digital

**MCS
LOGISTICS
ENGINEERING**

Service
Maintenance
Manual

PRIORIS HX MP
Server

K-MN00000-03-JG00.A

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Preface

The Digital PRIORIS HX MP Service Maintenance Manual is a troubleshooting guide that can be used for reference when servicing the PRIORIS HX MP Server series.
Digital Equipment Corporation reserves the right to make changes to the Digital PRIORIS HX MP Server without notice. Accordingly, the diagrams and procedures in this document may not apply to the computer(s) you are servicing since many of the diagnostic tests are designed to test more than one product.

CAUTION

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

Chapter 1   Product Description

Product Introduction

The PRIORIS HX MP Server family is a family of high-performance, highly-scaleable network and application servers featuring the latest in modular CPU and storage technology. Developed using the following state-of-the-art technology, the PRIORIS HX MP Servers are the most advanced servers in their class.

The PRIORIS HX MP server family also provides investment protection through CPU upgrade technology. This technology enables to easily upgrade to a higher-performance CPU by simply installing a new CPU module or modules.

The PRIORIS HX MP server family provides the following features:

♦   **CPU Module**
    Symmetrical multi-processing (SMP) Intel Pentium one (1P), two (2P), or four (4P) processor options available. Operates using a 128-bit memory interface and one external, 512 KB burst write-back cache modules per CPU. All modes support a 32-bit PCI interface.

♦   **Memory Module**
    One or two memory modules available. 128-bit (single module) or 256-bit (dual modules) ECC protected-memory data path using standard parity SIMMs. 16 SIMM sockets on a single memory module capable of supporting 32 MB to 512 MB (up to 1 GB with two modules). Two-way (single module) and four-way (dual modules) memory interleaving is provided for faster memory access.

♦   **PCI SCSI Adapter**
    A dual-channel PCI Fast Wide SCSI adapter board occupies a single PCI option slot in base servers.

♦   **PCI RAID Adapter**
    Single or three-channel PCI RAID adapter board in RAID-ready servers enable to manage data distribution using multiple disk drives.

♦   **Integrated Device Array Storage Bay**
    Supports up to seven 3½-inch, wide or narrow SCSI, hot-swap devices for configuring a mass storage array using Storage Building Blocks (SBBs).

PRIORIS HX MP

♦   **Expansion Slots**
Five EISA slots, five PCI slots, and one shared EISA/PCI slot for a total of 11 slots for maximum expandability.

♦   **Onboard Video Controller**
Onboard Cirrus 5428 video controller. 512 KB video RAM supporting 800 x 600 at 256 colors and 1024 x 768 at 16 colors.

♦   **Redundant Fans and Power Supply**
For added reliability, the server has redundant fans for cooling and the option to add a second power supply or an additional fan.

♦   **Operator Control Panel (OCP)**
Back-lit, 16-character LCD display that shows power-on status messages each time the server boots. The operator control panel can be lit by pressing a manual switch on the front bezel.

♦   **Pedestal Cabinet**
Optional floor-mounted pedestal cabinet available. This cabinet is modular with its own power supply blowers and SCSI cable connectors.

Product Models Information

PRIORIS HX 5100MP Systems

Model	CPU	Memory	Cache	HDD	Host Controller	CD-Rom
FR−890WW−AA	Single Pentium	32 MB ECC	512KB	None	Adaptec 2940W	SCSI-2, 600 KB/sec
FR−890WW−AB	Single Pentium	32MB ECC	512KB	None	SCSI-2 RAID	SCSI-2, 600 KB/sec
FR−890WW−AC	Single Pentium	32MB ECC	512KB	3 x 2GB, SBB	SCSI-2 RAID	SCSI-2, 600 KB/sec
FR−891WW−AA	Two Pentium	64MB ECC	512KB[1]	None	Adaptec 2940W	SCSI-2, 600 KB/sec
FR−891WW−AB	Two Pentium	64MB ECC	512KB[1]	None	SCSI-2 RAID	SCSI-2, 600 KB/sec
FR−891WW−AC	Two Pentium	64MB ECC	512KB[1]	3 x 2GB, SBB	SCSI-2 RAID	SCSI-2, 600 KB/sec
FR−892WW−AA	Four Pentium	128MB ECC	512KB[1]	None	Adaptec 2940W	SCSI-2, 600 KB/sec
FR−892WW−AB	Four Pentium	128MB ECC	512KB[1]	None	SCSI-2 RAID	SCSI-2, 600 KB/sec
FR−892WW−AC	Four Pentium	128MB ECC	512KB[1]	3 x 2GB, SBB	SCSI-2 RAID	SCSI-2, 600 KB/sec

[1] 512KB cache per processor.

Chapter 2　Server Utilities & Configuration

Server Utilities

Introduction

This chapter explains how to use the CD-ROM disk and the Startup/Utility diskette to access the server utilities and operating system-specific device drivers.
Use the CD-ROM disk to access the "Getting Started" program.

♦　SCSI, enables the server to operate using an Adaptec 2940 or 3940 SCSI controller.
♦　Mouse, enables the server to operate using a Logitech mouse.
♦　Video, enables the server to operate using the onboard Cirrus 5428 video controller.

Use the Startup/Utility diskette to:

♦　Run EPP3SMC.EXE for enhanced printer port capabilities.
♦　Access the "Getting Started" program on the CD-ROM disk if the server does not have an operating system installed or an operating system other than Windows for Workgroups.
♦　Access the README.TXT file for the most current information on the server.

PHLASH.EXE

All servers have BIOS software in a read-only, non-volatile memory (ROM) chip. This BIOS initializes hardware and boots the operating system when the server is turned on. The BIOS also provides access to other services such as keyboard and disk drives.

The server comes equipped with flash memory. This means that the server's BIOS can simply restored by running the PHLASH.EXE utility. The server's BIOS can also be upgraded to future releases by running PHLASH.EXE along with any flash BIOS update diskette, if necessary.

PHLASH.EXE and BIOS updates are available on the Digital Bulletin Board (BBS).

Using EPP3SMC.EXE

EPP3SMC.EXE is a device driver for configuring the parallel port as an enhanced parallel port (EPP). Before loading this device driver, check the documentation for the device to be connected to the parallel port and make sure it supports EPP mode. If it does not, this device driver does not need to be loaded.

If the device does support EPP mode:

1)   Copy EPP3SMC.EXE from the Startup/Utility diskette to the hard disk drive.
     Note the path where the driver is located.
2)   Edit the CONFIG.SYS file to enter the path for EPP3SMC.EXE.
     Refer to the DOS documentation for information on editing the CONFIG.SYS file. For example a line in the CONFIG.SYS might be:
     device=C:\epp3smc.exe
3)   Save the new version of the CONFIG.SYS file.
4)   Press **[Ctrl]** + **[Alt]** + **[Del]** to reboot the server.
5)   Before POST completes, press **[F2]** to enter Setup.
6)   Choose the Advanced Menu in Setup and select Parallel Port Mode.
7)   Choose EPP mode.
8)   Select `Save Changes` and `Exit` to save the new setting.

The server will then automatically reboot, the parallel port is now configured as an EPP port.

Configuring The Server

Introduction

This chapter provides detailed information on how to configure the server when relocating, adding, or removing EISA/ISA/PCI expansion boards and how to change the server's factory-defined BIOS Setup options.

The server was pre-configured at the factory using the System Configuration Utility (SCU). This means that the server's hardware (CPU, memory, cache, mass storage devices, expansion boards, etc.) has been identified and configured for optimum performance. When necessary to make changes to this configuration, Digital recommends to use the SCU along with the information provided in this chapter.

Configuring Expansion Boards

Each time an EISA/ISA/PCI expansion board is added, removed, or relocated, the SCU must be run to identify their operating characteristics, server resource requirements, and slot locations. Based on this information, the SCU will then automatically assign the proper server resources to EISA expansion boards and provide information on what jumper or switch settings need to be manually set on ISA expansion boards to avoid resource conflicts.

The SCU identifies an expansion board's operating characteristics and resource requirements through Configuration (.CFG) files. These files contain main logic board, EISA, PCI, and ISA expansion board vital characteristics and the server resources they require for proper operation. When additional EISA, PCI, or ISA expansion boards are installed, make sure to copy the CFG files (and overlays, if applicable) supplied with the expansion boards, to the System Configuration Utility diskette before attempting to configure the server.

If a configuration file is not available for a specific ISA expansion board, use the supplied generic ISA expansion board configuration file. Note that this file will only supply basic ISA information and will not identify potential resource conflicts or the correct jumper and switch settings. Use the documentation that came with the ISA expansion board to properly configure it for use in the server.

BIOS Setup Options

Digital recommends to use the SCU (instead of the BIOS Setup utility) When a change of any of the setup options listed at the end of this chapter is needed. These options may be accessed using "Step 3: View and Edit Details" from the "Configure the Computer" menu.

NOTE	Although the BIOS Setup utility is separate from the SCU, the SCU will automatically update the BIOS settings. In most cases, the server will operate according to the most recent changes regardless of which utility has been used to make changes. However, Digital recommends to use the SCU to configure the server each time you add hardware, remove hardware, or change server settings to ensure that the server operates properly.

As an added feature, the SCU creates and stores all setup changes in a System Configuration (SCI) file. Afterwards, this SCI file can be used on any PRIORIS HX MP Server that is equally configured and can serve as a backup to the EISA configuration stored in NVRAM memory. The SCI file is maintained on the System Configuration Utility diskette and has a default name of SYSTEM.SCI.

SCU Diskette(s)

The SCU comes with the server on five separate language diskettes. These diskettes contain the SCU utility and the necessary files to configure expansion boards.

NOTE	Each time an EISA or ISA expansion board is added, it is important to copy all associated .CFG files to the appropriate SCU diskette before attempting to configure the server. The SCU needs this information to properly assign server resources and to maximize overall server performance.

When to Run the SCU

Always run the SCU each time ISA and EISA expansion cards are added, removed, or relocated, so no two boards use the same server resources (IRQs, I/O address, memory address, etc.).
For ISA expansion boards, run the SCU *before* adding, removing, or relocating. Running the SCU first can identify and resolve resource conflicts, as well as indicate the proper switch settings to configure ISA expansion boards.
For EISA and PCI expansion boards, run the SCU *after* adding, removing, or relocating. In this case, the SCU will automatically assign the proper server resources to the EISA expansion boards so they will operate correctly.

NOTE	If the server detects an expansion board configuration conflict, a warning message appears directing you to run the SCU to correct the problem.

Before Using the SCU

Perform the following procedures before using the SCU:

1)   Read any README files contained on the System Configuration Utility diskette(s) for additional information.
2)   Install any optional hardware, for example disk drives, EISA or PCI expansion boards, memory, etc.
3)   Make a backup copy of the supplied System Configuration Utility diskette. Store the original in a secure place and only use the backup copy when running the SCU. When unable to make a backup copy, use the original diskette cautiously.

NOTE	It is recommended not to install the SCU or any of its utilities on a hard disk drive. Running the SCU or any of its utilities from a hard disk drive might cause memory conflicts between the SCU and application software. This specifically applies to memory managers and Windows applications.

SCU Keyboard Function Keys

The following table lists the keyboard function keys used to scroll through the menu screens, and select specific menu items in the SCU.

Keyboard Key	Function
[↓]	Moves the cursor down one menu item.
[↑]	Moves the cursor up one menu item.
[→]	Moves the cursor one character to the right.
[←]	Moves the cursor one character to the left.
[Enter]	Displays the available user-selectable settings for the highlighted option or selects the highlighted menu item.
[F6]	Displays available resources (IRQs, DMAs, I/O ports, or memory) for the highlighted option.
[F10]	Press [F10] to complete a step.
[F1]	Displays the selected menu item's help screen.
[Esc]	Returns the monitor screen to the previously selected menu item.

Starting and Using the SCU

Perform the following procedures to start and use the SCU options shown in Figure 2-1. If this is the first time using the SCU, it is recommended to follow the procedures in the order given. If this is a subsequent session, refer to the appropriate sections in this chapter to change the server's configuration.
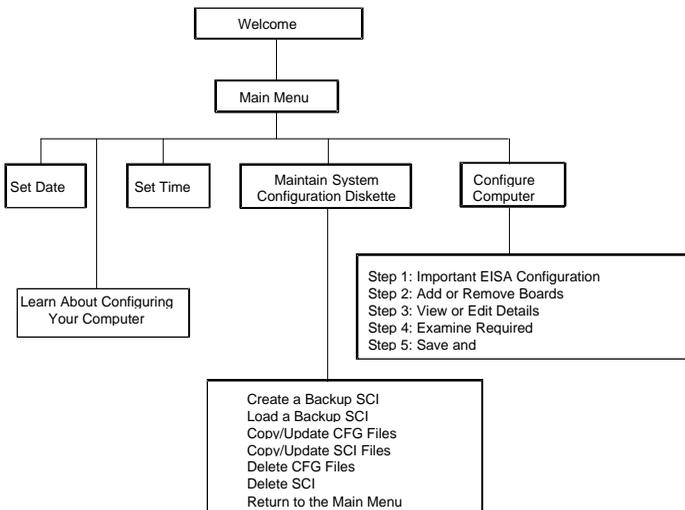
Figure 2 - 1 SCU Main Menu Options

To start and use the SCU:
1) Turn on the server and allow the POST to complete.
   If POST detects an error refer to *Chapter 4*, "*Troubleshooting*", and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.
2) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server. Press **[Enter]** and the SCU introductory screen appears.

| NOTE | The SCU contains help pop-up screens for any selected menu item. Press **[F1]** at anytime to display a help screen. Press **[Esc]** to remove a help screen. |

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3) Press **[Enter]** to display the SCU Welcome screen.
   If no configuration errors appear, the Welcome screen displays information about the SCU. Press **[Enter]** to display the Main menu and proceed to Step 5.
   If a configuration error appears, the Welcome screen displays information about the error and tells to reconfigure the server.
4) Press **[Enter]** to display the Main menu, select the `Configure Computer` option, then select the `View and Edit Details` option.
5) Make any changes as indicated by the configuration error message, and then select the `Save and Exit` option to end the SCU session and boot the server so the changes take effect.
6) If applicable, select the `Learn About Configuring The Computer` option to get familiar with the SCU.
7) If applicable, set the current server time and date using the `Set Time` and `Set Date` menu options.
8) Using the `Maintain System Configuration Diskette` option, copy the CFG files supplied with any EISA or ISA expansion board.
9) Select the `Configure Computer` option to configure the server.
10) To end the SCU session select the `Exit From This Utility` option.
11) If applicable, install the operating system and any application software.

Configure The Computer

This option provides step-by-step instructions on how to configure the server when adding, removing, or relocating expansion boards and when changing operating parameters (BIOS Setup options). When accessing this menu item for the first time, it is recommended to follow the menu items listed below in the order given. If this is a subsequent session, refer to the appropriate menu item to update the server's configuration.

Step 1: Important EISA Configuration Information
Selecting this menu item enables to display information screens describing basic EISA configuration information and differences with ISA configurations. These screens are available at any time during the configuration process by pressing **[F1]** and then by selecting `EISA configuration` from the help menu.

Step 2: Adding or Removing Expansion Boards
Selecting this menu item enables to view the types of expansion boards installed in the server and the slots they occupy. Note that the SCU will only display this information when the appropriate .CFG files are copied onto the SCU diskette.

If this the first time running the SCU, select this option to verify that the server has detected and acknowledged all installed expansion boards. Afterwards, use this menu item each time any expansion board has been added, removed, or relocated.

Step 3: View or Edit Details
This menu item enables to set BIOS Setup options through the .SCI file. Through this file, the server can be setup and configured for new hardware, additional memory, passwords, I/O port allocation, etc. Note that some options cannot be accessed. These options display information that reflect the actual hardware installed in the server and cannot be changed.

To access this menu item:
1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press **[Enter]** to display the SCU main menu and then **[Enter]** again to continue.
3) From the `Configure The Computer` menu, select "Step 3: View and Edit Details".
4) Press **[Enter]** and change/update the appropriate server parameters following the instructions displayed on the monitor screen.
5) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.

Step 4: Examine Required Switches
This menu item enables to view settings (switches and jumpers) that need to be manually set and software drivers that need to be installed. These recommendations must be followed exactly, otherwise the server will not work properly.
To access this menu item:
1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press **[Enter]** to display the SCU main menu and then **[Enter]** again to continue.
3) From the `Configure The Computer` menu, select "Step 4: Examine Required Switches".
4) Press [Enter] to view how the server is configured following the instructions displayed on the monitor screen.
5) Select "Step 5: Save and Exit," to save the current configuration and exit the SCU.

Step 5: Save and Exit
This menu item allows to exit the SCU program with or without saving the configuration settings.
When the changes are saved, the SCU saves the new configuration in the server's NVRAM and in the .SCI file on the SCU diskette. When the changes are canceled, you continue to use the SCU and make other changes or exit without saving changes.

