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**Service
Maintenance
Manual**

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**PRIORIS HX590
& HX590 DP Server**

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Preface

The Digital PRIORIS HX590 & HX590 DP Server Service Maintenance Manual is a troubleshooting guide that can be used for reference when servicing the PRIORIS HX590 & HX590 DP Server series.

Digital Equipment Corporation reserves the right to make changes to the Digital PRIORIS HX590 & HX590 DP 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 individual 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 HX590 & HX590 DP Servers are a family of high-performance, highly-scalable network and application servers featuring the latest in modular CPU and Storage technology. Developed using the state-of-the-art technology, PRIORIS HX Servers are the most advanced servers in their class.

Description PRIORIS HX590 & HX590 DP Servers, all:

- ◆ Single and dual 90 MHz Pentium processor with 512 KB onboard writeback cache
- ◆ 64-bit memory card supporting up to 512 MB parity or 256 MB ECC memory
- ◆ On board Cirrus 5482 16-bit , 512KB video memory
- ◆ 6 PCI slots (3 Primary and 3 secondary) and 6 EISA I/O slots
- ◆ 10 external expansion slots
- ◆ Redundant cooling (2 fans, 2 spare fans)
- ◆ Single 450 watt power supply with fan
- ◆ Optional Redundant Power supply 450 watt
- ◆ 1 inch double-speed CD-ROM with SCSI interface
- ◆ 3.5 inch 1.44 Mb floppy disk
- ◆ Two 5.25 inch half-height disk bays
- ◆ Integral hot swap bay with 7 drives to support Storageworks Storage
- ◆ Building Block (SBB) drives
- ◆ Fast/wide SCSI-2 and narrow RAID configurations
- ◆ SCSI cabling supports both wide and narrow controllers and devices
- ◆ Rackmountable
- ◆ Total connectable storage capacity up to 1000 GB
- ◆ Six fans with two redundant backup fans

Product Models Information

There are three different system configurations that are currently offered for both single (PRIORIS HX590) as well as dual (PRIORIS HX590 DP) processor servers:

Base Systems are built around 16MB (single processor) or 32MB (dual processor) of parity RAM memory and a Fast Wide (16-bit) SCSI host controller.

RAID Systems are built around 16MB (single processor) parity DRAM memory and two 1GB Storage Building Block (SBBs) with a narrow (8-bit) intelligent EISA SCSI RAID controller or 32MB (dual processor) of Error Correction Code (ECC) DRAM memory and four 1GB Storage Building Block (SBBs) with a narrow (8-bit) intelligent EISA SCSI RAID controller.

Kernel Systems contain no SCSI controller and must be ordered with at least 16MB of DRAM memory. With these systems either wide or narrow, non-RAID or RAID host controllers can be added. Kernel systems may not be available in all territories.

The tables on the following pages provide details on these configurations:

PRIORIS HX 590 Systems

<i>Model</i>	<i>Memory</i>	<i>Cache</i>	<i>FDD</i>	<i>HDD</i>	<i>Host Contr.</i>	<i>CD-ROM</i>
FR-880WW-AA	16 MB parity	512KB	1.44MB	None	Adaptec 2940W 1 channel, Wide	SCSI-2, 600 KB/sec
FR-880WW-AB	16 MB Parity	512KB	1.44MB	2 x 1.0 GB SCSI-2	1 channel, Narrow RAID, EISA	SCSI-2, 600 KB/sec
FR-880WW-AC	32MB ECC	512KB	1.44MB	None	Adaptec 2940W 1 channel, Wide	SCSI-2, 600 KB/sec
FR-880WW-AD	32MB ECC	512KB	1.44MB	2 x 1GB, SBB	1 channel Narrow RAID, EISA	SCSI-2, 600 KB/sec
FR-880WW-LA	32MB parity	512KB	1.44MB	1GB SCSI-2	Adaptec 2940W 1 channel, Wide	SCSI-2, 600 KB/sec
FR-880WW-AX ⁽¹⁾	none	512KB	1.44MB	none	None	SCSI-2, 600 KB/sec

⁽¹⁾ No memory installed, at least 16MB must be ordered with the system.

