on EMC and Safety standards compliance.

Environmental

The following table defines the environmental specifications for the I/O base board in the VXI Pentium Controller.

Table C-1. Environmental Specifications

Characteristic	Operating Value	Non-Operating (Storage) Value
Temperature	5°C to 45°C, derated 2°C per 1,000 feet (300 meters) over 10,000 feet (3,000 meters); 2°C per minute maximum excursion gradient	-40°C to +65°C, 5°C per minute maximum excursion gradient
Humidity	8% to 90% non-condensing	5% to 95% non-condensing
Altitude	0 to 10,000 feet (3,000 meters)	0 to 40,000 feet (12,000 meters)
Vibration	0.015 inch (0.38 mm) P-P displacement with 2.5 g peak (maximum) acceleration over 5 to 300 Hz	0.030 inch (0.76 mm) P-P displacement with 5.0 g peak (maximum) acceleration over 5 to 300 Hz
Shock	30 g, 11 ms duration, half-sine shock pulse	50 g, 11 ms duration, half-sine shock pulse

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Electrical

The following table defines the electrical specifications for the controller's I/O base board.

Table C-2. VXI Pentium Controller Power Requirements[a]

Voltage	DC Current	Dynamic Current
+5 V dc	11 A	0.31 A
+12 V dc	40.2 mA	0.08 A
-12 V dc	2.4 mA	0.03 A
-2 V dc	120 mA	0.08 A
-5.2 V dc	335 mA	0.192 mA

a. These specifications are for an HP VXI Controller with a 166 MHz processor. The power requirements for a controller with a slower processor will be lower. The power requirements for a controller with a faster processor will be somewhat higher. Refer to your HP product's Technical Specifications data sheet for exact information.

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Appendix D
Installing BIOS Software

This appendix explains how to reflash the system BIOS in the HP VXI Pentium Controller from the controller's floppy disk drive. This process is rarely done *only* when the BIOS stored in the controller's flash memory has been damaged or when HP releases a new version of the BIOS to correct a specific problem or to add support for new system features.

Note The special BIOS boot diskette referred to in the instructions below is *not* shipped with your HP VXI Pentium Controller. If required, it must be obtained from an HP Support Representative.

Caution **It is strongly recommended that a trained computer service technician performs the installation and removal of the jumpers referred to in the instructions below. An HP Service Technician can perform this task for you. Contact your HP Service and Support Center for assistance.**

Overview

The HP VXI Pentium Controller's System BIOS is updated by using a special boot diskette that contains the System BIOS image as well as the code to perform the update.

To enable the recovery process and to allow writing to the flash memory which contains the BIOS, two jumpers must be installed on jumper-pin connector blocks located inside the controller. To access the jumper-pin connector blocks, the controller must be powered down and removed from the VXI mainframe in order to remove the side cover panel.

Once the jumpers have been installed and the controller returned to the VXI mainframe, the system must be booted with the special BIOS boot diskette loaded in the floppy disk drive. The recovery process will then automatically update the BIOS.

Once the recovery process is complete, the controller must be powered down and the jumpers removed before you can return to normal operation.

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Jumper Installation Procedure

Caution **The circuitry in the HP VXI Pentium Controller can be damaged by electrostatic discharge. All work must be done by a trained technician at a static-free workstation.**

Tools Required

You will need the following tools to access the controller's main circuit board and install the pin jumpers:

- two, 2-position, 2.5 mm, removable jumpers;
- a grounding wrist strap and static-free workstation; and
- a #0 (small) Phillips screwdriver.

Installation Steps

1. At a static-free workstation, place the HP VXI Pentium Controller on its left side such that the front panel is facing you and the sheet-metal cover with its bar-coded serial number is on the far edge away from you.
2. Attach the grounding strap to your wrist and take appropriate anti-static precautions during the rest of this procedure.
3. With the #0 Phillips screwdriver, remove the eight Phillips-head screws holding the sheet-metal cover to the chassis. Do not lose these very small screws. They will be needed to re-attach the cover.
4. Remove the sheet-metal cover and set it aside.