Adding ISA Expansion Boards

Perform the following steps to add ISA expansion boards to the server configuration:
1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) From the `Configure The Computer` menu, select "Step 2: Adding and Removing Boards," and update the list of expansion boards and options to include any ISA expansion boards to be installed in the server.
3) Select "Step 4: Examine Required Switches," to check the required switch and jumper settings of the ISA expansion boards.
4) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.
5) Turn off the server and install the ISA expansion boards, manually setting the necessary switches and jumpers.

Adding EISA Expansion Boards

Perform the following steps to add EISA expansion boards to the server configuration:

1) Turn off the server and install the EISA expansion boards.
2) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
   After the server boots, the following message appears:
   `EISA Configuration Error - Run Configuration Utility`
   This indicates that the EISA configuration changed since the last time the configuration was saved.
3) Press **[Enter]** to display the SCU main menu and then **[Enter]** again to continue.
   The SCU requests to load all appropriate .CFG files for the newly installed EISA expansion boards. Afterwards, the SCU displays the `Configure The Computer` menu.
4) From the `Configure The Computer` menu, select "Step 3: View or Edit Details," to verify that all EISA expansion boards were installed and configured correctly.
5) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.

NOTE	An EISA expansion board might require an IRQ to be set. If so, select that board and choose an IRQ from the list provided. This list displays IRQs that are either not assigned or can be re-assigned. If an IRQ is selected that conflicts with another expansion board in the server, a menu appears providing information of the expansion board that is in conflict, its current settings, and the settings that will change if you choose to set that IRQ.

Adding PCI Expansion Boards

| ⚠ | **CAUTION**
Before installing a PCI video expansion board, make sure the appropriate PCI slot options group is enabled. Failure to do so might cause the server to operate incorrectly. |
|---|---|

Perform the following steps to add PCI expansion boards to the server configuration:

1) Turn off the server and install the PCI expansion boards. Note which slots the PCI expansion boards were installed into.
2) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
3) Press **[Enter]** to display the SCU welcome screen and then **[Enter]** again to continue.
4) From the `Configure The Computer` menu, select "Step 3: View or Edit Details".
5) Highlight the appropriate `PCI slot Options Group` for each installed PCI expansion board and then select `Enable Device` to configure the server.
   If an IRQ needs to be assigned for an installed PCI expansion board, select `PCI Interrupt` and set it to `One IRQ Required`.
   Press **[F6]** to display the IRQ currently assigned and + or - to scroll through the remaining un-assigned IRQs to select the desired one.
6) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.

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NOTE	At any time you can view IRQ, DMA, and memory assignments while in the SCU by selecting **[F7]**, the "View Additional System Information" menu. From this menu, select either *Used Resources* or *Available Resources*.
	When a PCI video expansion board has been installed, the server will automatically disable the onboard video controller and use the installed PCI video expansion board.
	Make sure to switch the video signal cable from the onboard video connector to the connector on the PCI video expansion board.

Relocating Expansion Boards

Perform the following steps **before** relocating an ISA expansion board and **after** relocating an EISA or PCI expansion board:

1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press **[Enter]** to display the SCU main menu and then [**Enter**] again to continue.
3) From the `Configure The Computer` menu, select "Step 2: Adding and Removing Boards".
4) Highlight the expansion board to be relocated, press **[Enter],** and then follow the instructions displayed on the monitor screen.
5) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.

If there are no resource conflicts, the new configuration information is saved to the .SCI file. If there is a conflict, resolve it before completion of the server's configuration.

Deleting Expansion Boards

Perform the following steps **before** deleting an ISA expansion board and **after** deleting an EISA or PCI expansion board.

NOTE	Also remove the deleted expansion board's .CFG file from the SCU.

1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press [**Enter**] to display the SCU main menu and then **[Enter]** again to continue.
3) From the `Configure The Computer` menu, select "Step 2: Adding and Removing Boards".
4) Highlight the expansion board to be deleted, press **[Enter],** and then follow the instructions displayed on the monitor screen.
5) Select "Step 5: Save and Exit," to save the configuration and exit the SCU.

If there are no resource conflicts, the new configuration information is saved to the .SCI file. If there is a conflict, resolve it before completion of the server's configuration.

Setting the Date and Time

Use these two SCU options to reset the date and time maintained by the server's battery. Note that it might be faster to change the date and time using the BIOS Setup options.

To access this menu item:
1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press **[Enter]** to display the SCU main menu.
3) Configure the server for the current date and time by selecting the Set Date and Set Time options.

Maintain the SCU Diskette

Select this option to maintain Configuration (CFG) files and System Configuration Information (SCI) files. The following menu options are available:
♦ Create a backup SCI file
♦ Load a backup SCI file
♦ Copy/update CFG files
♦ Copy/update SCI files
♦ Delete CFG files
♦ Delete SCI files
♦ Return to the Main Menu
To access this menu item:
1) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server.
2) Press **[Enter]** to display the SCU main menu.
3) Highlight the appropriate Maintain the SCU Diskette option, Press **[Enter],** and then follow the instructions displayed on the monitor screen.

SCU and Setup Options

The following tables list the options that are available in the BIOS Setup utility and in the SCU (View or Edit details). Use the keyboard function keys to help select options, change values, and display help information.

NOTE	Although the BIOS Setup utility is separate from the SCU, the SCU will automatically update the BIOS settings. In most cases, the server will operate according to the most recent changes regardless of which utility has been used to make changes. However, Digital recommends to use the SCU to configure the server each time you add hardware, remove hardware, or change server settings to ensure that the server operates properly.
	Also, the following menu fields might not reflect current BIOS or SCU revisions. Refer to the BIOS Setup utility screens, the SCU, and any associated on-line help for more information.

When access to the BIOS Setup utility is needed:
1) Reboot the server.
2) After the POST has successfully completed, press **[F2]** to access Setup.

Main Menu Options

Menu Fields	Settings	Comments
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Language	English Duetsch Español Français Italiano	Enables to select a desired language.
Diskette drive A Diskette drive B	1.44 MB, 3½ 2.88 MB, 3½ Not Installed 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½	Sets the size and density of diskette drives.
IDE adapter 0/1 master/slave	None	The server does not support IDE devices.
Video system	EGA / VGA CGA 80x25 Monochrome	Sets the video controller type.
System memory	Not user selectable	Displays the amount of base (conventional) memory each time the server boots.
Extended memory	Not user selectable	Displays the amount of extended memory each time the server boots.

Memory and Cache Options

Menu Fields	Settings	Comments
System Cache	Enabled Disabled	Sets the state of System cache. The server's external cache operates in writeback mode when Enabled is selected. Keep this setting at Enabled for optimal server performance.
System BIOS shadow	Enabled	Not user selectable.
System BIOS cache	Enabled Disabled	Enables or disables the System BIOS caching request.
Video BIOS shadow	Enabled Disabled	Enabled opens the area on the main logic board that is reserved for a copy of the video BIOS shadow RAM.
Video BIOS cache	Enabled Disabled	Enables or disables the Video BIOS caching request.

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Memory and Cache Options (continued)

Menu Fields	Settings	Comments
Shadow 16K at: **C8000h** **CC000h** **D0000h** **D4000h** **D8000h** **DC000h** **E0000h** **E4000h**	Enabled Disabled	Allows to enable or disable shadowing and caching of individual segments of ROM to increase server performance. Caution: Some option ROMs do not operate properly when shadowed.
AT Bus Space	Disabled	Memory hole not available upper memory is contiguous.
	F00000h, 1 MB	Sets the memory hole at address F00000 with 1 MB memory available.
	E00000h, 2 MB	Sets the memory hole at address E00000 with 2 MB memory available.
	C00000h, 4 MB	Sets the memory hole at address C00000 with 4 MB memory available.

Boot Options

Menu Fields	Settings	Comments
Boot option	A: only A: then C: C: then A: C: only	Each time the server boots, it will load the operating system from the drive sequence selected.
Summary screen	Enabled Disabled	Enabling this option causes the server to display configuration parameters (in the form of a summary screen) during boot.
SETUP prompt	Enabled Disabled	Enables or disables the <F2> setup prompt each time the server boots. Note: Setup can still be entered by pressing <F2> before POST completes.
POST errors	Enabled Disabled	Enabling this options causes the server to pause and display a setup entry or resume the boot prompt if an error occurs at boot. Disabling this option causes the server to always attempt to boot regardless of a setup entry or error.
Floppy check	Enabled Disabled	Enabling this option causes the server to verify the diskette type each time the server boots. Disabling this option speeds up the boot process.

Keyboard Features

Menu Fields	Settings	Comments
NumLock	Auto Off On	Turns NumLock on or off each time the server boots. Note: When Auto is selected, the server will turn on NumLock if it detects a numeric keypad.
Key click	Disabled Enabled	Enables or disables the audible key click feature.
Keyboard auto-repeat rate	30/sec 2/sec 6/sec 10/sec 13.3/sec 18.5/sec 21.8/sec 26.7/sec	Sets the number of times a second to repeat a keystroke while holding the key down.
Keyboard auto-repeat delay	1/2 sec 3/4 sec 1 sec 1/4 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.

Integrated Peripherals

Menu Fields	Settings	Comments
Mouse port	Disabled Enabled	Enables or disables the mouse port.
Parallel port	378, IRQ 7 278, IRQ 5 Auto Disabled 3BC, IRQ 7	Enables or disables the onboard port at the specified address.
Parallel port mode	EPP 1.7	Enhanced parallel port mode.
	EPP 1.9	Selection based on what EPP version the printer supports. EPP 1.9 is IEEE 1284 compliant. Only choose a mode that the parallel port device (such as a printer) supports. Check the parallel port device documentation for this information. When unsure or unable to locate this information, use the default setting.
	ECP	Sets the extended capabilities port mode.
	Compatible mode	Compatible mode - standard printer connection.
	Bi-directional mode	Bi-directional mode - PS/2 compatible mode and able to receive data.

Integrated Peripherals (continued)

Menu Fields	Settings	Comments
Serial port 1	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables onboard serial port 1 at the specified address.
Serial port 2	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables onboard serial port 2 at the specified address.
Diskette controller	Enabled Disabled	Enables or disables the onboard diskette controller.
OCP saver timer	5 minutes 15 minutes 30 minutes Disabled	Selects disabling or a timer value. If a keyboard and mouse remains inactive for the specified time, the OCP will be set to an OFF state to increase the life of the OCP.
OCP backlight	On Off	Selects the power-on state of the OCP backlight.
Exchange diskette drives	Disabled Enabled	Enables to logically exchange physical diskette drive designations.
Diskette write protection	Disabled Enabled	Enables or disables the selected diskette drive's write protect option. Enabling this option means nothing can be written to the diskette drive (however, data from the diskette can still be read). Disabling this option enables to read and write data to the diskette drive.
IDE controller	Disabled	The server does not support an onboard IDE controller.

PCI Devices

Menu Fields	Settings	Comments
PCI devices, slot 1/2/3/4/5/6 INTA, INTD, INTB, INTC	None IRQ	Selects IRQ routing.
Default latency timer	Enabled Disabled	When enabled, the device's power up latency timer is used.
Latency	0040h	Sets the device latency timer.

Advanced Chipset Control

Menu Fields	*Settings*	*Comments*
Master retry timer	32 PCICLKS 16 PCICLKS Disabled 64 PCICLKS	Enables or disables the PCEB master retry timer.
EISA latency timer	80...F0	Holds the initial EISA count value.
PCI master latency timer	F8...10	This register contains the programmable value of the Master Latency Timer for use when the PCEB is a master on the PCI bus.
BCU PCI latency timer	F8...10	BCU PCI latency timer.
SERR generate NMI	Enabled Disabled	Enables or disables the SERR generated NMI option.
PCI SERR driver enable	Enabled Disabled	Setting this bit enables the SERR pin driver.
PCI PERR/SERR reporting	Enabled Disabled	When this bit is set, PERR and SERR errors will generate an I/O fault.
Fault to SERR	Enabled Disabled	This bit determines whether an MPI-Bus fault generates a PCI SERR signal. When set, MFAULT is propagated to SERR. When cleared, MFAULT is not propagated to SERR.
EISA to PCI line buffer	Enabled Disabled	Enables or disables the EISA to PCI line buffer.
PCEB bus park	Enabled Disabled	When enabled (bit set to 1), the PCEB parks CPUREQ on the PCI bus when it detects a PCI bus idle. When disabled (bit set to 0), the PCEB takes responsibility for driving AD.
PCEB bus lock	Enabled Disabled	When enabled (bit set to 1), the PCEB arbiter considers the entire PCI bus locked at initiation of any LOCKed transaction. When disabled (bit set to 0), resource lock is enabled.
MPI parking device	Bus bridge MREQ0/MGNT0 pair MREQ1/MGNT1 pair MREQ2/MGNT2 pair MREQ3/MGNT3 pair MREQ4/MGNT4 pair	This option defines the default parking device.
MPI parking mode	Default device No parking Last-in-use	This option defines the MPI parking mode.
MCP parking mode	Default device No parking Last-in-use	This option defines the MCP parking mode.

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Security Options

Menu Fields	Settings	Comments
Supervisor password is	Not user selectable	Tells whether or not the supervisor's password is enabled or disabled.
User password is	Not user selectable	Tells whether or not the user's password is enabled or disabled.
Set supervisor password	Press [Enter]	Enables to set a supervisor password. The supervisor password must be set if you intend to allow the user password to be used. When the supervisor later enters his or her password, all user selectable features are accessible. Note: Entering Setup with a supervisor password provides full access to all BIOS Setup utility menus. To delete or disable the Supervisor password, press [Enter] for this field. When prompted for the Supervisor password, leave the field blank and press [Enter].
Set user password	Press [Enter]	Enables to set a user password. This password can only be set if a supervisor password is entered. When the user has entered his or her name but the supervisor is not logged in, only the following information is accessible: Supervisor password is Enabled. User password is Enabled. Set user password [press enter] to enter a user password. Password on boot Enabled/Disabled (which ever is in effect). This option is not allowed to change. Note: Entering Setup with a user password restricts access to certain BIOS Setup utility menus. To delete or disable the User password, press [Enter] for this field. When prompted for the User password, leave the field blank and press [Enter]. Also, this option requires prior setting of the supervisor password.
Password on boot	Enabled Disabled	Enables or disables the enter password on boot option. Note: This option requires prior setting of the supervisor/user password.
Diskette access	Supervisor User	Enables to control who has access to diskette drives. When Supervisor has been selected, access to the diskette drive is limited to the supervisor, who must enter his or her password. When User has been selected, the diskette can be accessed by entering either the supervisor or the user password. Whatever setting has been chosen, it only becomes functional when a Supervisor Password and a User Password has been set (when User has been chosen for the setting).
Fixed disk boot sector	Normal Write protect	Enables to write protect the boot sector on the hard disk drive.
Network server	Disabled Enabled	This option keeps the server from being accessed during network operation.
System backup reminder	Disabled Daily,Weekly Monthly	Enables or disables the system backup reminder message.
Virus check reminder	Disabled Daily, Weekly Monthly	Enables or disables the virus check reminder message.

Chapter 3   Service Procedures

Safety Requirements

WARNING

Static electricity collects on non-conductors such as paper, cloth, or plastic. A static discharge can be damaging even though you often cannot see or feel it.

The following safety precautions must be observed to insure product and personal safety and prevent damage to circuit boards and/or components:

♦   Always wear an ESD wrist strap when handling ESD sensitive material. Be sure it is properly connected.
♦   Keep circuit boards and components away from non-conductors.
♦   Keep clothing away from circuit boards and components.
♦   Keep circuit boards in anti-static bags.
♦   Be cautious when AC power is exposed when working on an assembly.
♦   Always use an ISOLATION TRANSFORMER when diagnosing any terminals, monitors or power supplies when AC power is applied.
♦   Be cautious of very high voltage potentials when working with monitors.

There should be an approved insulating mat (for technician safety) in front of any workbench where monitors, terminals or power modules are being serviced when power is applied.

NOTE	Do NOT wear ESD straps when working on terminals, monitors or power supplies when AC power is applied. This is to avoid the hazard of electrical shock.

Recommended Tools

The following tools are needed for servicing Digital PC systems. Note that test equipment must calibrated.

♦   Multimeter (4 1/2 digit)
♦   A philips screwdriver
♦   An antistatic wrist strap

Other Materials Needed

Cleaning agent should be an all purpose cleaner that is used in-house.

Special Tools Required

None.

Remedial Diagnostic Test Software

♦   *QAPLUS/fe* , PC Advanced Diagnostic Software, latest version.
                    Supplier information :
                    Diagsoft, Inc.
                    5615 Scotts Valley Drive, Suite 140
                    Scotts Valley, California 95066, U.S.A.
                    Voice : 1-408-438-8247
                    Fax :   1-408-438-7113
                    Internet : http://www.diagsoft.com (Diagsoft, Inc. homepage)

Recommended Virus Detection and Cleanup Software

♦   *F-PROT*, Virus Detection and Cleanup Software, latest version.
                    Supplier information :
                    North America, South America, Australia and New Zealand:
                    Command Software Systems Inc.
                    Tel: +1-407-575 3200
                    Fax: +1-407-575 3026

                    Most of Europe, Africa, Middle and Far East:
                    Data Fellows Ltd
                    Paivantaite 8
                    FIN-02210 ESPOO
                    FINLAND
                    tel: +358-0-478 444
                    fax: +358-0-478 44 599
                    e-mail: f-prot@datafellows.fi
                    Internet : http://www.datafellows.fi (Data Fellows Ltd. homepage)

ECO/FCO Information

BIOS Version Information

Refer to the Digital DECpc Bulletin Board Support (telephone number: **xx33 92960312**) for the latest information on BIOS upgrades.