PRIORIS HX590 DP Systems

<i>Model</i>	<i>Memory</i>	<i>Cache</i>	<i>FDD</i>	<i>HDD</i>	<i>Host Contr.</i>	<i>CD-ROM</i>
FR-881WW-AA	32 MB parity	512KB	1.44MB	None	Adaptec 2940W 1 channel, Wide	SCSI-2, 600 KB/sec
FR-881WW-AB	32 MB ECC	512KB	1.44MB	4 x 1GB, SCSI-2	1 channel, Narrow RAID, EISA	SCSI-2, 600 KB/sec
FR-881WW-AX ⁽¹⁾	None	512KB	1.44MB	None	None	SCSI-2, 600 KB/sec

⁽¹⁾ No memory installed, at least 16MB must be ordered with the system.

Chapter 2 Server Utilities & Configuration

Server Utilities

The following sections provide detailed instructions on running the MS-DOS utilities contained on the supplied CD-ROM startup diskette and CD-ROM. Note that these utilities can also be copied to the hard disk drive. Refer to the operating system documentation for information on copying files.

PHLASH.EXE

All servers have BIOS software in a read-only, non-volatile memory (ROM) chip. The 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 drive.

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

Before Using PHLASH.EXE

When not familiar with utility programs and their uses, carefully read and understand the following instructions before attempting to use PHLASH.EXE.

Have the following items available:

- ◆ Blank 3½-inch 1.44 MB formatted diskette.
- ◆ Diskette copy of the server utilities.

Creating a Crisis Recovery Diskette

A crisis recovery diskette should always be prepared before attempting to upgrade the BIOS. This diskette is used to reprogram the BIOS in case the flash process fails.

To create a crisis recovery diskette:

- 1) Turn on the server and allow the POST to complete. If the POST detects an error and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.
- 2) Insert the startup and utilities diskette and make sure the following files are in the UPGRADE directory:
 - MINIDOS.SYS
 - PHLASH.EXE
 - DEVTBLS.DAT
 - PHLASH.INI
 - PRIORISHX.ROM
 - MAKEBOOT.EXE
 - MAKECRD.EXE
- 3) Create the same directory on the hard disk drive and then copy the above files to it.
- 4) Insert a blank formatted diskette into drive A.
- 5) From drive C: type MAKECRD. This copies the files to drive A.
- 6) Remove the crisis recovery diskette from drive A and store it in a safe place.

Using the Crisis Recovery Diskette

The crisis recovery diskette must be used only if the server's BIOS fails or if a BIOS upgrade was unsuccessful

- ◆ POST detects an error after a normal boot cycle or a BIOS upgrade.
- ◆ The BIOS in the bootblock memory executes.
- ◆ The server beeps several times.
- ◆ The diskette drive begins searching for the crisis recovery diskette.

If the server's BIOS fails:

- 1) Turn off the server and set the recovery jumper (**J39**) to recovery mode.
- 2) Insert the crisis recovery diskette into drive A and power on the server.
- 3) After the BIOS is restarted, turn off the power and remove the crisis recovery diskette from drive A.
- 4) Set the recovery jumper (**J39**) back to normal to prevent unauthorized personnel from loading a new server BIOS.
- 5) Turn the power back on for normal operation.

Upgrading The Server's BIOS

Perform the following steps to update the server's BIOS in flash memory:

- 1) Turn on the server and allow the POST to complete.
If POST detects an error, take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.
- 2) Create a crisis recovery diskette. Refer to “*Creating a Crisis Recovery Diskette*” previously described.
- 3) Insert the startup and utilities diskette.
- 4) At the MS-DOS prompt:
change directory to **a:\UPGRADE**
type: **PHLASH /e**
A screen appears on the monitor warning that you are about to erase the server's BIOS.