   The two jumper-pin connector blocks, labelled P7 and P8, are located just to the left of the power cable connector (see the multi-colored wire harness) on the main I/O base board near the rear-center of the unit.
5. Place a jumper to connect pin 7 to pin 8 on jumper block P7 and a jumper to connect pin 1 to pin 3 on jumper block P8 as shown below:

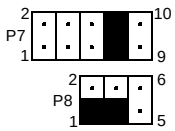


Figure D-1. Jumper-Pin Connector Blocks

6. Replace the sheet-metal cover such that the bent edges on the sides are down and the bar-coded serial number label is on the edge nearest the VXI connector blocks on the rear of the unit.

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7. Using the #0 Phillips screwdriver, replace the eight Phillips-head screws holding the sheet-metal cover to the chassis. Gently tighten the screws being careful not to strip the threads.

8. Return the controller to its slot in the VXI mainframe.

Booting the Special BIOS Boot Diskette

Perform the following procedure to boot the special BIOS boot diskette and write the system BIOS into the controller's flash memory:

Note The video monitor is not operative during the recovery process. The progress of the recovery is communicated to the operator via audible beeps from the controller's internal speaker.

1. With the VXI mainframe powered down, insert the special BIOS boot diskette into the controller's floppy disk drive.

2. Power on the VXI mainframe. The controller will start booting from its floppy disk drive.

   The boot program will issue three beeps when the actual recovery process begins. The first series of beeps from the recovery program denotes the reading of the System BIOS file. The last series of beeps denotes the erasing of the flash memory and reloading of the BIOS code. A final long beep denotes the successful recovery of the System BIOS and that the system is about to reset itself.

Note If the system will not boot from the floppy diskette and the system has SO DIMM installed in only the right memory bank (bank 1), move the memory from bank 1 to bank 0 (left bank) and retry this procedure. See Appendix E, "Installing Additional DRAM Memory", for instructions on how to move the memory.

3. When the final long beep has been issued and the system reset begins, you must immediately power down the VXI mainframe. Otherwise, the boot from the special BIOS boot diskette will start again and the recovery process will repeat.

4. Remove the HP VXI Pentium Controller from the VXI mainframe and take it to a static-free workstation in order to remove the jumpers you installed earlier.

Note Both jumpers must be removed to prevent later accidental writing of the System BIOS.

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5. Return to the section above titled **Jumper Installation Procedure** and follow the instructions to remove the cover panel. But, this time, remove the jumpers from jumper blocks P7 and P8.

You may resume normal operation once the jumpers have been removed, the panel cover reinstalled, and the controller has been returned to its slot in your VXI mainframe.

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Appendix E
Installing Additional DRAM Memory

This appendix explains how to install additional DRAM memory into the HP VXI Pentium Controller.

Caution **It is strongly recommended that a trained computer service technician installs any memory upgrade, as SO DIMMs are more flexible than common SIMMs and are also more costly if damaged. There is also potential for damage to the controller itself. An HP Service Technician can perform this task for you. Contact your HP Service and Support Center for assistance.**

The HP VXI Pentium Controller has four SO DIMM sockets supporting from 16 MB to 256 MB of dual-ported, DRAM memory. The standard controller comes with two SO DIMM modules installed in two sockets. This leaves two open sockets available for additional memory.

Please note that because the memory is interleaved, the sockets must be populated in pairs of identical SO DIMM modules. However, memory module densities of upgrades may be mixed. For example, if two 8 MB SO DIMM modules occupy the first two sockets, the remaining two sockets may be occupied by two SO DIMM modules of any other supported density. If mixed memory module densities are used, there is no dependency on the order in which the module pairs are loaded into the sockets pairs.

While the HP VXI Pentium Controller can support both 60ns and 70ns memory speeds, it is not recommend to mix memory of different speeds in the same unit. If you chose to ignore this recommendation and install slower speed 70ns memory in a unit which already has 60ns memory pre-installed, you *must* set the `DRAM Speed` setting in the BIOS Advanced Chipset Control Sub-Menu to `70ns` (See Chapter 3, “Using the BIOS Setup Utility”). This will cause all the memory in the unit to operate at the same, slower 70ns speed.

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Memory Specifications

The following table lists the memory specifications for the HP VXI Pentium Controller.

Table E-1. Memory Specifications

Type	EDO DRAM (Standard), Fast Page Mode DRAM (Not Recommended)
Form	SO (Small Outline) DIMM
Number of Pins	72
Voltage	3.3 V
Speed	60ns (Standard), 70ns (Not Recommended)
Bit Width	x32
Parity	No
Refresh Rate	1 K/sec, 2 K/sec, or 4K/sec
Density/SO DIMM	8 MB, 16 MB, 32 MB, or 64 MB[a]
Number of Sockets	4, interleaved
Minimum Size	16 MB (2x8 MB)
Maximum Size	256 MB (4x64 MB)

a.64 MB SO DIMMs require BIOS revision 1.01.04 or above.