Removing the Side Panel

Before removing the side panel, perform the following:

1) Turn off power to all external devices connected to server.
2) Turn server off.
3) Unplug power cord from wall outlet.
4) Disconnect power cord and monitor cord from server.

WARNING

You might injure yourself or damage the server if you attempt to remove the side panel before unplugging the ac and monitor power cords.

To remove the side panel, perform the following:
1) Unlock side panel.
2) Slide panels to rear of server.
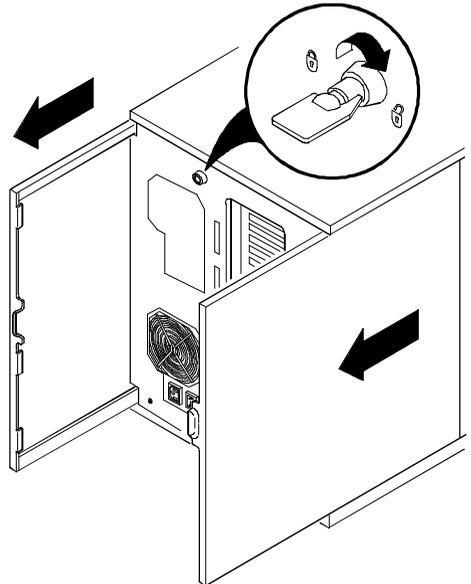
Figure 3 - 1 Unlocking and Removing the Side Panel

DEC00405-2

Server Components (Left Side)

Legend	Component	Legend	Component
A	CD-ROM drive	K	Casters
B	3½-inch diskette drive	L	Five EISA expansion slots
C	Front access 5¼-inch half-height drive bays	M	2 primary PCI slots, 1 shared PCI/EISA slot
D	3-way security lock	N	Memory module 1
E	Integral hot-swap device bay for SBBs	O	Terminator card or CPU module 2
F	Power, OCP, and reset buttons	P	Main logic board
G	Operator control panel (OCP)	Q	Three secondary PCI slots
H	Power indicator	R	Power switch interlock
I	Cooling fans	S	Brake
J	CPU module 1 and cache memory	T	Redundant fans
		U	Memory module 2 connector
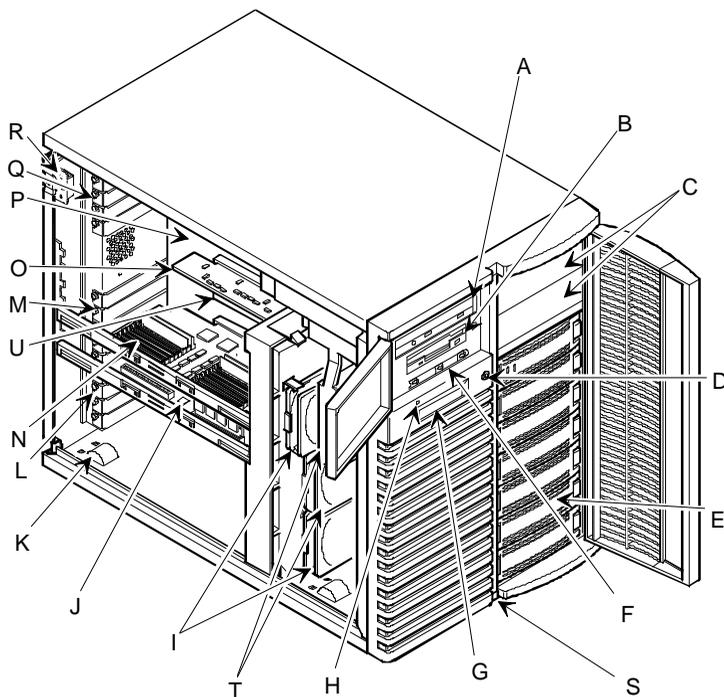
Figure 3 - 2 Server Components (Left Side, Single or Dual Configuration Shown)

Server Components (Right Side)

Legend	Component	Legend	Component
A	Power supply	I	Serial ports
B	Redundant power supply area	J	Parallel port
C	Storage backplane	K	Video port
D	Power interlock switch	L	Keylock
E	AC power plug	M	Storage backplane SCSI terminator
F	Monitor plug	N	Jumper cable
G	SCSI knockouts (back panel)	O	Power plug
H	Keyboard and mouse ports	P	68-pin connector
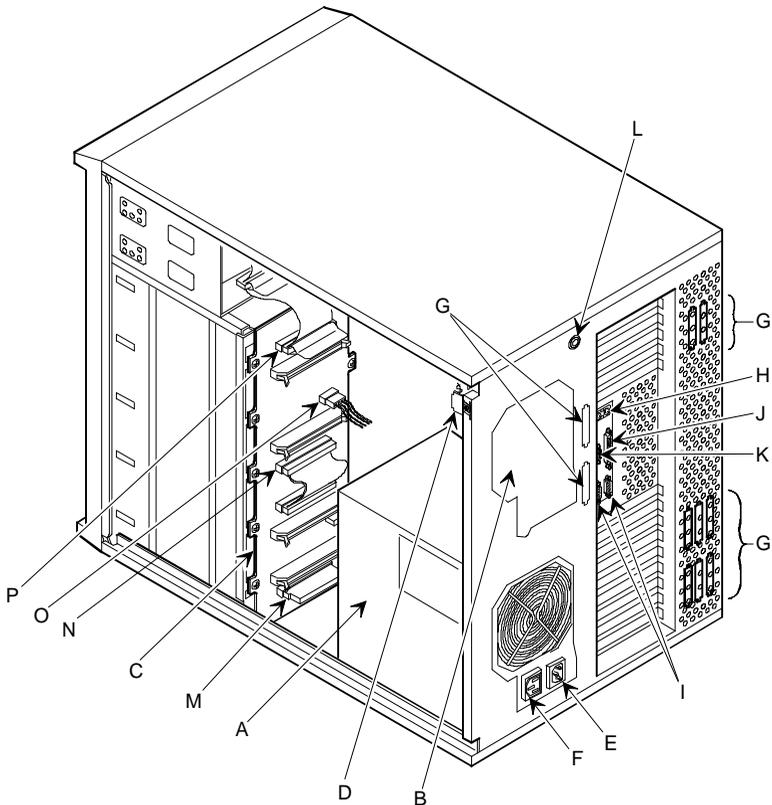
DEC00438-2

Figure 3 - 3 Server Components (Right Side)

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Expansion Slots

The PRIORIS HX MP server's main logic board contains 12 expansion board slots for installing up to eleven EISA or PCI expansion boards. Six of the slots support industry-standard 32-bit EISA expansion boards. The remaining six expansion slots support 32-bit PCI local bus expansion boards. This enables the server to deliver improved performance by using a higher speed data path.

NOTE	Some PCI expansion boards might need to be installed in a primary PCI slot. Refer to the documentation that came with the PCI expansion board.

Expansion Slot Designation	Description
EISA slots 1 through 6	Supports extended industry-standard 32-bit EISA expansion boards
EISA slot 1	Designated as a shared slot with PCI slot 3[1]
PCI slots 1 through 6	Supports bus mastering 32-bit PCI expansion boards
PCI slot 3	Designated as a shared slot with EISA slot 1[1]

[1]   Only one expansion board can reside in EISA slot 1 or PCI slot 3 at any one time. These slots have to share the expansion slot opening at the rear panel.
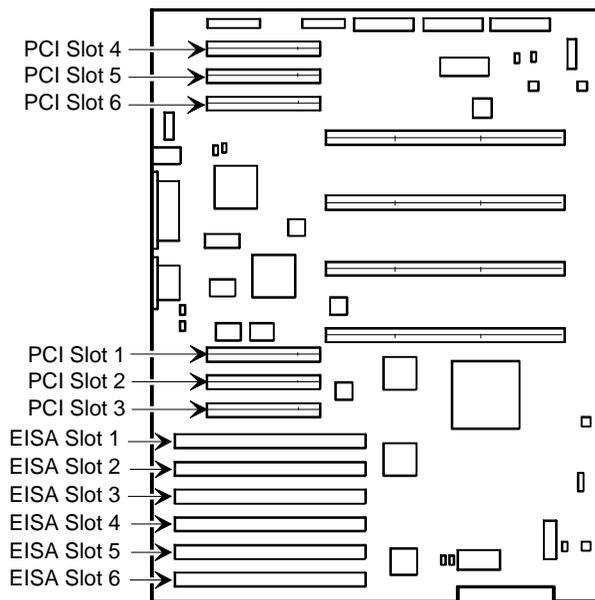
DEC00578-5

Figure 3 - 4 PRIORIS HX MP Server Expansion Board

Main Logic board Jumpers

Jumper pins allow to set specific server parameters. They are set by changing the pin location of jumper blocks. A jumper block is a small plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting, remove the jumper from its current location with the fingers. Place the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins. Be careful not to bend the pins.
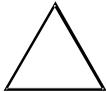
CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist wrap or touch an exposed metal part of the server's chassis.

Main Logic Board Jumper Settings

Feature	Description	Setting
DSM	Not install[1]	J7, jumpered[1]
	Install	J7, open
Doorlock 1[2]	Enabled[1]	J9, jumpered[1]
	Disabled	J9, open
Doorlock 2[2]	Enabled[1]	J11, jumpered[1]
	Disabled	J11, open
Recovery mode	Recovery mode	J13, jumpered
	Normal[1]	J13, open[1]
Password clear	Password clear (MFG test)	J14, jumpered
	Normal mode[1]	J14, open[1]
Onboard VGA	Enabled[1]	J32, jumpered[1]
	Disabled	J32, open
VGA IRQ 9	Enabled	J33, jumpered
	Disabled[1]	J33, open[1]
Boot block update[3]	Enabled	J38, pins 1 and 2 jumpered
	Disabled[1]	J38, pins 2 and 3 jumpered[1]
BIOS upgrade	Enabled	J39, jumpered
	Disabled[1]	J39, open[1]

[1] Factory default setting

[2] The power switch interlocks are connected when the doorlock jumpers are enabled.

[3] Disabling this jumper prevents corruption of the BIOS boot block when a boot block update is not required.

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Main Logic Board Jumper Locations

DEC00578-3
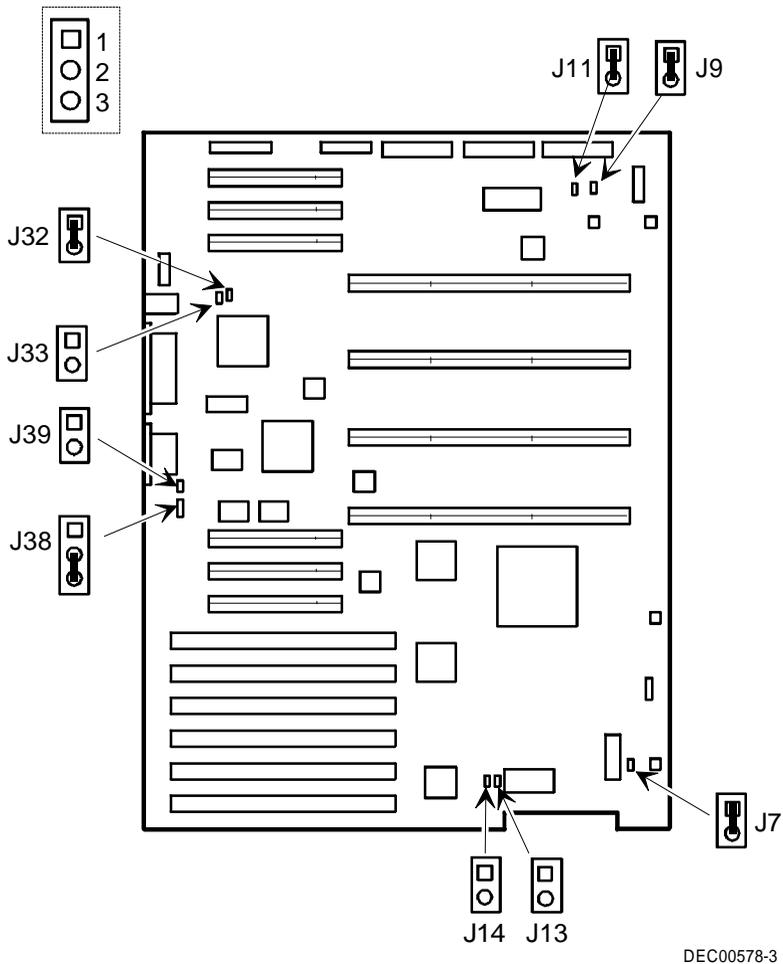
Figure 3 - 5 PRIORIS HX MP Main Board Jumper Locations

CPU Module Jumper Settings

The following table lists the main logic board jumpers and factory default settings. Figure 3-6 shows their locations.
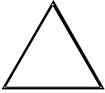
<div>

△ **CAUTION**

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist wrap or touch an exposed metal part of the server's chassis.

</div>

Feature	*Description*	*Setting*
CPU frequency core/bus ratio	3/2	J3, off[1] J4, off[1] J7, off[2] J8, off[2]
	2/1[1]	J3, off[1][3] J4, on[1][3] J7, off[2] J8, on[2]
	3/1	J3, on[1] J4, off[2] J7, on[2] J8, off[2]
	5/2	J3, on[1] J4, on[1] J7, on[2] J8, on[2]
APIC	Enable Disable	J10, on J10, off

[1] For CPU 1

[2] For CPU 2

[3] Factory default setting. Digital recommends not to change the factory default settings.

CPU Module Jumper Settings (continued)
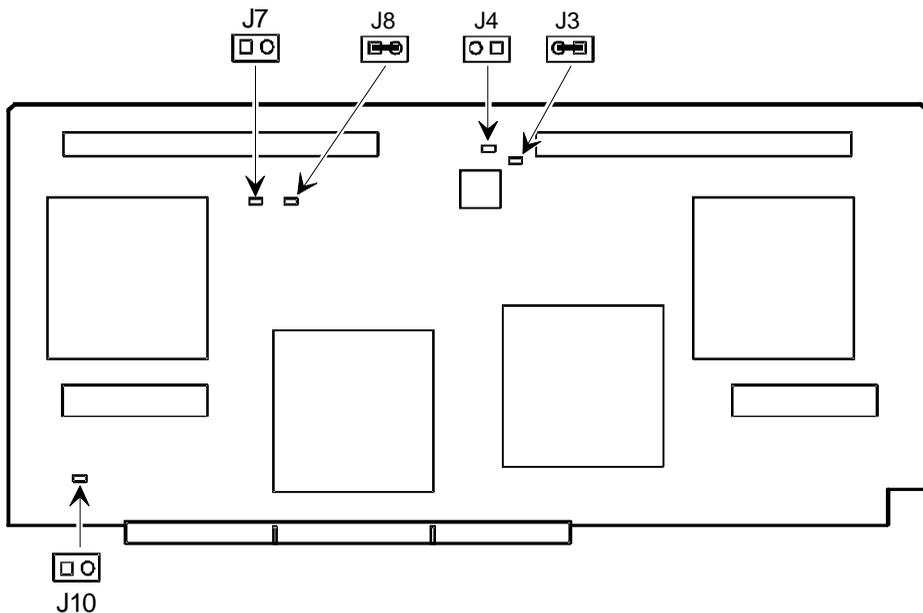
Figure 3 - 6 CPU Module Jumper Settings

Computer Memory Configurations

Adding more memory allows the server to run larger, more complicated software and run it quicker. The PRIORIS HX MP server will support up to 1 GB of standard parity memory. This memory can either be installed entirely on one memory module or can be split between two memory modules.

Each memory module contains two sets of memory banks (banks 0 through 3). Each bank consists of four SIMM sockets. The PRIORIS HX MP server comes with at least 32 MB of memory installed in bank 0. When adding additional memory make sure you:

♦ Install 36-bit SIMMs having an access time of 70 ns or less.
♦ For single memory module configurations, fill one bank (four sockets) at a time using the same SIMM size, type, and speed (8 MB, 16 MB, and 32 MB densities are available).
♦ Fill bank 0 (0H and 0L) before bank 1 (1H and 1L), bank 1 before bank 2 (2H and 2L), bank 2 before bank 3 (3H and 3L).

NOTE	Due to height limitations, 64 MB SIMMs cannot be used on the PRIORIS HX MP memory modules.

♦ For dual memory module configurations, fill one bank (four sockets) at a time on each module using the same SIMM size, type, and speed (8 MB, 16 MB, and 32 MB). For optimal memory performance, use the same SIMM number, size, type, and speed on each memory module.

The following tables list the SIMM combinations supported by the PRIORIS HX MP server.