NOTE If you need to flash a file other than the one on the diskette, copy the new file to the upgrade directory and type:
PHLASH [filename]

- 5) Press [Enter] to continue. If not, press [Esc] to cancel.
Once [Enter] is pressed, PHLASH.EXE automatically updates the server's BIOS.
- 6) After the flashing process completes, the server automatically reboots itself so changes immediately take effect.
- 7) Remove the startup utilities diskette.

EPP3SMC.EXE

EPP3SMC.EXE can be executed as an MS-DOS command or added to the CONFIG.SYS file as a device driver. In either case, use the BIOS Setup utility or the SCU to set the parallel port to EPP mode.

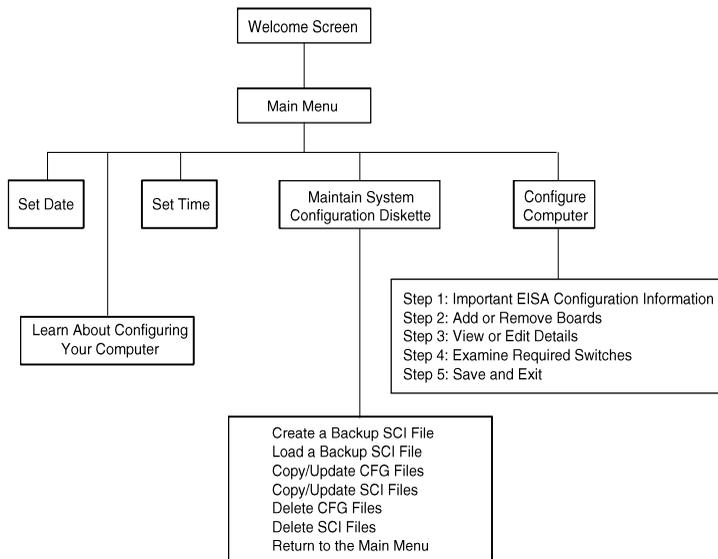
Configuring The Server

This chapter provides detailed information on how to configure the server using the System Configuration Utility (SCU). Digital recommends to use the SCU to initially configure the server and each time you add hardware, remove hardware, or change server settings.

If the server was delivered with factory-installed hardware and software, the server has already been configured.

The SCU

The SCU enables to setup and configure the server using the menu driven items shown in figure 2-1. Depending on the installed hardware and level of server security required, you might have to access one or more of these items to properly configure the server.



DEC00456

Figure 2 - 1 SCU Main Menu OptionsBefore Using the

SCU

When familiar with utility programs and their uses, refer to the appropriate sections in this chapter to setup or update the server’s configuration. Otherwise, carefully read and understand this chapter before attempting to modify the server’s configuration settings.

Read any README files contained on the System Configuration Utility diskette for additional information.

In addition, have the following items readily available:

- ◆ A 1.44 MB formatted diskette.
- ◆ Configuration (CFG) files supplied with any installed EISA/PCI expansion boards.
Refer to the section, "SCI Files and CFG Files", later in this chapter for more information about CFG files.
- ◆ Kit installation instructions for any installed optional hardware.

SCI Files and CFG Files

The SCU creates a System Configuration Information (SCI) file each time the server has been configured. This SCI file can be used on any PRIORIS HX590 (DP) Servers that has been 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.

Configuration (CFG) files contain main logic board, EISA, PCI, and ISA expansion board vital characteristics and the server resources they require for proper operation. When installing additional EISA, PCI, or ISA expansion boards, make sure to copy the CFG files (and overlays, if applicable) associated with the expansion boards, to the System Configuration Utility diskette before attempting to configure the server.

Refer to the option documentation for additional information.

Using the SCU

Use the SCU when experiencing problems with the hard disk and reconfiguration of the server is necessary. In addition, the SCU should be used to modify the configuration after you add or remove hardware, or change server settings.

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 to update the server configuration.