Ordering HP Memory

Two additional memory kit products are available from Hewlett-Packard. Note that each kit includes two SO DIMMs of the appropriate size to result in the total memory upgrade size.

Table E-2. HP Memory Upgrade Kits

HP Product No.	Upgrade Size	SO DIMM Density
E6245A	16 MB	2x8MB
E6246A	32 MB	2x16MB

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Referenced Memory Parts

The following table lists the vendor and part number of other qualified memory parts. Please note that these memory modules must be ordered and installed in pairs.

Table E-3. DRAM Memory Parts List[a]

SO DIMM Density	Manufacturer Name	Mfg. Part Number
1x32 MB	Simple Technology, Inc.	STI328014D1-60VG
1x64 MB[b]	Unigen Corporation	UG316W3248HSG-6

a.These products are referenced by Hewlett-Packard. They are manufactured and sold by the respective manufacturer listed in this table. HP does not sell, distribute, warrant, or support these products.

b.64 MB SO DIMMs require BIOS Revision 1.01.04 or above.

Ordering Referenced Memory

Additional DRAM memory must be purchased directly from the referenced product manufacturer or its distributors. The contact information for each manufacturer listed below is supplied only for the convenience of the reader and is not guaranteed by HP to be correct or current.

Simple Technology, Incorporated
3001 Daimler Street
Santa Ana, California 92705
Sales & Technical Support: 1-800-367-7330
International Sales: (714) 476-1180
General Assistance: (714) 476-1180
Fax: (714) 476-1209
BBS: (714) 476-9034
Toll-Free fax-back service (international): 1-800-429-5626, ext. 500
E-Mail: info@simpletech.com
WWW: http://www.simpletech.com/

Unigen Corporation
45388 Warm Springs Boulevard
Fremont, California 94539
International Sales: (510) 668-2088
General Assistance: (510) 668-2088
Fax: (510) 661-2788
U.S. East Coast: 1-800-711-7140
U.S. West Coast: 1-800-826-0808
Other Offices: New York, Hong Kong, and Tokyo
E-Mail: unigen@ix.netcom.com
WWW: http://www.unigen.com/

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Installation Procedure

Caution

The integrated circuit components in these products can be damaged by electrostatic discharge. All work must be done by a trained technician at a static-free workstation.

The SO DIMM modules are fragile. Care must be taken to not bend or twist them during installation.

Tools Required

You will need the following tools to access the controller and install the SO DIMM modules:

- a grounding wrist strap and static-free workstation; and
- a #0 (small) Phillips screwdriver.

SO DIMM Installation Requirements

Ensure that the following requirements are met.

- SO DIMM modules must be installed in pairs with each module in a pair being identical.
- The SO DIMM modules being installed must be of the same type and speed, but not necessarily size, as the pre-installed modules.

Installation Steps

1. At a static-free workstation, place the HP VXI Pentium Controller on its left side such that the front panel is facing you and the sheet-metal cover with its bar-coded serial number is on the far edge away from you.
2. Attach the grounding strap to your wrist and take appropriate anti-static precautions during the rest of this procedure.
3. With the #0 Phillips screwdriver, remove the eight (8) Phillips-head screws holding the sheet-metal cover to the chassis. Do not lose these very small screws. They will be needed to re-attach the cover.
4. Remove the sheet-metal cover and set it aside.

   The CPU sub-module printed-circuit board is attached to the main I/O base board in the upper-right corner of the unit. Two memory banks, each with two SO DIMM sockets, are located on the CPU sub-module just above the CPU cooling fan. The right memory bank will already be occupied by the pre-installed SO DIMM modules. The new SO DIMM modules are to be inserted into the left memory bank.
5. Carefully remove the first SO DIMM module from its packaging. Take care to handle it only by its non-conductive edges and to not touch the pin-connectors.

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6. Orient the SO DIMM module such that the corner cutout on its pin-connector edge aligns with the matching corner bulge of the socket receptacle. This may result in the DRAM chips being on the top or bottom surface depending on the orientation of the memory bank sockets and the placement of the chips on the module.