Memory Module Configurations

BANK OH/OL	BANK 1H/1L	BANK2H/2L	BANK3H/3L	TOTAL
4 x 8MB				**32MB**
4 x 8MB	4 x 4MB			**48MB**
4 x 8MB	4 x 4MB	4 x 4MB		**64MB**
4 x 8MB	4 x 8MB			**64MB**
4 x 16MB				**64MB**
4 x 8MB	4 x 8MB	4 x 4MB		**80MB**
4 x 16MB	4 x 4MB			**80MB**
4 x 8MB	4 x 8MB	4 x 4MB	4 x 4MB	**96MB**
4 x 8MB	4 x 8MB	4 x 8MB		**96MB**
4 x 8MB	4 x 16MB			**96MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 4MB	**112MB**
4 x 8MB	4 x 16MB	4 x 4MB		**112MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	**128MB**
4 x 8MB	4 x 8MB	4 x 16MB		**128MB**
4 x 16MB	4 x 16MB			**128MB**
4 x 32MB				**128MB**
4 x 8MB	4 x 8MB	4 x 16MB		**128MB**
4 x 16MB	4 x 16MB			**128MB**
4 x 32MB				**128MB**

Single Memory Module Configurations (continued)

BANK OH/OL	BANK 1H/1L	BANK2H/2L	BANK3H/3L	TOTAL
4 x 8MB	4 x 8MB	4 x 16MB	4 x 4MB	**144MB**
4 x 16MB	4 x 16MB	4 x 4MB		**144MB**
4 x 32MB	4 x 4MB			**144MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 16MB	**160MB**
4 x 8MB	4 x 16MB	4 x 16MB		**160MB**
4 x 8MB	4 x 32MB			**160MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 4MB	**176MB**
4 x 8MB	4 x 32MB	4 x 4MB		**176MB**
4 x 8MB	4 x 8MB	4 x 16MB	4 x 16MB	**192MB**
4 x 16MB	4 x 16MB	4 x 16MB		**192MB**
4 x 8MB	4 x 8MB	4 x 32MB		**192MB**
4 x 16MB	4 x 32MB			**192MB**
4 x 16MB	4 x 16MB	4 x 16MB	4 x 4MB	**208MB**
4 x 32MB	4 x 16MB	4 x 4MB		**208MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 32MB	**224MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 16MB	**224MB**
4 x 8MB	4 x 16MB	4 x 32MB		**224MB**
4 x 8MB	4 x 16MB	4 x 32MB	4 x 4MB	**240MB**
4 x 8MB	4 x 8MB	4 x 16MB	4 x 32MB	**256MB**
4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	**256MB**
4 x 16MB	4 x 16MB	4 x 32MB		**256MB**
4 x 32MB	4 x 32MB			**256MB**
4 x 16MB	4 x 16MB	4 x 32MB	4 x 4MB	**272MB**
4 x 32MB	4 x 32MB	4 x 4MB		**272MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 32MB	**288MB**
4 x 8MB	4 x 32MB	4 x 32MB		**288MB**
4 x 8MB	4 x 32MB	4 x 32MB	4 x 4MB	**304MB**
4 x 8MB	4 x 8MB	4 x 32MB	4 x 32MB	**320MB**
4 x 16MB	4 x 32MB	4 x 32MB		**320MB**
4 x 16MB	4 x 32MB	4 x 32MB	4 x 4MB	**336MB**
4 x 8MB	4 x 16MB	4 x 32MB	4 x 32MB	**352MB**
4 x 16MB	4 x 16MB	4 x 32MB	4 x 32MB	**384MB**
4 x 32MB	4 x 32MB	4 x 32MB		**384MB**
4 x 32MB	4 x 32MB	4 x 32MB	4 x 4MB	**400MB**
4 x 8MB	4 x 32MB	4 x 32MB	4 x 32MB	**416MB**
4 x 16MB	4 x 32MB	4 x 32MB	4 x 32MB	**448MB**
4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	**512MB**

Dual Memory Module Configurations

Memory Module 1				Memory Module 2				
BANK OH/OL	*BANK 1H/1L*	*BANK 2H/2L*	*BANK 3H/3L*	*BANK OH/OL*	*BANK 1H/1L*	*BANK 2H/2L*	*BANK 3H/3L*	*TOTAL*
4 x 8MB				4 x 8MB				**64MB**
4 x 8MB	4 x 4MB			4 x 8MB	4 x 4MB			**96MB**
4 x 8MB	4 x 4MB	4 x 4MB		4 x 8MB	4 x 4MB	4 x 4MB		**128MB**
4 x 8MB	4 x 8MB			4 x 8MB	4 x 8MB			**128MB**
4 x 16MB				4 x 16MB				**128MB**
4 x 8MB	4 x 8MB	4 x 4MB		4 x 8MB	4 x 8MB	4 x 4MB		**160MB**
4 x 16MB	4 x 4MB			4 x 16MB	4 x 4MB			**160MB**
4 x 8MB	4 x 8MB	4 x 4MB	4 x 4MB	4 x 8MB	4 x 8MB	4 x 4MB	4 x 4MB	**192MB**
4 x 8MB	4 x 8MB	4 x 8MB		4 x 8MB	4 x 8MB	4 x 8MB		**192MB**
4 x 8MB	4 x 16MB			4 x 8MB	4 x 16MB			**192MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 4MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 4MB	**224MB**
4 x 8MB	4 x 16MB	4 x 4MB		4 x 8MB	4 x 16MB	4 x 4MB		**224MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 8MB	**256MB**
4 x 8MB	4 x 8MB	4 x 16MB		4 x 8MB	4 x 8MB	4 x 16MB		**256MB**
4 x 16MB	4 x 16MB			4 x 16MB	4 x 16MB			**256MB**
4 x 32MB				4 x 32MB				**256MB**
4 x 8MB	4 x 8MB	4 x 16MB		4 x 8MB	4 x 8MB	4 x 16MB		**256MB**
4 x 16MB	4 x 16MB			4 x 16MB	4 x 16MB			**256MB**
4 x 32MB				4 x 32MB				**256MB**
4 x 8MB	4 x 8MB	4 x 16MB	4 x 4MB	4 x 8MB	4 x 8MB	4 x 16MB	4 x 4MB	**288MB**
4 x 16MB	4 x 16MB	4 x 4MB		4 x 16MB	4 x 16MB	4 x 4MB		**288MB**
4 x 32MB	4 x 4MB			4 x 32MB	4 x 4MB			**288MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 16MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 16MB	**320MB**
4 x 8MB	4 x 16MB	4 x 16MB		4 x 8MB	4 x 16MB	4 x 16MB		**320MB**
4 x 8MB	4 x 32MB			4 x 8MB	4 x 32MB			**320MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 4MB	4 x 8MB	4 x 16MB	4 x 16MB	4 x 4MB	**352MB**
4 x 8MB	4 x 32MB	4 x 4MB		4 x 8MB	4 x 32MB	4 x 4MB		**352MB**
4 x 8MB	4 x 8MB	4 x 16MB	4 x 16MB	4 x 8MB	4 x 8MB	4 x 16MB	4 x 16MB	**384MB**
4 x 16MB	4 x 16MB	4 x 16MB		4 x 16MB	4 x 16MB	4 x 16MB		**384MB**
4 x 8MB	4 x 8MB	4 x 32MB		4 x 8MB	4 x 8MB	4 x 32MB		**384MB**
4 x 16MB	4 x 32MB			4 x 16MB	4 x 32MB			**384MB**
4 x 16MB	4 x 16MB	4 x 16MB	4 x 4MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 4MB	**416MB**
4 x 32MB	4 x 16MB	4 x 4MB		4 x 32MB	4 x 16MB	4 x 4MB		**416MB**
4 x 8MB	4 x 8MB	4 x 8MB	4 x 32MB	4 x 8MB	4 x 8MB	4 x 8MB	4 x 32MB	**448MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 8MB	4 x 16MB	4 x 16MB	4 x 16MB	**448MB**
4 x 8MB	4 x 16MB	4 x 32MB		4 x 8MB	4 x 16MB	4 x 32MB		**448MB**
4 x 8MB	4 x 16MB	4 x 32MB	4 x 4MB	4 x 8MB	4 x 16MB	4 x 32MB	4 x 4MB	**480MB**
4 x 8MB	4 x 8MB	4 x 16MB	4 x 32MB	4 x 8MB	4 x 8MB	4 x 16MB	4 x 32MB	**512MB**
4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	4 x 16MB	**512MB**
4 x 16MB	4 x 16MB	4 x 32MB		4 x 16MB	4 x 16MB	4 x 32MB		**512MB**
4 x 32MB	4 x 32MB			4 x 32MB	4 x 32MB			**512MB**

Dual Memory Module Configurations (continued)

Memory Module 1				Memory Module 2				
BANK OH/OL	BANK 1H/1L	BANK 2H/2L	BANK 3H/3L	BANK OH/OL	BANK 1H/1L	BANK 2H/2L	BANK 3H/3L	TOTAL
4 x 16MB	4 x 16MB	4 x 32MB	4 x 4MB	4 x 16MB	4 x 16MB	4 x 32MB	4 x 4MB	**544MB**
4 x 32MB	4 x 32MB	4 x 4MB		4 x 32MB	4 x 32MB	4 x 4MB		**544MB**
4 x 8MB	4 x 16MB	4 x 16MB	4 x 32MB	4 x 8MB	4 x 16MB	4 x 16MB	4 x 32MB	**576MB**
4 x 8MB	4 x 32MB	4 x 32MB		4 x 8MB	4 x 32MB	4 x 32MB		**576MB**
4 x 8MB	4 x 32MB	4 x 32MB	4 x 4MB	4 x 8MB	4 x 32MB	4 x 32MB	4 x 4MB	**608MB**
4 x 8MB	4 x 8MB	4 x 32MB	4 x 32MB	4 x 8MB	4 x 8MB	4 x 32MB	4 x 32MB	**640MB**
4 x 16MB	4 x 32MB	4 x 32MB		4 x 16MB	4 x 32MB	4 x 32MB		**640MB**
4 x 16MB	4 x 32MB	4 x 32MB	4 x 4MB	4 x 16MB	4 x 32MB	4 x 32MB	4 x 4MB	**672MB**
4 x 8MB	4 x 16MB	4 x 32MB	4 x 32MB	4 x 8MB	4 x 16MB	4 x 32MB	4 x 32MB	**704MB**
4 x 16MB	4 x 16MB	4 x 32MB	4 x 32MB	4 x 16MB	4 x 16MB	4 x 32MB	4 x 32MB	**768MB**
4 x 32MB	4 x 32MB	4 x 32MB		4 x 32MB	4 x 32MB	4 x 32MB		**768MB**
4 x 32MB	4 x 32MB	4 x 32MB	4 x 4MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 4MB	**800MB**
4 x 8MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 8MB	4 x 32MB	4 x 32MB	4 x 32MB	**832MB**
4 x 16MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 16MB	4 x 32MB	4 x 32MB	4 x 32MB	**896MB**
4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	4 x 32MB	**1024MB**

Memory Board SIMM Socket Locations
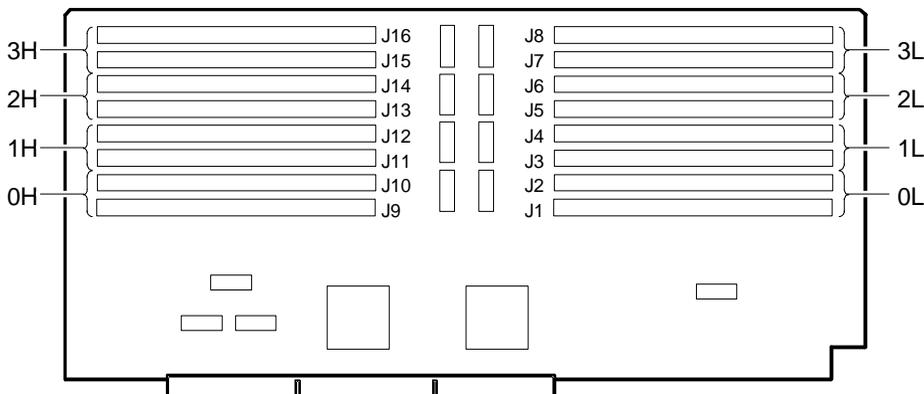
DEC-00580

Figure 3 - 7 SIMM Socket Locations and Bank Designations

Part Removal and Replacement Procedures

Removing the 3½-inch Diskette Drive

To remove the 3½-inch diskette drive:

1)   Turn off the computer.
2)   Disconnect external devices, ac power, and monitor power.
3)   Unlock and remove side panels.
4)   Disconnect power and ribbon cables.
5)   Remove screws securing the diskette drive to chassis.
6)   Slide the diskette drive out of the drive bay.
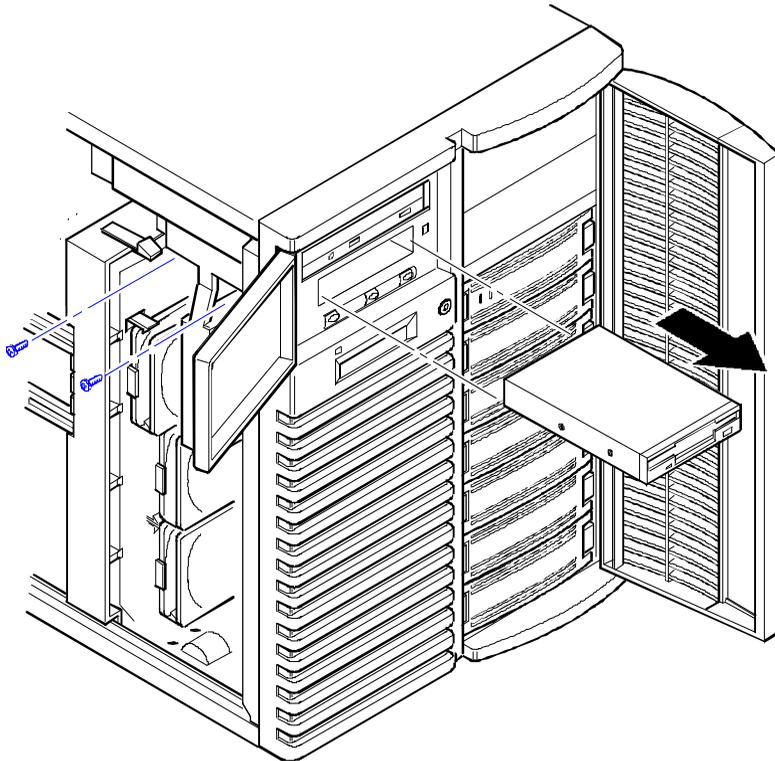
Figure 3 - 8 Replacing the 3½-inch Diskette Drive

Removing the CD-ROM Drive

To remove the CD-ROM drive:

1) Turn off the computer.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove side panels.
4) Disconnect power and ribbon cables.
5) Remove screws securing the CD-ROM drive to chassis.
6) Slide the CD-ROM drive out of the drive bay.
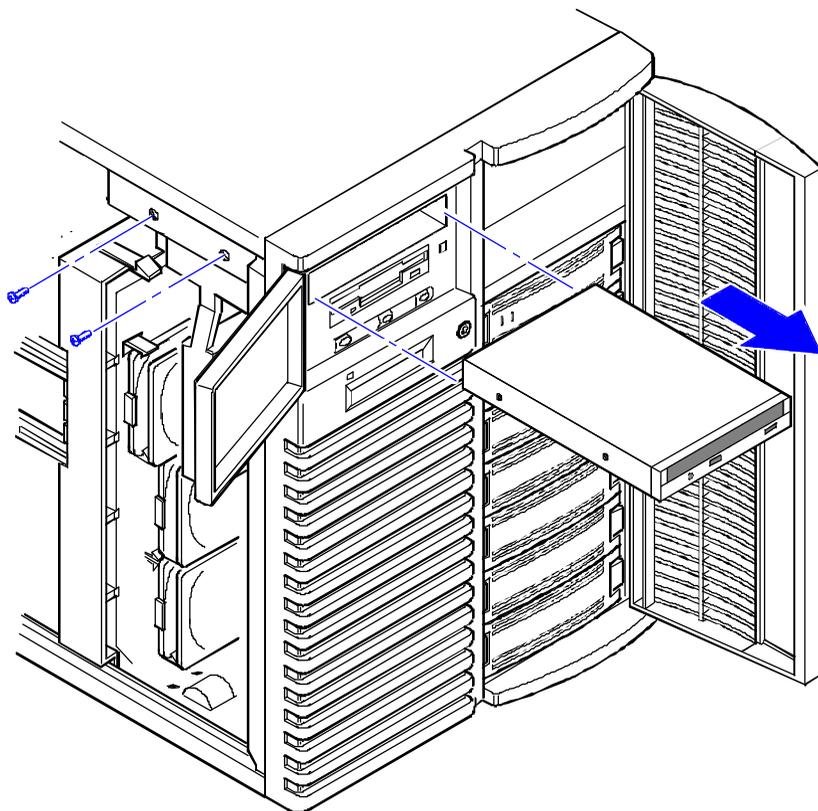
Figure 3 - 9 Removing the CD-Rom drive