To run the SCU, perform the following steps:

- 1) Install any optional hardware, for example disk drives, EISA expansion boards, and so on. Refer to Chapter 3, "Service Procedures".
- 2) 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 to run the SCU from the floppy disk and 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.

- 3) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server. The SCU introductory screen appears.

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

- 4) 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 6. If a configuration error appears, the Welcome screen displays information about the error and tells to reconfigure the server. Press **[Enter]** to display the Main menu, select the Configure Computer option, then select the View and Edit Details option. Make any changes as indicated by the POST error message, and then select the Exit and Save option to end the SCU session and boot the server so the changes take effect.
- 5) If applicable, select the Learn About Configuring The Computer option to familiarize with the SCU.

- 6) If applicable, set the current server time and date using the `Set Time` and `Set Date` menu options.
- 7) Using the `Maintain System Configuration Diskette` option, copy the CFG files supplied with any EISA, PCI, or ISA expansion board.
- 8) Select the `Configure Computer` option to configure the server.
- 9) If applicable, select the `Maintain System Configuration Diskette` option to create, change, or update SCI or CFG files.
- 10) To end the SCU session select the `Exit From This Utility` option.
- 11) If applicable, install the operating system and any application software.
Refer to the operating system and application software documentation for installation information.

Configure The Computer

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 configuration.

Step 1: Important EISA Configuration Information

Step 2: Add or remove boards

Step 3: View or edit details

Step 4: Examine required switches

Step 5: Save and Exit

Step 1: Important EISA Configuration Information

This menu item provides basic EISA configuration information and how it differs from ISA configuration. These screens are available at any time during the configuration process by pressing **[F1]** and by selecting EISA configuration from the help menu.

Step 2: Adding or Removing Boards

This menu item provides a list of boards and options in the configuration. You can add, move, and delete boards from this list until it shows all the boards and installed options in the server, including the boards not yet physically installed. The SCU automatically detects any EISA expansion boards installed on the server and configures the server accordingly. The SCU does not automatically detect ISA expansion boards.

Step 3: View or Edit Details

This menu item allows to examine and change the setting of each function and the resource allocated for those functions. When editing a function or resource in this step, you might have to change the switch or jumper setting.

Step 4: Examine Required Switches

This menu item allows 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.

Step 5: Save and Exit

This menu item allows to exit the SCU program with or without saving the configuration settings.

Adding ISA Boards

Perform the following steps to add ISA boards to the server configuration:

- 1) Select "*Step 2: Adding and Removing Boards*", and update the list of boards and options to include any ISA boards you are going to install in the server.
- 2) Select "*Step 4: Examine Required Switches*", to check the required switch and jumper settings of the ISA boards.
- 3) Select "*Step 5: Save and Exit*", to save the configuration and exit the SCU.
Turn off the server and install the ISA boards.



CAUTION

Do not attempt to physically install boards while the server is turned on.

SCU and Setup Options

The tables below 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.

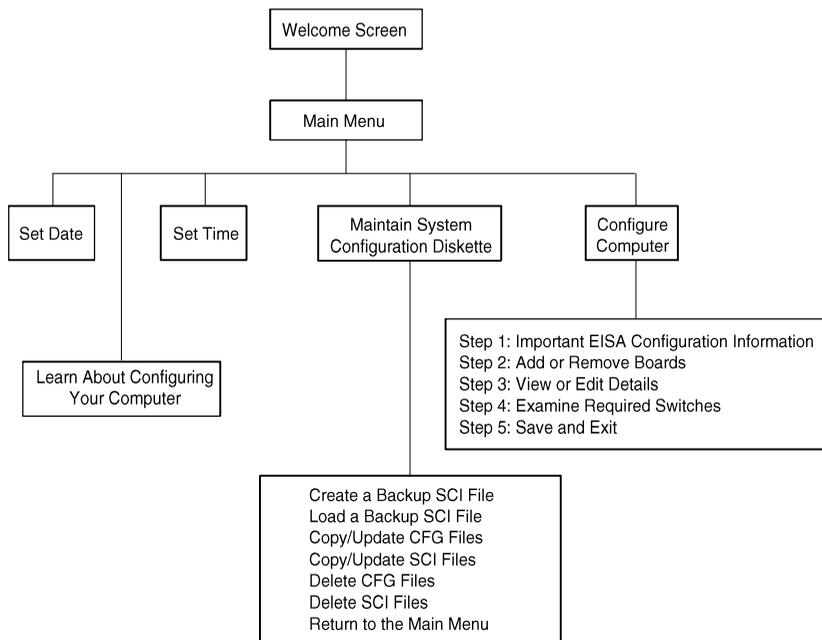
NOTE The ROM BIOS Setup utility and the SCU contain the same options as those listed in the option tables below. Digital recommends to use the SCU to configure the server each time you add hardware, remove hardware, or change server settings.