   The SO DIMM modules and sockets are physically keyed to each other such that a module will fit into a socket only one way. Each SO DIMM module has a small, rounded cutout on one corner of its pin-connector edge. Each SO DIMM socket has a small, rounded bulge on one of its receptacle corners. The two parts fit into each other like a key. If the parts are not properly oriented in relationship to each other, you cannot insert the module into the socket.

7. The first SO DIMM module must be inserted into the lower socket of the memory bank. Slide the SO DIMM module at a slightly downward angle between the upper and lower retaining clips directing its pin-connectors into the lower socket.

8. Once the pin-connectors have made contact with the socket, gently press along the entire edge of the SO DIMM module to firmly seat the module into the socket. At the same time, the outside edge of the SO DIMM module should be tilted slightly downward such that the retainer clips of the socket engage the matching retainer cutout slots on the module's top and bottom edges.

9. Repeat steps 5 and 6 for the second SO DIMM module.

10. The second SO DIMM module must be inserted into the upper socket of the memory bank. Slide the SO DIMM module at a slightly downward angle above the upper retaining clips directing its pin-connectors into the upper socket.

11. Repeat step 8 for the second SO DIMM module.

12. Replace the sheet-metal cover such that the bent edges on the sides are down and the bar-coded serial number label is on the edge away from you.

13. With the #0 Phillips screwdriver, replace the eight (8) Phillips-head screws holding the sheet-metal cover to the chassis. Tighten the screws gently being careful not to strip the threads.

The installation of the memory upgrade is now complete. When power is next applied to the HP VXI Pentium controller, the system BIOS will automatically detect and configure the new memory.

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Appendix F
POST Beep Codes

If valid BIOS code cannot be loaded from the BIOS memory, the controller will issue two beeps and halt the CPU.

The rest of this appendix lists the codes which are written to the diagnostic port of the HP VXI Pentium Controller during the power-on self-test (POST) phase of the system boot. The POST Codes listed in the tables below are viewable only by HP service personnel with the proper diagnostic equipment.

The audible Beep Codes listed in the tables below will be issued only when the associated self-test detects a failure. This information, if available, is useful to the HP Service and Support Center when you report a problem.

Phoenix NuBIOS Checkpoints

The Phoenix NuBIOS writes a number of checkpoints to I/O port 80h just before each self-test is executed. Note that the execution order of the POST tests generally follows the order listed in the tables below, but not exactly.

Table F-1. Phoenix NuBIOS Checkpoint Codes

Beep Code	POST Code	Checkpoint Description
	02h	Verify Real Mode
	04h	Get CPU type
	06h	Initialize system hardware
	08h	Initialize chipset registers with initial POST values
	09h	Set in POST flag
	0Ah	Initialize CPU registers
	0Ch	Initialize cache to initial POST values
	0Eh	Initialize I/O
	10h	Initialize Power Management
	11h	Load alternate registers with initial POST values
	12h	Jump to UserPatch0
	14h	Initialize keyboard controller
1-2-2-3	16h	BIOS ROM checksum
	18h	8254 timer initialization
	1Ah	8237 DMA controller initialization

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Table F-1. Phoenix NuBIOS Checkpoint Codes (continued)

Beep Code	POST Code	Checkpoint Description
	1Ch	Reset Programmable Interrupt Controller
1-3-1-1	20h	Test DRAM refresh
1-3-1-3	22h	Test 8742 Keyboard Controller
	24h	Set ES segment to register to 4GB
	28h	Autosize DRAM
	2Ah	Clear 512KB base RAM
1-3-4-1	2Ch	Test 512KB base address lines
1-3-4-3	2Eh	Test 512KB base memory
	32h	Test CPU bus-clock frequency
	37h	Reinitialize the chipset
	38h	Shadow system BIOS ROM
	39h	Reinitialize the cache
	3Ah	Autosize cache
	3Ch	Configure advanced chipset registers
	3Dh	Load alternate registers with CMOS values
	40h	Set Initial CPU speed
	42h	Initialize interrupt vectors
	44h	Initialize BIOS interrupts
2-1-2-3	46h	Check ROM copyright notice
	47h	Initialize manager for PCI Option ROMs
	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
	52h	Test keyboard
	54h	Set key click if enabled
	56h	Enable keyboard
2-2-3-1	58h	Test for unexpected interrupts

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Table F-1. Phoenix NuBIOS Checkpoint Codes (continued)