Removing the Main Logic Board

To remove the main logic board:

1) Turn off the computer.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove side panels.
4) Remove all connectors.
5) Remove all expansion boards.
6) Remove screws and lift the board out.
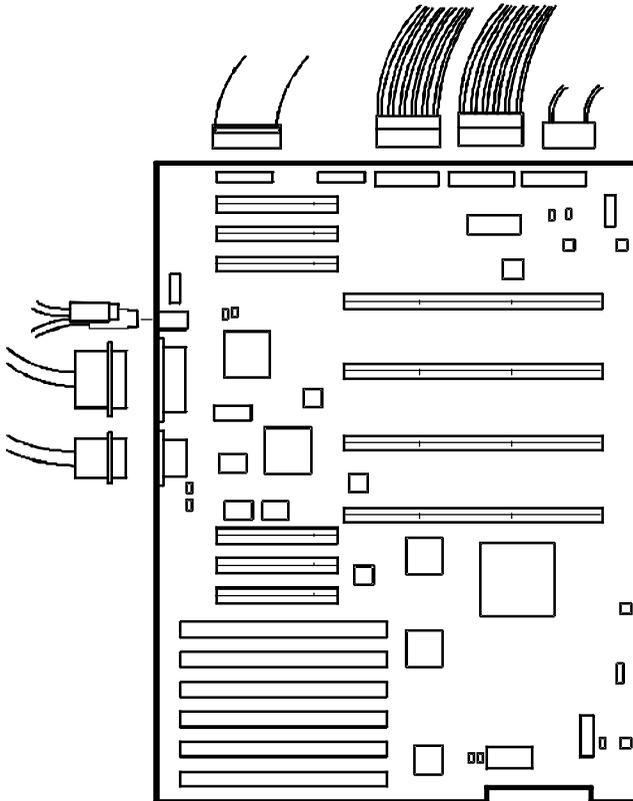
Figure 3 - 10 Removing the main logic board

Removing the Power Supply

To remove the Power Supply:

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove left side panel.
4) Remove metal shield.
5) Remove screws securing power supply to rear of chassis.
6) Release power supply from two locking tabs at side of chassis.
7) Carefully remove power supply from server.
8) Replace and lock left side panel.
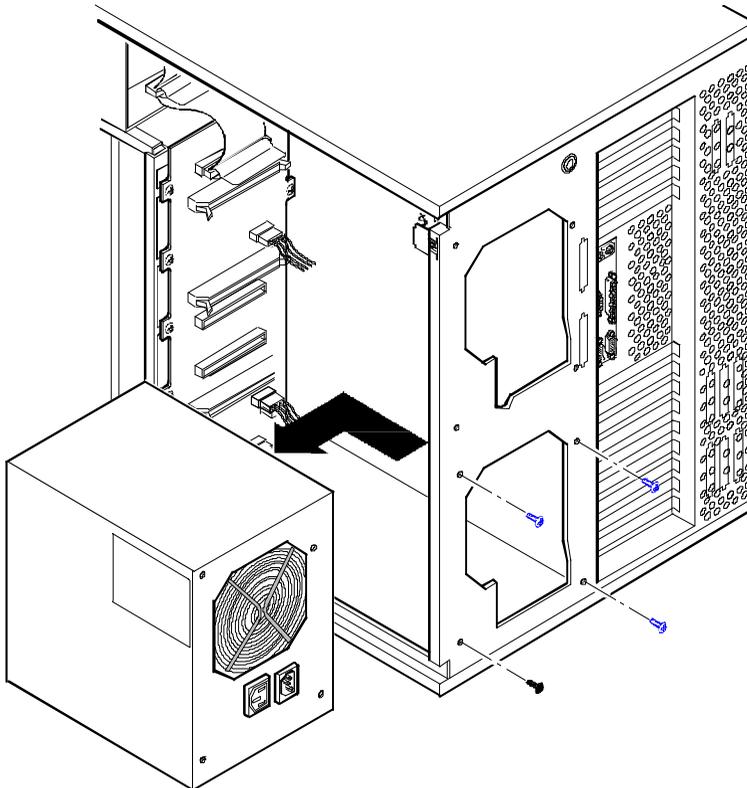
Figure 3 - 11 Removing the Power Supply

Removing the Fan

To remove the fan:

1)   Turn off the server, disconnect external devices, ac power, and monitor power.
2)   Unlock and remove the right side panel.
3)   Disconnect the fan's power cable from the 15-pin mating connector on the power harness.
4)   Remove the four Phillips-head screws that secure the cooling fan assembly on the back of the server .
5)   Remove the fan and metal bracket from the server.
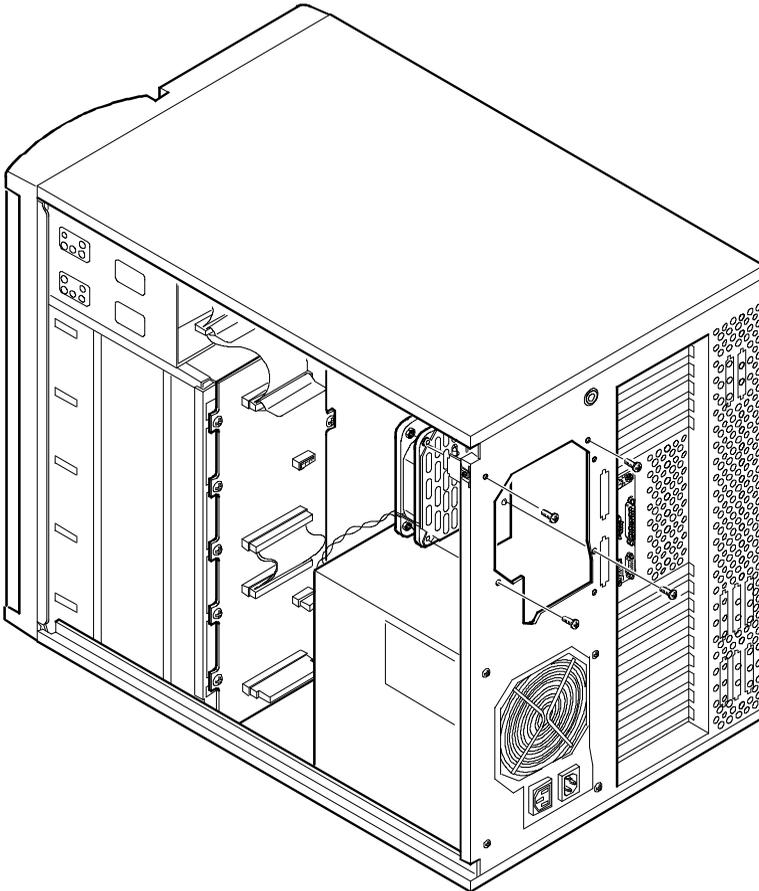
DEC00609

Figure 3 - 12 Removing the Server Top Fan Assembly

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Removing the Optional Power Supply

To remove the Optional Power Supply:

1)   Turn off the server.
2)   Disconnect external devices, ac power, and monitor power.
3)   Unlock and remove left side panel.
4)   Remove metal shield.
5)   Remove screws securing power supply to rear of chassis.
6)   Release power supply from two locking tabs at side of chassis.
7)   Carefully remove power supply from server.
8)   Replace and lock left side panel.
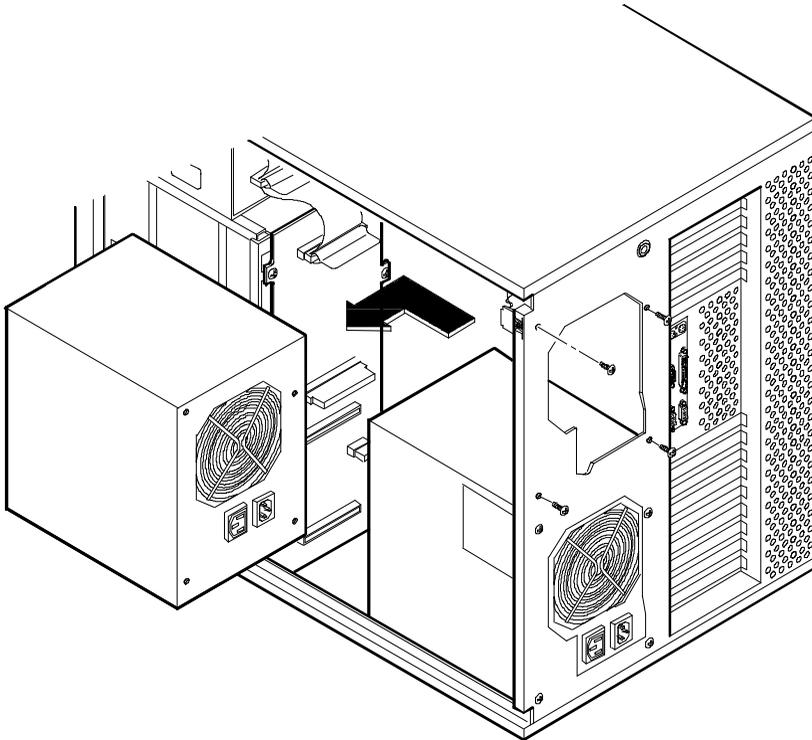
DEC00419

Figure 3 - 13 Removing the Optional Power Supply

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Removing a Half-Height 5¼-Inch Device from Top-Right Drive Bay

To remove a half-height 5¼-inch device from one of the top-right drive bay slots, perform the following:

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove side panels.
4) Unlock and open door.
5) Remove screws securing the device drive to chassis.
6) Slide the device drive out of the drive bay. Refer to *"Connecting SCSI Devices"*.
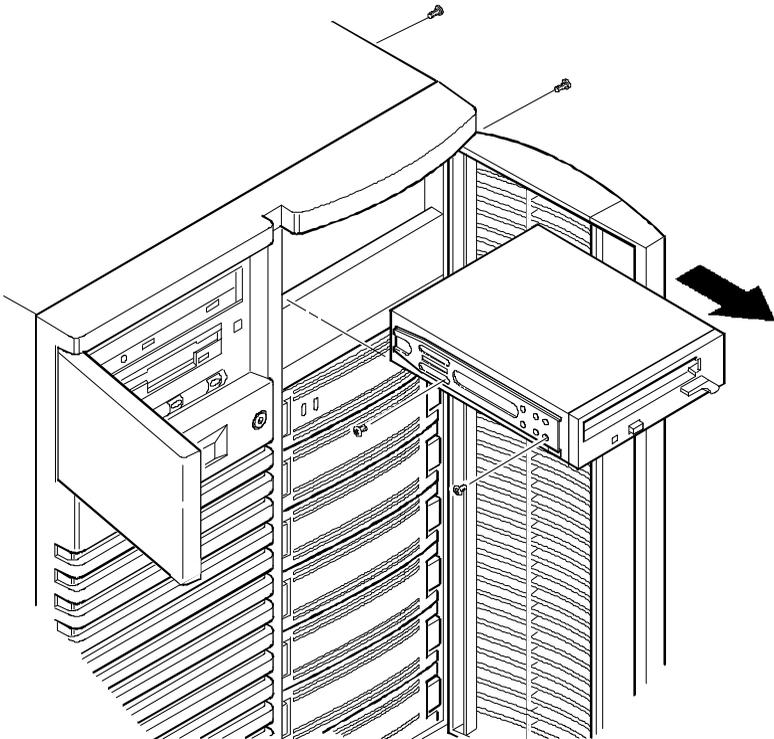
DEC00409-2

Figure 3 - 14 Removing a Half-Height 5¼-Inch Device from Top-Right Drive Bay

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Replacing a Device Into the Hot-Swap Drive Bay

Hot-swapping allows to remove or install an SBB (Storage Building Block) while the server remains online and active, eliminating interference with the server's operation. For SBBs, the hot-swap method can be used to replace a device providing that the device is not active (green activity LED is off).

NOTE	Not all SCSI host adapters support the hot-swap method. Refer to the SCSI host adapter documentation to determine if the hot-swap method is supported. Also, you might need to reconfigure the server to recognize the devices you installed.

Use the following procedure to replace an SBB:

1) Unlock and open door.
2) Remove filler panel or SBB by pressing the two tabs together to pull filler panel or SBB out.
3) Insert SBB into the guide slots and push it in until it is fully seated and the mounting tabs engage the shelf.
4) Close and lock door.
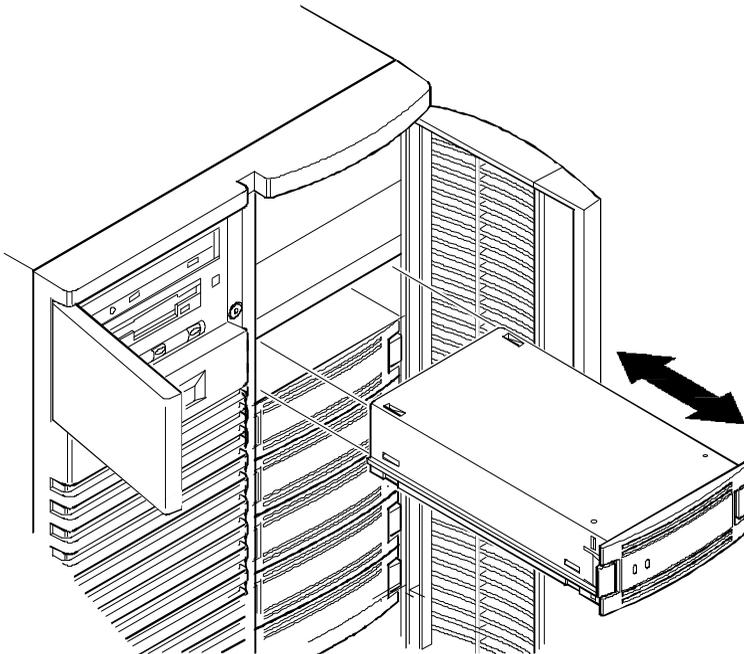
Figure 3 - 15 Replacing a Device Into the Hot-Swap Drive Bay

SBB LED Status Indicators

The hot-swap backplane monitors shelf status to identify error conditions or failures. This status is displayed on the SBB LEDs. The left LED displays the device activity and the right LED displays the fault status.

♦   The left LED (green) is the device activity LED and is on or flashing when the SBB is active.

♦   For RAID servers, the right LED (amber) is the SBB fault LED and indicates an error condition when it is either on or flashing.

⚠	**CAUTION**
	For non-RAID servers, removing a SBB when the left LED is on or flashing can cause the loss or corruption of data.

SBB Status LEDs

Activity Status LED	Fault Status LED	Indication
On	Off	Device is operating properly
Flashing	Off	Device is operating properly
Off	Off	Device is inactive and operating normally. There is no fault.
On	On	Fault status, device is hung. Replace SBB.
Off	On	Fault status, device is inactive and spun down. Replace SBB.
On	Flashing	Fault status, device is active and spinning down due to a fault.

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Replacing the Battery/Real Time Clock (RTC)

The server's battery runs the server clock and retains any setup information when it is turned off. If the server ever fails to retain the correct date, time, or configuration settings when it is turned on, replace the server's battery.

To replace the battery, perform the following:

1) Record server configuration settings using the SCU.
2) Turn off the server.
3) Disconnect external devices, ac power, and monitor power.
4) Unlock and remove left side panel.
5) Remove old battery.
6) Install new battery. Make sure pin 1 of the battery is aligned with pin one on the socket (A, Figure 3 - 16).
7) Replace and lock left side panel.
8) Connect external devices and restore power.
9) Run SCU to reconfigure computer using recorded configuration settings from step 1.

⚠ **WARNING**

Depending on your locality, the server's battery might be considered hazardous waste. Make sure to follow any state or local statute to properly dispose of the old battery.
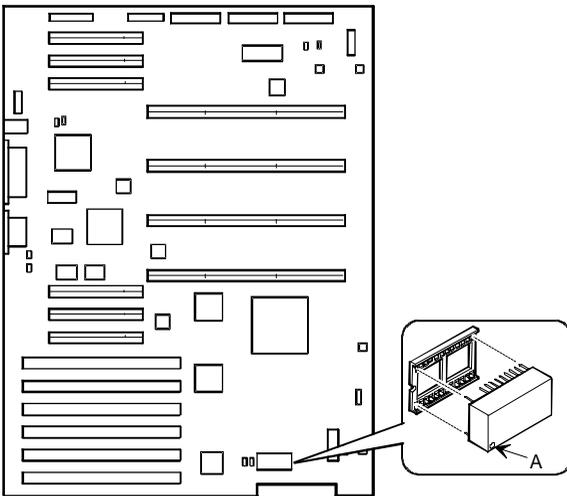
DEC00578-4

Figure 3 - 16 Replacing the Server Battery/Real Time Clock (RTC)

Removing and Replacing the Terminator Card

The terminator card terminates the memory and CPU bus for the PRIORIS HX MP one and two processor (1P, 2P) configurations. When upgrading to the four processor (4P) configuration, replace the terminator card with a second CPU module.