SCU Main Menu

The SCU enables to set up and configure the server using a menu-driven interface. Depending on the hardware installed in the server and the level of required server security, you might need to access one or more of the menu items to properly configure the server.

When accessing the SCU, a welcome screen appears, followed by the main menu options listed below. Some listed menu items access the listed functions directly, while accessing others brings up an appropriate secondary menu.

- ◆ Set Date
- ◆ Set Time
- ◆ Learn A.bout Configuring The Computer
- ◆ Maintain System Configuration
- ◆ Configure Computer



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Figure 2 - 2 SCU Main Menu Options

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 Español Français Deutsch 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	Not installed	The PRIORIS HX Server family does not support IDE drives.
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.

Boot Options

Menu Fields	Settings	Comments
Boot option	A: then C: C: then A: C: only	Each time the server boots, it will load the operating system from the sequence selected.
SETUP prompt	Enabled Disabled	Enables or disables the <F2> setup prompt each time the server boots.
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.
Summary screen	Enabled Disabled	Enabling this option causes the server to display configuration parameters (in the form of a summary screen) during boot.

Keyboard Features

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Keyboard features	Auto Off On	Selects the keyboard option.
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 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.

Memory and Cache Options

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Internal cache	Enabled Disabled	Enables or disables the server's internal cache.
External cache	Enable Disable	Enables or disables the server's external cache.
System BIOS shadow	Enabled Disabled	Enables or disables the server's BIOS shadowing option.
Cache system BIOS	Enabled Disabled	Enables or disables caching control of the system BIOS system area.
Shadow video BIOS	Enabled Disabled	Enables or disables the server's shadow video ROM option.
Cache video BIOS	Enabled Disabled	Enables or disables caching control of the video BIOS area.
Shadow 16K at: C8000h CC000h D0000h D4000h D8000h DC000h	Enabled Disabled	Allows to enable or disable shadowing of individual segments of ROM to increase server performance.

Memory and Cache Options (continued)

Menu Fields	Settings	Comments
AT bus space	Disabled F00000h, 1 MB	Memory hole not available upper memory is contiguous. 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.

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.
Set user password	Press [Enter]	Enables to set a user password.
Password on boot	Enabled Disabled	Enables or disables the enter password on boot option.
Diskette access	Supervisor User	Enables to control who has access to diskette drives.
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.

Integrated Peripherals

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Mouse port	Disabled Enabled	Enables or disables the mouse port.
Parallel port	378, IRQ7 278, IRQ5 Auto Disabled 3BC, IRQ7	Enables or disables the onboard port at the specified address.
Parallel port mode	EPP 1.7 EPP 1.9 ECP Compatible mode Bi-directional mode	Sets the enhanced parallel port mode. Sets the extended capabilities port mode. Compatible mode - standard printer connection. Bi-directional mode - PS/2 compatible mode and able to receive data.
Serial port 1	Auto Disabled 3F8, IRQ4 2F8, IRQ3 3E8, IRQ4 2E8, IRQ3	Enables or disables onboard serial port 1 at the specified address.
Serial port 2	Auto Disabled 3F8, IRQ4 2F8, IRQ3 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 the keyboard and mouse remain 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.
IDE controller	Enabled Disabled	The server does not support an onboard IDE controller.