Beep Code	POST Code	Checkpoint Description
	5Ah	Display prompt “Press F2 to enter SETUP”
	5Ch	Test RAM between 512KB and 640KB
	60h	Test extended memory
	62h	Test extended memory address lines
	64h	Jump to UserPatch1
	66h	Configure advanced cache registers
	68h	Enable external and CPU caches
	6Ah	Display external cache size
	6Ch	Display shadow message
	6Eh	Display non-disposable segments
	70h	Display error messages
	72h	Check for configuration errors
	74h	Test real-time clock
	76h	Check for keyboard errors
	7Ch	Set up hardware interrupts vectors
	7Eh	Test coprocessor if present
	80h	Disable onboard I/O ports
	82h	Detect and install external RS232 ports
	84h	Detect and install external parallel ports
	86h	Re-initialize onboard I/O ports
	88h	Initialize BIOS Data Area
	8Ah	Initialize Extended BIOS Data Area
	8Ch	Initialize floppy controller
	90h	Initialize hard disk controller
	91h	Initialize localbus hard disk controller
	92h	Jump to UserPatch2
	94h	Disable A20 address line
	96h	Clear huge ES segment register
	98h	Search for option ROMs
	9Ah	Shadow option ROMs

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Table F-1. Phoenix NuBIOS Checkpoint Codes (continued)

Beep Code	POST Code	Checkpoint Description
	9Ch	Set up Power Management
	9Eh	Enable hardware interrupts
	A0h	Set time of day
	A2h	Check keylock
	A8h	Erase F2 prompt
	AAh	Scan for F2 keystroke
	ACh	Enter SETUP
	AEh	Clear in-POST flag
	B0h	Check for errors
	B2h	POST done--prepare to boot operating system
	B4h	One beep
	B6h	Check password (optional)
	B8h	Clear global descriptor table
	BCh	Clear parity checkers
	BEh	Clear screen (optional)
	BFh	Check virus and backup reminders
	C0h	Try to boot with INT19

Table F-2. Phoenix NuBIOS Auxiliary Checkpoint Codes

Beep Code	POST Code	Checkpoint Description
	D0h	Interrupt handler error
	D2h	Unknown interrupt error
	D4h	Pending interrupt error
	D6h	Initialize option ROM error
	D8h	Shutdown error
	DAh	Extended Block Move
	DCh	Shutdown 10 error

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Table F-3. Phoenix NuBIOS Boot Block Checkpoint Codes

Beep Code	POST Code	Checkpoint Description
	E2h	Initialize the chipset
	E3h	Initialize refresh counter
	E4h	Check for Forced Flash
	E5h	Check HW status of ROM
	E6h	BIOS ROM is OK
	E7h	Do a complete RAM test
	E8h	Do OEM initialization
	E9h	Initialize interrupt controller
	EAh	Read in bootstrap code
	EBh	Initialize all vectors
	ECh	Boot the Flash program
	EDh	Initialize the boot device
	EEh	Boot code was read OK

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Index

B

Beep Codes, 67
BIOS extension
  SCSI, 51
  VGA video, 51
BIOS Setup utility
  Advanced Menu, 35
    Advanced Chipset Control Sub-Menu, 37, 61
    Integrated Peripherals Sub-Menu, 36
  configuration procedures, 27
  error messages, 46
  Exit Menu, 43
  exiting without saving changes, 43
  EXM Menu, 42
  Main BIOS Setup Panel, 28
    Boot Sequence Sub-Menu, 33
    IDE Adapter 0 Sub-Menus, 29
    Keyboard Features Sub-Menu, 34
    Memory Cache Sub-Menu, 31
    Memory Shadow Sub-Menu, 32
    Numlock (Keyboard Features) Sub-Menu, 34
  Power Management Menu, 39
  problems after configuring, 48
  restoring default values, 43
  restoring previous values, 43
  saving changes and exiting, 43
  saving changes without exiting, 43
  setting internal clock, 23
BIOS, recovery from diskette, 57