To remove the terminator card:

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove left side panel.
4) Remove terminator card.
5) Install CPU module and secure with retaining bracket.
6) Replace and lock left side panel.
7) Connect external devices and restore power.

NOTE   The server will not power up with the side panel removed.
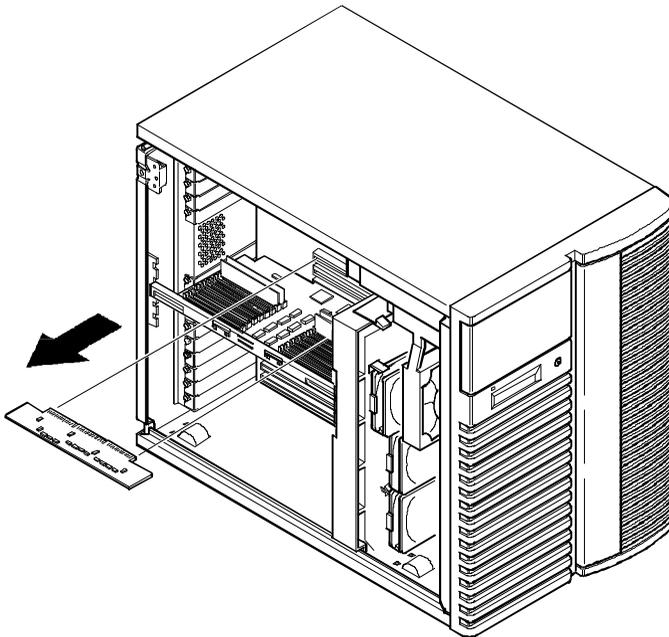
DEC00579-4

Figure 3 - 17 Removing a Terminator Card

Removing and Replacing a Memory Module

The PRIORIS HX MP server comes with a single memory module that supports a 128-bit memory interface and 2-way memory interleaving. The server's overall performance can be increased by adding an additional memory module.

NOTE	Due to height limitations, 64 MB SIMMs cannot be used on the PRIORIS HX MP memory modules.

The following procedure can be used to remove and replace any memory module:

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove left side panel.
4) Remove memory module retaining bracket.
5) Carefully remove memory module from main logic board.
6) Install an additional memory module or add additional server memory on existing memory module.
7) Replace memory module and secure with retaining bracket.
8) Replace and lock left side panel.

NOTE	The server will not power up with the side panel removed.

9) Connect external devices and restore power.
10) Run the SCU, select `Configure Computer`, select `View and Edit Details`, and then select `Save and Exit`.
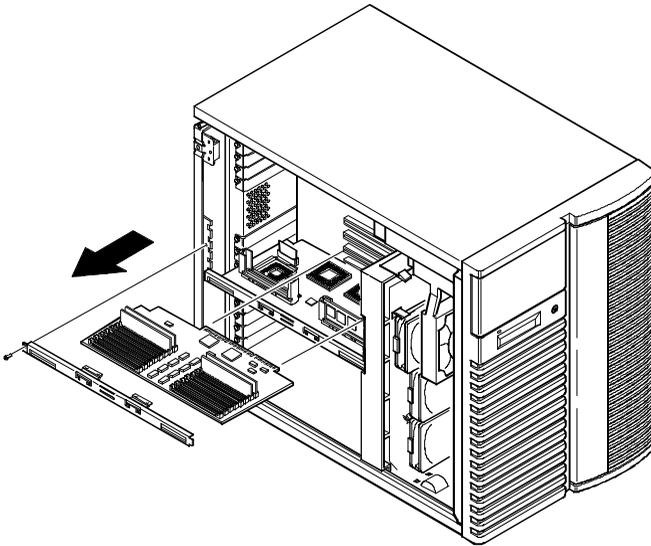
Figure 3 - 18 Removing the Memory Module

DEC00579-3

Upgrading the CPU Module

The PRIORIS HX MP one or two (1P, 2P) processor configurations include a single CPU module. The PRIORIS HX MP four (4P) processor configuration includes two CPU modules. The following procedure can be used to upgrade or remove the CPU module(s):

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove left side panel.
4) Remove CPU module retaining bracket.
5) Carefully remove the original CPU module from main logic board and place on an antistatic surface.
6) Install cache modules (one per CPU) on the CPU module(s). Refer to *"Installing a Secondary Cache Module"* later in this chapter.
7) Install the new CPU module(s) and secure with retaining bracket(s).

NOTE   1P/2P CPU module must be installed in CPU Module 1 slot and a terminator card in CPU Module 2 slot.

For 4P servers, the terminator card must be removed and a second CPU module must be installed in the CPU Module 2 slot. Refer to *"Removing the Terminator Card"* in this chapter.

1P servers are not chip-upgradeable. All CPU upgrades require a new CPU module.

---

8) If necessary, install a new memory module. Refer to *"Removing and Replacing a Memory Module"* for more information on installing memory modules.
9) Replace and lock left side panel (the server will not power up with the side panel removed).
10) Connect external devices and restore power.
11) Run the SCU, select `Configure Computer`, select `View and Edit Details`, and then select `Save and Exit`.
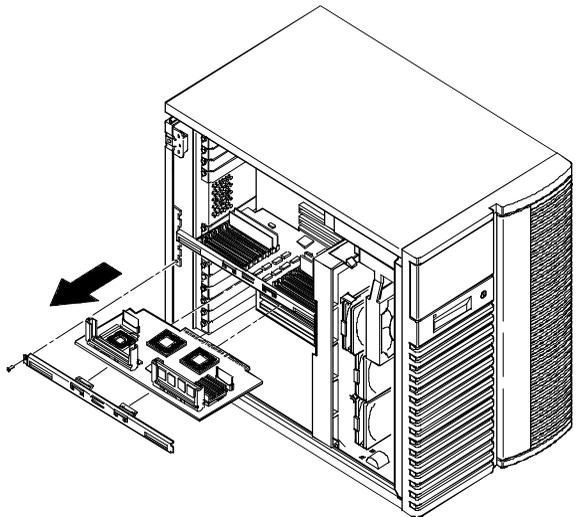
Figure 3 - 19
Removing
the CPU Module

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Installing a Secondary Cache Module

The server's Pentium CPU module comes with a 512 KB write-back burst secondary cache module per CPU. To install additional cache modules for CPU upgrades, perform the following:

1) Turn off the server.
2) Disconnect external devices, ac power, and monitor power.
3) Unlock and remove left side panel.
4) Remove CPU module and place it on an antistatic surface.
5) Carefully remove cache module and place it on an antistatic surface.
6) Install cache module. Make sure it seats firmly into the socket.
7) Install the CPU module.
8) Replace and lock left side panel. (The server will not power up with the side panel removed.)
9) Connect external devices and restore power.
10) If necessary, reboot and run the SCU. From the main menu, select Configure Computer and then select View and Edit Details to enable the system cache option. Select Save and Exit to configure the server for the external cache.
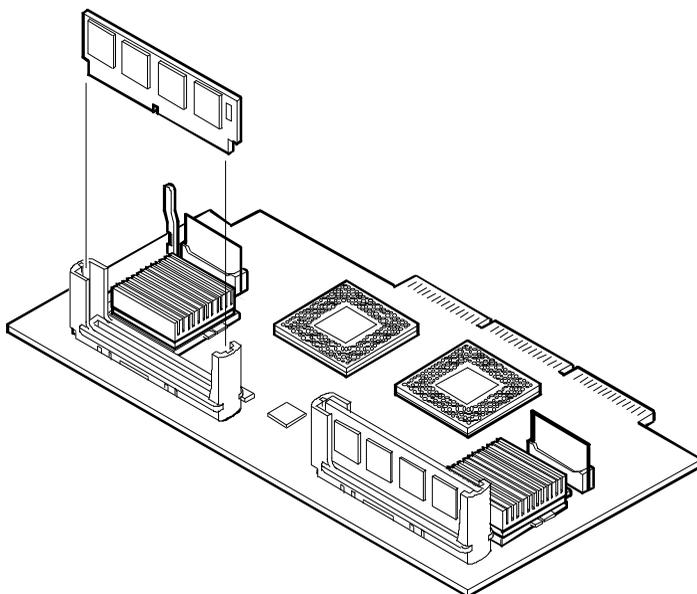
DEC00584-2

Figure 3 - 20 Installing a secondary Cache Module

Mass Storage Devices

The PRIORIS HX MP server has three drive bay areas. Mass storage devices such as SCSI hard disk drives, floppy diskette drives, SCSI CD-ROM drives, and SCSI tape backup systems are installed in these drive bay areas. The three drive bay areas are:

♦ *Left-front access drive bay area*
    This area has one 5¼-inch SCSI CD-ROM drive and one 3½-inch diskette drive (both standard on all PRIORIS HX MP Servers).
♦ *Top-right front access drive bay area*
    This area has room for two wide (68-pin) or narrow (50-pin) 5¼-inch or 3½-inch half-height SCSI devices, or one full-height, 5¼-inch device.
♦ *Lower-right front access drive bay area*
    This area has room for seven 3½-inch, wide or narrow Fast SCSI-2, hot-swap devices.

SCSI Configuration Guidelines

The PRIORIS HX MP Server supports up to 10 internal SCSI devices (this includes seven hotswap drive bays). Additional SCSI devices can be added to the server by installing EISA- or PCI-based SCSI host adapters in available expansion slots in conjunction with an external SCSI expansion box.

The server configuration, SCSI adapter(s), and all SCSI devices must work together for optimum performance. When installing SCSI devices, use the following guidelines:

♦ The last physical SCSI device on each end of the SCSI bus must be terminated. Only use SCSI devices without terminators. If the SCSI device came with a built-in terminator installed, remove or disable the terminator from the device before completion of the installation.
    Refer to the SCSI device's manufacturer documentation for the terminator location.
♦ Each SCSI device (including the SCSI host adapter) must be configured with a unique ID number. SCSI host adapters usually default to ID 7. The SCSI CD-ROM drive defaults to ID 6. Use the remaining IDs 0 through 5 (narrow and wide adapters) and 8 through 15 (wide adapters only) to configure hard disk drives and other SCSI devices. Hard disk drives should be configured to start with SCSI ID 0 and the lower ID numbers.
    Refer to "SCSI Drive IDs" later in this chapter.

SCSI Configuration Utility

The Adaptec 2940W or 3940W controller includes a SCSI configuration utility that lets you change host controller settings and perform low-level formatting on new SCSI devices.

To start the SCSI configuration utility:

Press **Ctrl + A** when the BIOS banner appears during the boot process.

Connecting SCSI Devices

The server supports up to 10 internal SCSI devices. Additional SCSI devices can be added to the server by using an EISA- or PCI-based SCSI host adapter installed in an available expansion slot in conjunction with an external SCSI expansion box. The PRIORIS HX MP supports the following configurations.

Configuration	*Base Server Host Adapter*	*RAID Server Host Adapter*
PRIORIS HX MP (one processor)	2-channel wide SCSI-2	2-channel wide PCI RAID
PRIORIS HX MP/2 (two processors)	2-channel wide SCSI-2	2-channel wide PCI RAID
PRIORIS HX MP/4 (four processors)	2-channel wide SCSI-2	2-channel wide PCI RAID

Storage Backplane

The storage backplane supports seven hot-swap devices split between two SCSI bus sections: SCSI bus A and SCSI bus B (see Figure 3-21). SCSI bus A is the upper section and consists of four SCSI device connections. SCSI bus B is the lower bus section and consists of three SCSI device connections. These buses can be configured as two independent SCSI channels or as one channel by installing a wide SCSI jumper cable. Figures 3-22 through 3-26 show the available cable configurations.

The server has been supplied with three SCSI cables and three SCSI bus terminators to configure the server for up to three internal SCSI channels. Additional cables are available to support external SCSI devices or as replacement cables.
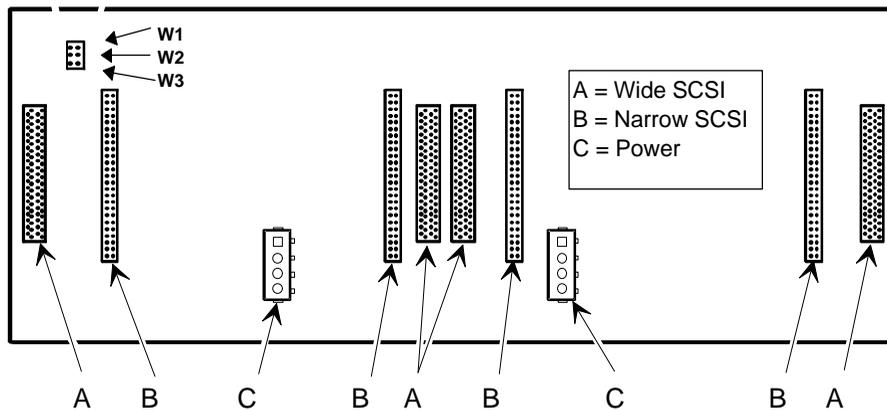
Figure 3 - 21 Storage Backplane

SCSI Drive IDs

SCSI bus device addresses are automatically assigned in the hot-swap drive bay depending on the slot number in which there are installed. The address jumper on the storage backplane is used to override the default addresses. The default settings are listed in the following table and can be set manually to different addresses at the option. The storage backplane can be configured as two separate SCSI buses or as a single SCSI bus using a jumper cable.

Note that:
♦   The SCSI ID addressing is independent of the single or dual SCSI bus arrangement. Make sure to select unique SCSI IDs for all SCSI devices on the SCSI bus.
♦   Use a wide SCSI host adapter to set SCSI IDs greater than seven.
♦   The CD-ROM drive and tape IDs must be set manually. *Refer to the manufacturer's documentation for information on setting drive IDs.*

SCSI ID Settings

Jumpers	*None*	*W1*	*W2*	*W3*	*W1+W2*	*W1+W3*	*W2+W3*	*W1+W2+W3*
SBB slot0 ID	0	0	8	0	8	0	8	8
SBB slot1 ID	1	1	9	1	9	1	9	9
SBB slot2 ID	2	2	10	2	10	2	10	10
SBB slot3 ID	3	3	11	3	11	3	11	11
SBB slot4 ID	0	4	0	8	4	12	8	12
SBB slot5 ID	1	5	1	9	5	13	9	13
SBB slot6 ID	2	6	2	10	6	14	10	14

Single Channel SCSI and RAID Configuration

To connect SCSI devices to a single channel SCSI and RAID host adapter, perform the following:

1) Connect the cables as shown in Figure 3 - 22. If necessary, connect appropriate power cable to device.
2) Replace and lock side panels.
3) Connect external devices and restore power.
4) Run SCU and the SCSI configuration utility to configure the server. *Refer to the SCSI and RAID documentation for additional configuration information.*

NOTE   Server's with this configuration are shipped with an additional terminator and a two connector cable to enable you to split the storage backplane.