Advanced Chipset Control

Menu Fields	Settings	Comments
CPU to PCI posting	Disabled Enabled	Enables or disables the CPU to PCI write buffers. When enabled, these buffers temporarily store data between writes.
PCI to memory posting	Enabled Disabled	Enables or disables the PCI to DRAM write buffers. When enabled, these buffers temporarily store data between writes.
CPU to memory posting	Enabled Disabled	Enables or disables the CPU to DRAM write buffers. When enabled, these buffers temporarily store data between writes.
PCI burst write	Enabled Disabled	Enables or disables PCI memory burst write cycles.
PCI arbiter	System default Pure rotating EISA slots PCI slots 4-6 CPU PCI slot 1 PCI slot 2 PCI slot 3	Selects the PCI arbiter priority scheme. Select “ <i>System Default</i> ” for optimal setting. Select “ <i>Pure Rotating</i> ” or a device with the highest priority, if absolutely needed.
Latency timer value	20 90 A0 F0	Sets the maximum number of PCI bus clocks that the PMPC can burst as a master.
EISA to PCI line buffer	Enabled Disabled	Enables or disables the EISA to PCI line buffer.

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.

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 to prevent damage to circuit boards and/or components:

- ◆ Always wear an ESD wrist strap when handling ESD sensitive material and 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 will be needed for servicing Digital PC systems. Note that test equipment must be calibrated:

- ◆ 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.
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)

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.

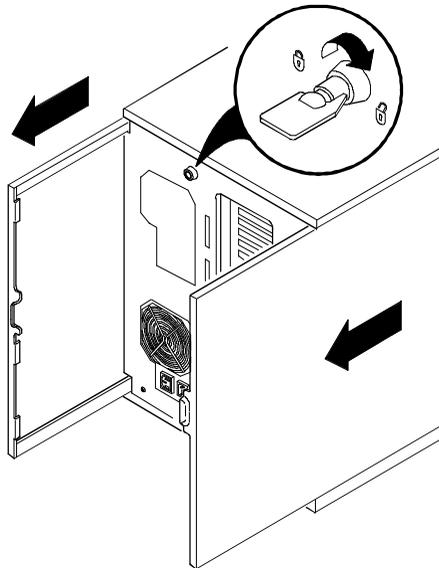


WARNING

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.

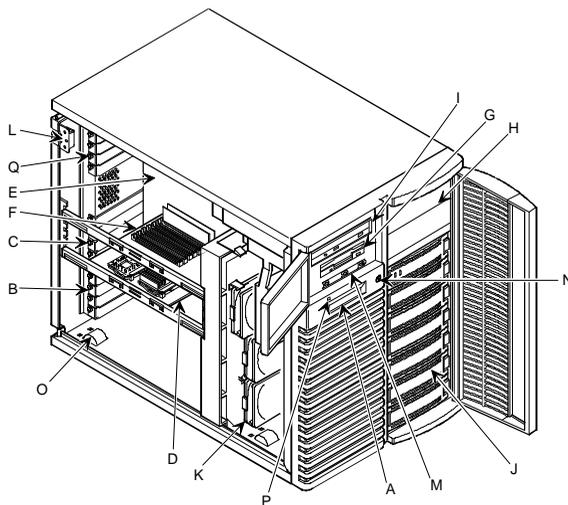


DEC00405-2

Figure 3 - 1 Unlocking and Removing the Side Panel

Server Components (Left Side)

<i>Legend</i>	<i>Component</i>
A	Operator control panel (OCP)
B	6 EISA expansion slots
C	Primary PCI 32-bit local bus expansion slots
D	CPU module
E	Main logic board
F	Memory module
G	3½-inch diskette drive
H	Front access 5¼-inch half-height drive bays
I	CD-ROM drive bay
J	Integral hot-swap device bay (slots 0 through 6 from top to bottom)
K	Cooling fans (two spare fans)
L	Contact switch
M	Power, OCP, and reset buttons
N	Security keylock
O	Casters
P	Power indicator
Q	Secondary PCI 32-bit local bus expansion slots