C

Card cage, installing controller in, 20
Checklist, before power-up, 23
Clock, setting, 23
Configuring
  BIOS Setup utility, 27
  controller hardware, 17
  list of possible steps, 24
Conformity, Declaration of, 3
  EMC, 3
  safety, 3
Connecting peripherals to the controller, 22
Connectors on front panel, 16
Controller
  BIOS error messages, 46
  BIOS Setup utility, 27
  connecting peripherals, 22
  connectors on front panel, 16
  customizing, 24
  diagnostic beep codes, 67
  electronic components, 14
  Ethernet controller, 52
  front panel, 15
  hardware installation and configuration, 17
  installing in VXI card cage, 20
  installing memory, 61
  installing other interfaces, 20
  IRQs, 53
  LED abnormal states, 45
  LEDs on front panel, 49
  memory map, 52
  memory specifications, 62
  overview, 13
  ports on front panel, 16
  powering up, 23
  problems after configuring the BIOS, 48
  SCSI Controller and BIOS extension, 51
  setting internal clock, 23
  specifications, 55, 67
  troubleshooting, 45
  verifying the product package, 18
  VGA video controller and BIOS extension, 51
Customizing
  BIOS Setup utility, 27
  list of possible steps, 24

D

Date/time, setting, 23
Declaration of Conformity, 3
Diagnostic beep codes, 67

E

Electrical specifications, 56
EMC conformation, 3
Environmental specifications, 55
Error codes, self-test, 67

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Error messages, BIOS, 46

F

Flashing, BIOS software, 57
Front panel, 15

H

Hardware
- BIOS error messages, 46
- BIOS Setup utility, 27
- connectiong peripherals, 22
- connectors on front panel, 16
- customizing, 24
- diagnostic beep codes, 67
- electronic components, 14
- Ethernet controller, 52
- front panel, 15
- installation and configuration, 17
- installing controller in VXI card cage, 20
- installing memory, 61
- installing other interfaces, 20
- IRQs, 53
- LED abnormal states, 45
- LEDs on front panel, 49
- memory specifications, 62
- ports on front panel, 16
- powering up, 23
- problems after configuring the BIOS, 48
- SCSI Controller and BIOS extension, 51
- troubleshooting, 45
- VGA video controller and BIOS extension, 51

I

Installing
- BIOS software, 57
- controller hardware, 17
- controller in VXI card cage, 20
- interfaces, 20
- memory, 61
- peripherals, 22

Interfaces, installing, 20
Internal clock, setting, 23
IRQs (interrupt request lines)
- list of, 53

K

Keyboard, connecting to the controller, 22

L

LED indicators
- on front panel, 49
- RUN or TEST LED abnormal states, 45

M

Memory map, 52
Memory specifications, 62
Memory speed, setting in BIOS, 61
Memory, installing DRAM, 61
Monitor (VGA), connecting to the controller, 22
Mouse, connecting to the controller, 22

N

Networking, Ethernet controller, 52

P

Ports on front panel, 16
POST beep codes, 67
Powering up the controller, 23
Pre-Power checklist, 23
Problems after configuring the BIOS, 48
Problems, troubleshooting, 45
Product package, verifying, 18

R

Recovering BIOS software, 57
RUN LED not lit, 45

S

Safety conformation, 3
SCSI Controller and BIOS extension, 51
Self-test beep codes, 67
Setting internal clock, 23
Setting up
- BIOS, 27
- hardware, 17

Software
- installation and configuration
  - E6232A and E6233A, 25

Specifications
- electrical, 56
- environmental, 55
- See also Conformity

T

TEST LED lit, 45

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Time/date, setting, 23
Troubleshooting
BIOS error messages, 46
LED abnormal states, 45
problems after configuring the BIOS, 48
self-test beep codes, 67

V

Verifying the product package, 18
VGA Monitor, connecting to the controller, 22
VGA video controller and BIOS extention, 51
VXI card cage, installing controller in, 20
VXI Pentium Controller
BIOS error messages, 46
BIOS Setup utility, 27
connectiong peripherals, 22
connectors on front panel, 16
customizing, 24
diagnostic beep codes, 67
electronic components, 14
Ethernet controller, 52
front panel, 15
hardware installation and configuration, 17
installing in VXI card cage, 20
installing other interfaces, 20
IRQs, 53
LED abnormal states, 45
LEDs on front panel, 49
memory map, 52
memory specifications, 62
overview, 13
ports on front panel, 16
powering up, 23
problems after configuring the BIOS, 48
SCSI Controller and BIOS extension, 51
setting internal clock, 23
specifications, 55, 67
troubleshooting, 45
verifying the product package, 18
VGA video controller and BIOS extension, 51
VXI pentium Controller
installing memory, 61

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