Legend	*Component*
A	SCSI host adapter (SCSI bus, host termination)
B	RAID host adapter (channel A, host termination)
C	External SCSI connector
D	Backplane terminator
E	Jumper cable
F	Backplane, 68-pin connector
G	Cable terminator
H	68-pin-to-50-pin adapter cable to top-right drive bay
I	68-pin-to-50-pin adapter cable to CD-ROM drive

DEC00576
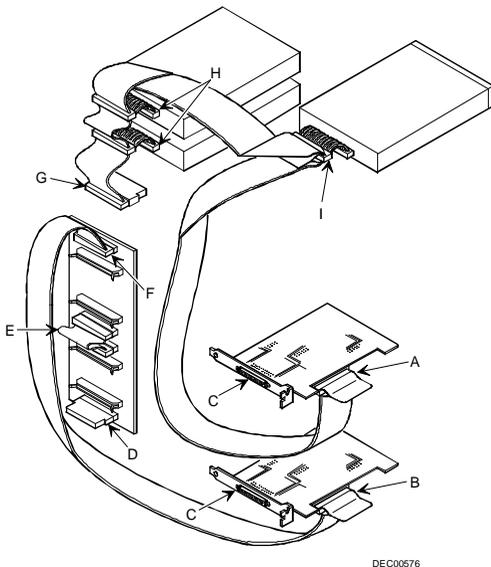
Figure 3 - 22 Single Channel SCSI and RAID Bus

Dual Channel SCSI Bus Configuration (One Internal Channel and One External Channel)

To connect SCSI devices to a non-RAID dual channel host adapter, perform the following:

1) Connect the SCSI cables as shown in Figure 3 - 23. If necessary, connect appropriate power cable to device.
2) Replace and lock side panels.
3) Connect external devices and restore power.
4) Run SCU and the SCSI configuration utility to configure the server. *Refer to the SCSI documentation for additional configuration information.*

Legend	Component
A	SCSI host adapter (ID 7, channel A, host termination)
B	68-pin-to-50-pin adapter cable to CD-ROM drive
C	68-pin-to-50-pin adapter cable to top-right drive bay
D	Backplane, 68-pin connector
E	Terminator[1]
F	Jumper cable
G	External channel

[1] This terminator can be removed and replaced with a 68-pin wide cable to connect to an external SCSI device.
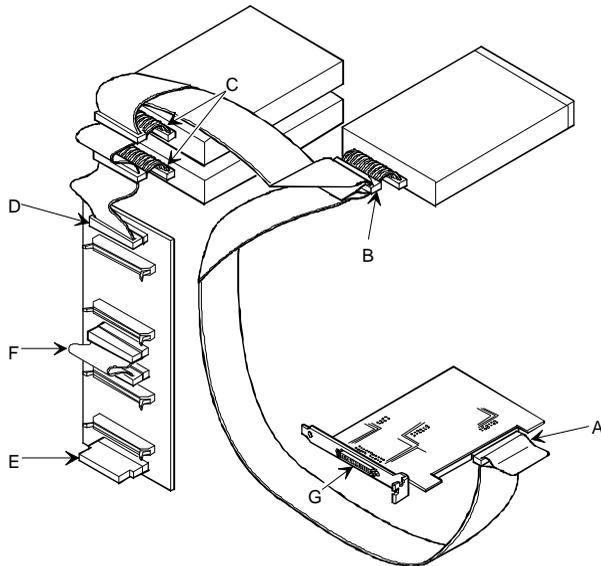
DEC00571

Figure 3 - 23 Dual Channel SCSI Bus Configuration (One Internal Channnel and One External Channel)

Dual Channel SCSI Bus Configuration (Two Internal Channels)

To connect SCSI devices to a dual channel SCSI host adapter, perform the following:

1) Connect the SCSI cables as shown in Figure 3 - 24. If necessary, connect appropriate power cable to device.
2) Replace and lock side panels.
3) Connect external devices and restore power.
4) Run SCU and the SCSI configuration utility to configure the server. *Refer to the RAID documentation for additional configuration information.*

Legend	Component
A	External channel[1]
B	SCSI host adapter (channel B, host termination)
C	Backplane, 68-pin connector
D	Jumper cable
E	Terminator
F	68-pin-to-50-pin adapter cable to top-right drive bay
G	68-pin-to-50-pin adapter cable to CD-ROM drive
H	Cable terminator
I	SCSI host adapter (channel A, host termination)

[1] The external SCSI connector supports the same SCSI bus as channel A in this configuration.
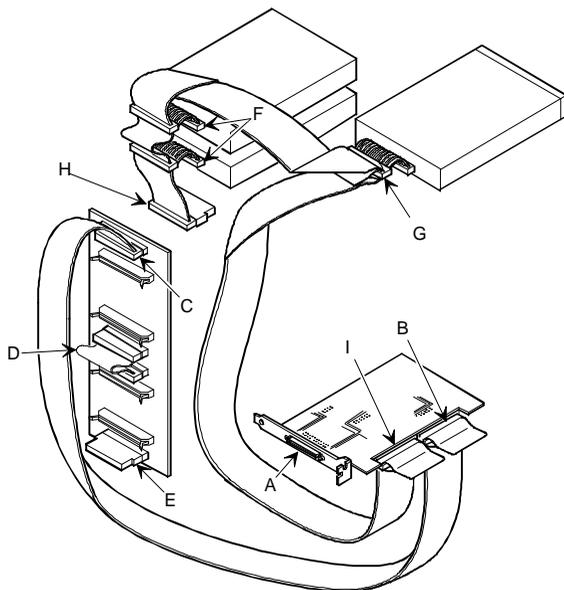
DEC00573-2

Figure 3 - 24 Dual Channel SCSI Bus Configuration (Two Internal Channels)

3-Channel RAID Configuration (Two Internal Channels and One External Channel)

To connect SCSI devices to a 3-channel RAID host adapter, perform the following:

1) Connect the SCSI cables as shown in Figure 3 - 25. If necessary, connect appropriate power cable to device.
2) Replace and lock side panels.
3) Connect external devices and restore power.
4) Run SCU and RAID configuration utility to configure the server. *Refer to the RAID documentation for additional configuration information.*

Legend	Component
A	External channel (channel C, host termination)
B	RAID host adapter (channel A, host termination)
C	Backplane, 68-pin connector
D	Jumper cable
E	Terminator
F	68-pin-to-50-pin adapter cable to top-right drive bay
G	68-pin-to-50-pin adapter cable to CD-ROM drive
H	Cable terminator
I	RAID host adapter (channel B, host termination)
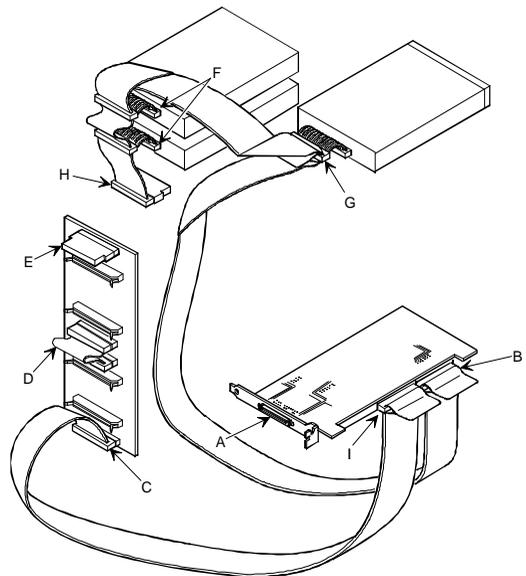
Figure 3 - 25 3-Channel RAID Bus (Two Internal Channels and One External Channel)

DEC00629

3-Channel RAID Configuration (All Internal Channels)

To connect SCSI devices to a 3-channel RAID host adapter, perform the following:

1) Connect the SCSI cables as shown in Figure 3 - 26. If necessary, connect appropriate power cable to device.
2) Replace and lock side panels.
3) Connect external devices and restore power.
4) Run SCU and RAID configuration utility to configure the server. *Refer to the RAID documentation for additional configuration information.*

Legend	Component
A	RAID host adapter (channel C, host termination)
B	RAID host adapter (channel B, host termination)
C	Backplane, 68-pin connector
D	Terminator
E	68-pin-to-50-pin adapter cable to top-right drive bay
F	68-pin-to-50-pin adapter cable to CD-ROM drive
G	RAID host adapter (channel A, host termination)
H	Cable terminator
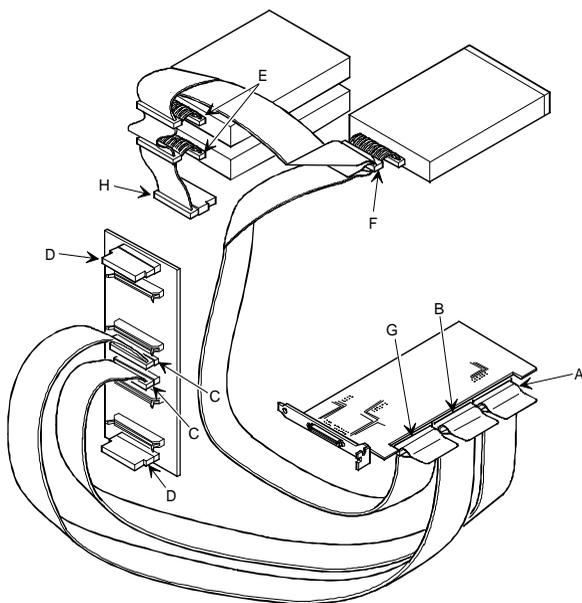
Figure 3 - 26 3-Channel RAID Bus (All Internal Channels)

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Using Multiple or Multi-Channel SCSI Host Adapters

The following guidelines apply when configuring the server using multiple or multi-channel SCSI host adapters:

♦   The SCSI host adapter with the lowest BIOS address is identified by the server as the "primary" SCSI host adapter. When loading the operating system from a SCSI hard disk drive, this primary or boot drive must be connected to the primary SCSI host adapter. The SCSI address of the primary SCSI hard disk drive must be set to the lowest SCSI address connected to the SCSI host adapter.

♦   To improve server performance, the SCSI devices may be distributed across the SCSI host adapters. When arranging SCSI devices, make sure each device connected to a SCSI host adapter is assigned a unique SCSI address.

♦   Each operating system has different limitations regarding the number of SCSI host adapters that are supported. Refer to the operating system documentation for additional information.

♦   SCSI IDs on one channel do not interfere with the IDs on another channel. This applies when installing two SCSI host adapters that implement a different bus as well as dual channels on a single SCSI host adapter.

External SCSI Bus

Additional SCSI cables and/or host adapters may be used to connect external SCSI devices to the server. To connect the storage backplane to an external SCSI bus:

1)   Remove the terminator from the storage backplane for the bus to be connected.
2)   Connect the 68-pin unshielded cable connector to the storage backplane (A, Figure 3-27).
3)   Using a screwdriver, gently pry away one of the SCSI knockouts at the rear panel (see Figure 3-27).
4)   Screw the 68-pin or 50-pin external shielded connector to the rear panel (B, Figure 3-27).
5)   Connect the external SCSI device making sure the external device is properly terminated.
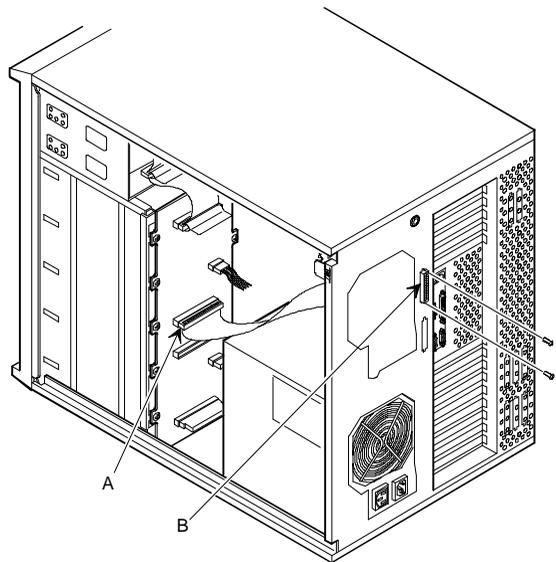
Figure 3 - 27 Extrernal SCSI Bus Connections

DEC00444

External SCSI Bus Guidelines

♦   Make sure that the selected SCSI addresses for the external SCSI devices do not conflict with other
    devices in the server.
♦   Make sure that the external SCSI bus is terminated properly.
♦   For proper operation, the length of the SCSI cable must not exceed 1 meter (3.28 ft).
♦   Use only a high-density external connector.
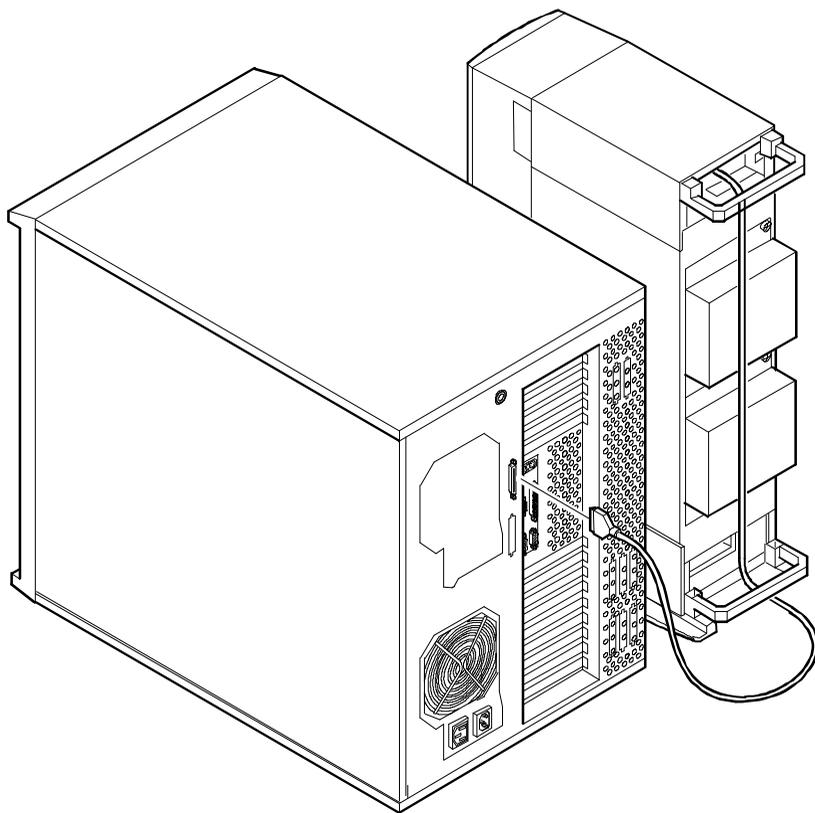
DEC00626

Figure 3 - 28 Connecting an External SCSI Storage Box

Chapter 4   Troubleshooting

The following pages provide initial troubleshooting procedures and tables listing specific problems, probable causes, and recommended actions to take if the computer fails after configuration or after installation of optional hardware or software.

Refer to the documentation supplied with additional options when experiencing problems with specific options that you have installed.

Initial Troubleshooting

Follow these general procedures to troubleshoot the PRIORIS HX MP Server:

♦   Press [Ctrl] + [Alt] + [Del]. If the computer fails to boot, turn it off, wait until all hard disk drives are spun down completely, and then turn it back on.
♦   If the POST detects an error refer to *chapter 4* "*Troubleshooting"* and take the appropriate steps to correct the problem. After the problem has been resolved, restart the computer.
♦   Run the BIOS Setup utility.
♦   Make sure all necessary changes have been made to the CONFIG.SYS and AUTOEXEC.BAT files
♦   Make sure all necessary video, printer, and application device drivers are properly installed.
♦   Ensure that all cables and connections are secure.
♦   Run the *QAPLUS/fe* advanced diagnostic software.
♦   If these steps do not identify and/or correct the problem, perform the specific troubleshooting procedures appropriate to the circumstances.

NOTE	If you need to return a failed component, pack it in its original container and return it to Digital for service.

Fill in the appropriate fields of the Part Exchange Form with the relevant error information!!

Beep Codes

When POST finds an error and cannot display a message, the server's speaker emits a series of beeps to indicate the error and places a value in I/O port 80h. During POST, if the video configuration fails or if an external ROM module fails a checksum test, then the server beeps three times (one long beep, and two short beeps).

The following table lists other fatal errors and their associated beep codes. Each code represents the number of short beeps that are grouped together. Fatal errors (errors that lock up the server) are generally the result of a failed main logic board or some other add-on component (SIMM, BIOS, server battery, etc.).

Beep Code	*Error*
1 - 2	Video Configuration Fails
2 - 2 - 3	BIOS ROM checksum
3 - 1 - 1	Test DRAM refresh
3 - 1 - 3	Test keyboard controller
3 - 4 - 1	Test 512K base address lines
3- 4 - 3	Test 512K base memory
2 - 1 - 2 -3	Check ROM copyright notice
2 - 2 - 3 - 1	Test for unexpected interrupts

POST Execution Messages

The following messages appear at the bottom of the screen during POST execution:

Message	*Description*
230	Unexpected interrupts test
220	Shadow ROMs
210	Test RAM between 512K and 640K
200	Extended memory test
190	Set cache registers
180	Cache configuration
170	Real-time clock test
160	Keyboard test
150	Initial hardware interrupt
140	Co-processor test
130	Serial ports test
120	Parallel ports test
110	Initiate onboard SIO
100	Mouse test
90	Testing diskette drives
80	Testing hard disk drives
30	Setup power management
20	Enable IRQs
10	Setting time of day

POST and Boot Messages

The POST displays messages to alert to errors in hardware, software, and firmware or to provide operating information about the server.

Each time the POST displays a message on the screen, the server's speaker beeps twice. If an error occurs before the monitor is initialised, specific beep codes sound to alert to a problem. The following table lists a general grouping of system messages. In addition, each message is accompanied by text describing the message and in most cases, a recommended solution to the problem.

NOTE	Italics indicate variable parts of a message such as memory addresses, hexadecimal values, and so on. These messages can differ at each occurrence.

Message	*Description/Solution*
nnnn **Cache SRAM Passed**	Where *nnnn* is the amount of server cache (in kilobytes) that tested successfully.
Diskette drive A error **Diskette drive B error**	Run the SCU. Check all connections.
Entering SETUP	BIOS Setup utility runs.
Extended RAM Failed at offset: *nnnn*	Extended memory failed or configured incorrectly. Make sure SIMMs are installed correctly If the problem persists, replace SIMMs. Run the SCU and restore all settings to original values.
Extended RAM Passed	Where *nnnn* is the amount of extended memory (in kilobytes) that tested successfully.
Failing Bits: *nnnn*	*nnnn* is a map of the bits at the RAM address that failed the memory test. Run the SCU and restore all settings to original values.
Fixed Disk 0 Failure **Fixed Disk 1 Failure** **Fixed Disk Controller failure**	Run the SCU. Check all connections.
Incorrect Drive A type - run SETUP **Incorrect Drive B type - run SETUP**	Diskette drive A and/or B not correctly identified in the SCU. Run the SCU and properly identify diskette drive A and/or B.
Invalid NVRAM media type	NVRAM access failed. Run the SCU and restore all settings to original values.
Keyboard controller error **Keyboard error** **Keyboard locked -** **Unlock key switch**	Check the keyboard connection. If the connection is secure, the keyboard or keyboard controller might have failed.
Monitor type does not match CMOS - **Run SETUP**	Run the SCU and set the correct monitor type.
Operating system not found	The operating system cannot be found on drive A or drive C. Run the SCU and correctly identify drive A or drive C. Correctly install the operating system. Refer to the supplied operating system documentation.