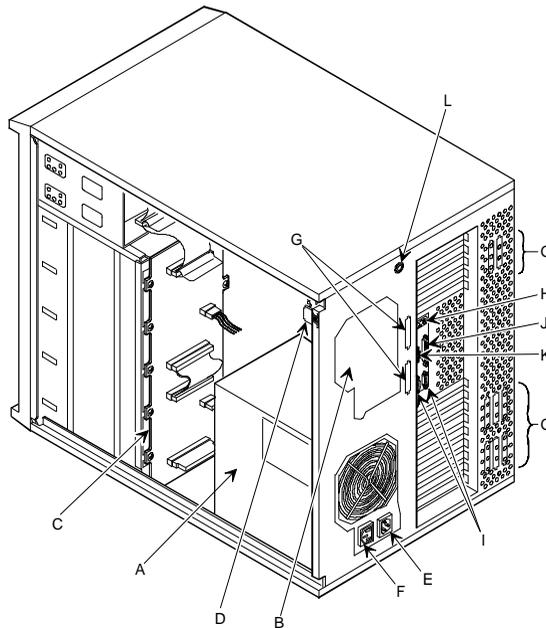


DEC00407-2

Figure 3 - 2 Server Components (Left Side)

Server Components (Right Side)

Legend	Component
A	Power supply
B	Redundant power supply area
C	Storage backplane
D	Contact switch
E	Ac power plug
F	Monitor plug
G	SCSI knockouts (back panel)
H	Keyboard and mouse ports
I	Serial ports
J	Parallel port
K	Video port
L	Keylock



DEC00438-2

Figure 3 - 3 Server Components (Right Side)

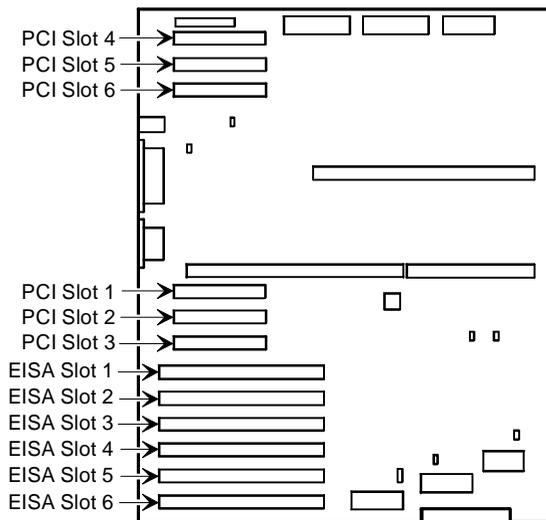
Expansion Slots

The PRIORIS HX Server contains 12 expansion board slots. 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 maximum performance by using a faster data path for greater computing speed. It also improves the expandability of the server.

NOTE When installing expansion boards, always read the accompanying documentation for server memory address and IRQ requirements. Compare that information to the server memory and IRQ requirements in the appropriate CPU module specifications booklet. If conflicts are detected, the expansion board must be configured to alternate settings.

<i>Expansion Slot Designation</i>	<i>Description</i>
EISA slots 1 through 6	Supports industry-standard 32-bit EISA expansion boards.
PCI slots 1 through 3 (primary) PCI slots 4 through 6 (secondary)	Supports bus mastering 32-bit PCI expansion boards.

Some PCI expansion boards might need to be installed in a primary PCI slot.



DEC00400-5

Figure 3 - 4 PRIORIS HX Server Expansion Board Slots

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. 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

Entries in *Italic bold* in the following table represent the factory default settings.