POST and Boot Messages (continued)

Message	Description/Solution
Parity check 1 nnnn **Parity check 2 nnnn**	Parity error found in the server bus. The BIOS attempts to locate the address and display it on the monitor screen. Run the SCU and restore all settings to original values.
Press <F1> to resume, <F2> to Setup	This message appears after any recoverable error message. Press **<F1>** to reboot or **<F2>** to enter the BIOS Setup utility to make any necessary changes.
Real time clock error	Real-time clock failed BIOS test. Replace the real-time clock (battery) and then run the SCU to restore previous configuration information.
Shadow RAM Failed at offset: *nnnn*	Shadow RAM failed. Run the SCU and disable failed shadow memory region.
nnnn **Shadow RAM passed**	Where *nnnn* is the amount of shadow RAM (in kilobytes) that tested successfully.
System battery is dead - Replace and run SETUP	Replace the battery and then run the SCU to restore previous configuration information.
System BIOS shadowed	This indicates that the server's BIOS was successfully copied to shadow RAM.
System cache error - Cache disabled	RAM cache failed. Run the SCU and restore all settings to original values.
System CMOS checksum bad - run SETUP	Run the SCU and ensure that all settings are correct. Save the configuration even if no changes have been made.
System RAM failed at offset: *nnnn*	System RAM failed. Run the SCU and restore all settings to original values.
nnnn System RAM passed	Where *nnnn* is the amount of system RAM (in kilobytes) that tested successfully.
System timer error	The server's timer test failed. Run the SCU and restore all settings to original values.
UMB upper limit segment address: *nnnn*	Displays the address of the upper limit of UMB. This indicates the released segments of the BIOS that can be reclaimed by a virtual memory manager.
Video BIOS shadowed	This indicates that the server's video BIOS was successfully copied to shadow RAM.

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is turned on	Main logic board failed.	Replace Main logic board.
	Main logic board jumpers incorrectly set.	Set all appropriate jumpers.
	CPU module has failed.	Reseat the CPU module.
	CPU module jumpers incorrectly set.	Make sure all jumpers are correctly set.
	Terminator card not seated properly (1P and 2P configurations only).	Reseat terminator card.
	Terminator card not installed.	Install terminator card.
	No memory module or SIMMs installed.	Install SIMMs and memory module.
	Side panels removed.	Install side panels.
Power is on, but there is no screen display	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect VGA drivers installed.	Install the correct VGA drivers.
	Video controller has failed.	Replace Video Controller.
	Power management features enabled.	Press any key on the keyboard to wake-up the monitor.
Power is on but no OCP display	OCP not backlit.	Press any keyboard key or manual LCD switch. Make sure OCP backlight is set to ON in the BIOS Setup utility.
Server operates incorrectly after installing a CPU or second CPU module	CPU installed incorrectly.	Reinstall CPU.
	CPU module installed incorrectly.	Reinstall CPU module.
	CPU module has failed.	Remove CPU module and reboot. If server boots without errors, replace CPU module.

Server Troubleshooting (continued)

Problem	Possible Cause	Action
Server operates incorrectly after installing optional expansion board	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	Did not run SCU to configure expansion board after installation.	Run the SCU to properly configure expansion board.
	Did not install CFG file for expansion board.	Run SCU and add CFG file (if necessary).
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing optional memory (SIMMs)	SIMMs installed incorrectly.	Remove SIMMs and reinstall.
	SIMMs have failed.	Replace SIMMs.
	Memory module installed incorrectly.	Reinstall memory module.
	Memory module failed.	Replace memory module.
No response to keyboard commands	Keyboard is password protected.	Enter the keyboard password.
	Keyboard is not connected.	Power down the server and connect the keyboard.
	Keyboard is connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
No response to mouse commands	Mouse is not connected.	Power down the server and connect the mouse.
	Mouse is connected to the keyboard port.	Power down the server and connect the mouse to the mouse port.
	Mouse driver not installed.	Install the appropriate mouse driver.
Server operates correctly but application software does not	Application software installed incorrectly.	Refer to the application software documentation.
	CPU speed setting causes conflict with application software.	Run the SCU and reduce CPU speed setting.
	Having system cache enabled causes conflict with application software.	Run the SCU and disable system cache.
Target diskette drive cannot read or write information	Diskette write protection enabled.	Run the SCU and set the Diskette. Write Protection option to "Disabled."

Disk Drive Troubleshooting

Problem	Possible Cause	Action
Server does not recognize an internal or external SCSI device	SCSI device jumpers incorrectly set.	Refer to the SCSI kit installation instructions.
	SCSI ID conflicts.	Refer to the SCSI kit installation instructions.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	SCSI host adapter has failed.	Replace SCSI host adapter.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between SCSI host adapter, SCSI device or backplane.	Refer to "*SCSI Guidelines*" for correct SCSI cable installation.
Server does not boot from an internal SCSI hard disk drive	SCSI boot hard disk drive not formatted.	Format the SCSI hard disk drive. **CAUTION: Formatting the SCSI hard disk drive will destroy all the data on the drive.**
	SCSI device drivers not installed or incorrectly installed on SCSI boot hard disk drive.	Properly install all required SCSI device drivers.
	Operating system software is not installed on the SCSI boot hard disk drive.	Install the appropriate operating system.
	Requested partition does not exist.	Partition the SCSI hard disk drive and then reload the operating software.
	SCSI boot hard disk drive at wrong SCSI address.	Set SCSI boot hard disk drive to lowest "primary" SCSI address.
Server does not boot from a target diskette drive	Drive ID incorrectly set.	Make sure the drive ID is correctly set.
	Diskette drive not enabled.	Run the BIOS Setup utility to enable the diskette drive.
	Diskette boot option disabled.	Run the SCU and set boot option A then C.
	Diskette does not contain start-up files.	Insert a diskette with the correct start-up files.
	Loose cables.	Secure all cable connections.
	Diskette drive write protected.	Run the SCU and disable the diskette write protect option.

Disk Drive Troubleshooting (continued)

Problem	Possible Cause	Action
SCSI hard disk drive cannot read or write information	Incorrect disk drive jumper settings.	Refer to the SCSI kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
SBB failure	Check SBB status LEDs for a drive failure indication.	Refer to Chapter 3, *"SBB LED status indicators"* for additional information.

CD-ROM Troubleshooting

Problem	Possible Cause	Action
Cannot access the CD-ROM drive. Error message reading drive X	Install correct device drivers.	Device drivers not installed.
	Accessing wrong drive	Make sure correct SCSI ID is assigned. Refer to *"SCSI Drive IDs"*.
Disc is spinning but drive is idle	Application software not running.	Run application software.

Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on	Power indicator is defective	Replace the failed component
No screen display	Configuration error.	Run the SCU to configure the server for VGA operation. Set the jumper for VGA operation. Refer to *"Main Logic Board Jumpers"*.
	Monitor brightness and contrast controls are incorrectly set	Adjust the monitor brightness and contrast controls

Monitor Troubleshooting (continued)

Problem	Possible Cause	Action
No monitor display while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type. Refer to appropriate video driver documentation.
Distorted-rolling-or flickering screen display-or wrong / uneven color	Monitor incorrectly adjusted. Monitor signal cable incorrectly installed.	Adjust accordingly. Straighten any bent connector pins and then reconnect.
Color monitor displaying monochrome	Server was turned on before the monitor was turned on. Video jumper incorrectly set.	Turn off the server, turn on the monitor, then turn the server back on. Set the jumper for VGA operation.
Monitor fails to switch to high-resolution mode	Appropriate high-resolution video drivers are not installed or incorrectly installed.	Correctly install all appropriate high-resolution video drivers. Refer to the documentation supplied with the monitor and/or video drivers.
Monitor display not centered while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type. Refer to appropriate video driver documentation.

QAPlus/FE Advanced Diagnostics

Use QAPlus/FE Advanced Diagnostics to:

♦ Receive system Information, select SysInfo menu from the main menu.
♦ Locate bad chips and run mouse and keyboard tests, select Interact menu.
♦ Edit CMOS, select Setup menu.
♦ Run tests on components, select Testing menu.

Default testing is No Pause on Errors/Single Pass/No Peripherals/No Error Logging/Test All Components. To change default, select settings under the Testing menu before running tests.

QAPlus/FE Error Messages

Component	Messages	Solution
CPU	Arithmetic Function Failed General Functions Failed Exception Interrupt in Protected Mode Refresh Failure Logic Functions Failed	Reset CPU Replace CPU
Hard disk	Butterfly Cylinder Access Test Failed Cylinder 0 Errors Random Cylinder Access Failed Linear Cylinder Access Failed	Low-level format hard disk Replace disk
Hard drive / controller	Controller Diagnostic Test Failed Questionable Controller Card Hard drives failed	Run Setup, Check connections Reset controller, Replace controller Replace disk
Floppy diskette	Media Mismatch Drive Not Ready Write Protected Media Unformatted Media	Use known good diskette Check size and density of diskette Close drive door Remove write protection Format diskette
Floppy drive	Floppy Drives Failed	Check connections, Replace drive
Battery/clock	Clock Stopped Invalid Date RTC Interrupt Failed	Run Setup Replace battery/clock
CMOS	CMOS Clock Test Failed	Change time from Setup menu in QAPLUS
Serial port	COM port failed Serial Chip Error Serial Compare Error Serial Timeout Error	Check COM device Check connections Replace COM device Replace COM device
Video adapter	Video Failed Error in Video Buffer	Replace video adapter Replace video adapter

Chapter 5   Device Mapping

This section provides a series of tables listing mapping and address information related to computer memory and various main logic board devices (keyboard controller, interrupt controller, DMA controller, etc.).

The computer's memory and address locations are allocated at the factory to operate within a standard PC environment. However, due to the number of optional devices and/or expansion boards that are available, sometimes memory and address locations need to be changed. For example, some network expansion boards require a specific memory location. If that location is already allocated, a memory conflict results and the expansion board will not operate as expected. Note that some memory, I/O and interrupt locations can be changed using the BIOS Setup utility.

> **CAUTION**
>
> **Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available.**

CPU I/O Address Map

Range (hexadecimal)	Function
0000 to 0CF7	PCI I/O space
0CF8	Configuration space enable register
0CF9	Turbo and reset control register
0CFA to 6FFF	EISA PCI I/O space
7000 to BFFF	PCI I/O space
C000 to CFFF	PCI configuration space
D000 to FFFF	PCI I/O space

CPU Memory Address Map

Address Range	Function	Size
00000 to 7FFFF	Main memory	512 KB
80000 to 9FFFF	Main/PCI/EISA/ISA memory	128 KB
A0000 to BFFFF	PCI/EISA/ISA video buffer memory	128 KB
C0000 to C7FFF	Video memory BIOS	32 KB
C8000 to DFFFF	PCI/EISA/ISA expansion board BIOS and buffer memory	96 KB
E0000 to E7FFF	EISA/ISA/PCI adapter RAM after POST completesUsed by BIOS Setup during POST	32 KB
E8000 to EFFFF	EISA/ISA and buffer memory	32 KB
F0000 to FFFFF	System BIOS memory	64 MB

DMA Channel Assignment

Channel	Controller	Function
0	1	Refresh
1	1	Not Used
2	1	Diskette controller (if enabled)
3	1	Not Used
4	2	Cascade DMA
5	2	Not Used
6	2	Not Used
7	2	Not Used

I/O Address Map

Range (hexadecimal)	Function
060 to 064	Keyboard/mouse controller
0F0 to 0FF	Math co-processor
1F0 to 1F7	IDE controller (if enabled)
278 to 27F	LPT2 (if enabled)
2E8	COM4 (if enabled)
2F8	COM2 (if enabled)
378 to 37F	LPT1 (if enabled)
3BC to 3BE	LPT3 (if enabled)
3EB	COM3 (if enabled)
3F0 to 3F7	Diskette controller (if enabled)
3F8	COM1 (if enabled)

PCI Configuration Space Address Map

PCI Bus Number	Device Number	Device
0	31	Host bridge(CPU bridge)
0	13	EISA bridge
0	9	PCI slot 1
0	8	PCI slot 2
0	7	PCI slot 3
0	14	PCI to PCI bridge (PPB)
1	1	PCI slot 4
1	2	PCI slot 5
1	3	PCI slot 6

Server Interrupt Levels

Interrupt Number	Interrupt Source
IRQ1	Keyboard controller
IRQ3	COM2, COM 4 (if enabled)
IRQ4	COM1, COM 3 (if enabled)
IRQ6	Diskette drive (if enabled)
IRQ7	LPT1, LPT3 (if enabled)
IRQ12	Mouse interrupt
IRQ13	Math co-processor

Chapter 6 Pass / Fail Criteria

As Final Acceptance Test the following tests should be run to meet the Pass/Fail criteria:

1) **Successful Completion of the POST tests.**

2) **Successful Completion of the following QAPLUS/fe module tests (one pass):**
♦ System Board (All Tests)
♦ Memory (All Tests)
♦ Video (All Tests)
♦ Hard Disk (All Tests, except: Sequential write/read and Sequential write/random read

(Destructive Test !!))
♦ Floppy Disk (All Tests)
♦ Keyboard (All Tests)
♦ COM Ports (All Tests)
♦ LPT Ports (All Tests)
♦ Pointer device (All Tests)

3) **Successful Bootstrap of the on the computer installed Operating System.**

Operating Systems Supported:
◊ Windows for Workgroups 3.11 *(Single Processor Only)*
◊ Windows NT and Windows NT Server 3.5.
◊ OS/2 version 3.0 SMP
◊ SCO Unix with MPX, SCO Network System.
◊ SCO ODT, SCO Enterprise System
◊ Novell Netware 3.12 and 4.1. *(Single Processor Only)*
◊ Novell SFTIII 3.11 *(Single Processor Only)*
◊ Banyan Vines. *(Single Processor Only)*

Remove any software that was put on the hard drive to enable repair of the system before shipping.

When completed carefully clean outside of unit with cleaning solution.

Appendix A   Services Notes

Recommended Tools

The following tools will be needed for servicing Digital PC systems. Note that test equipment must be in calibration.

♦   Multimeter (4 1/2 digit)
♦   A philips screwdriver
♦   An antistatic wrist strap

Other Needed Materials

Cleaning agent should be an all purpose cleaner that is used in-house.

Required Special Tools

None.

Remedial Diagnostic Test Software

♦   *QAPLUS/fe* , PC Advanced Diagnostic Software, latest version.
    Partnumber : 22-00908-06

Recommended Virus Detection and Cleanup Software

♦   *F-PROT*, Virus Detection and Cleanup Software, latest version.
    Network locations:
                North America, South America, Australia and New Zealand:
                MINOTR::USER6:[VIRUS.F-PROT}

                Europe, Africa, Middle and Far East:
                VARDAF::EUROPUB:[VIRUS_SCANNER.F-PROT]

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ECO/FCO Information

BIOS version information

Refer to the Digital DECpc Bulletin Board Support , for the latest information on BIOS upgrades

   Network locations:
          North America, South America, Australia and New Zealand:
          PCBUHD::DKB300:[WC30.BBSFILES]

          Europe, Africa, Middle and Far East:
          SUTRA::D6:[PUBLIC].

Appendix B   Useful Information

Related Documentation

Document Titles	Order #'s
PRIORIS HX MP Server Quick Reference Guide	EK-A0829-RG
Service Maintenance Manual Spares Catalogue	EK-A0815-RG
PRIORIS HX MP Server User's Guide	ER-890BW-UA
PRIORIS HX MP Server Quick Setup Guide	ER-890WW-IA
Pentium CPU Modules	ER-78XWW-CA
Pentium CPU Modules (Multilingual)	ER-78XWW-CM

On-Line Bulletin Boards

The most current product information and technical support is also available on line. The most current device drivers, Setup diskettes and technical tips can be found on all of these bulletin boards.

♦   *DECpc Bulletin Board Server*
    DECpc BBS provides an easy-to-use, menu-driven bulletin board providing on-line access to the latest PC product information, device drivers, shareware and freeware.

    For access to the DECpc BBS, dial :   **xx33 9260312**

    Network Location for ;
        North America, South America, Australia and New Zealand
        PCBUHD::DKB300:[WC30.BBSFILES]

        Europe, Africa, Middle and Far East:
        SUTRA::D6:[PUBLIC].

Document Feedback

If you have comments on the contents or layout of this document we highly appreciate your feedback.
We will do our best to make this document a valuable support to your service efforts for Digital.
Please fill -out the reader feedback form and send or fax it to:

> **Digital Equipment Parts Center b.v.**
> **Att: MCS Logistics Engineering Call Desk**
> **P.O. Box 6774**
> **6503 GG Nijmegen**
> **Holland**

If you have questions about this document please do not hesitate to get in contact with our Call Desk. The number is:

> **Phone: xx31-24-3529666**
>
> **Fax: xx31-24-3563106**