Feature	Description	Setting
Onboard VGA	<i>Enabled</i> Disabled	<i>J17, jumpered</i> J17, open
VGA IRQ select	Enabled <i>Disabled</i>	J9, jumpered <i>J9, open</i>
Boot block update	Enabled <i>Disabled</i>	J28, pins 1 and 2 jumpered <i>J28, pins 2 and jumpered</i>
DSM	Install <i>Not install</i>	J42, open <i>J42, jumpered</i>
Recovery mode	Recovery mode <i>Normal</i>	J39, jumpered <i>J39, open</i>
Password clear	Password clear (MFG test) <i>Normal mode</i>	J38, jumpered <i>J38, open</i>
BIOS upgrade	<i>Enabled</i> Disabled	J41, jumpered <i>J41, open</i>

Main Logic Board Jumper Locations.

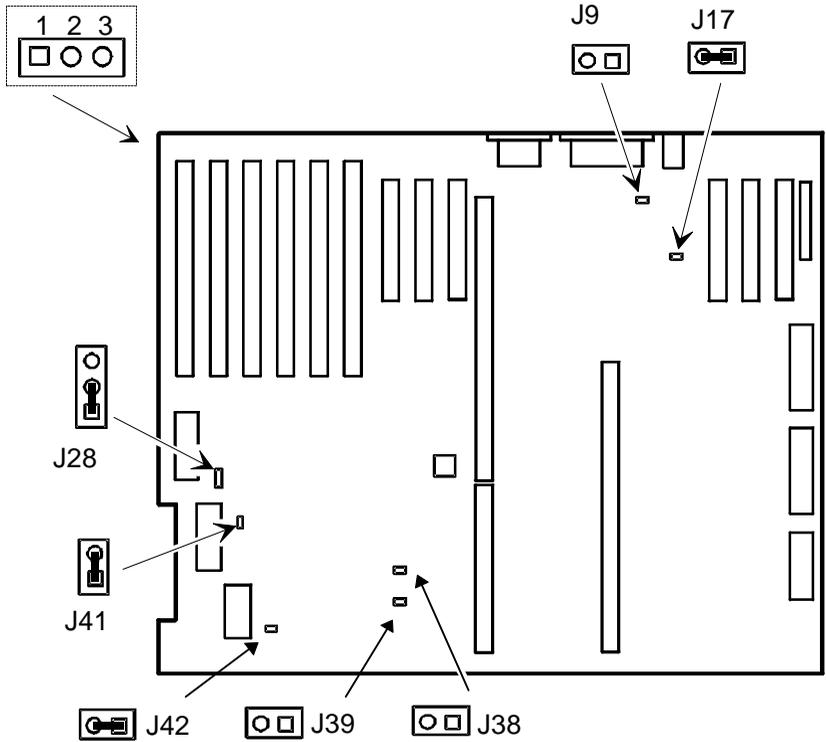


Figure 3 - 5 Main Board Jumper Locations

Computer Memory Configurations

The server will support up to 512 MB of parity memory and 256 MB of ECC memory using SIMM sockets 0 through 7.

When adding additional memory make sure to:

- ◆ Install 36-bit SIMMs having an access time of 70 ns or less.
- ◆ Fill two sockets at a time using the same SIMM size, type, and speed (4 MB, 8 MB, 16 MB, 32 MB, and 64 MB densities are available for parity memory. 16 MB and 32 MB densities are available for ECC memory).
- ◆ Fill sockets 0 and 1 before sockets 2 and 3, sockets 0 through 3 before sockets 4 and 5, and sockets 0 through 5 before sockets 6 and 7.
- ◆ Only the configurations listed below are allowed.
- ◆ Parity memory and ECC memory **cannot** be mixed together.
- ◆ Only 32 MB (2 x 16MB, IBM ECC) and 64 MB (2 x 32 MB, IBM ECC) densities are available for ECC memory modules.

Memory Configurations

<i>Bank 0/1</i>	<i>Bank 2/3</i>	<i>Bank 4/5</i>	<i>Bank 6/7</i>	<i>Total Memory</i>
2 x 4 MB	2 x 4 MB			16 MB
2 x 8 MB				16 MB
2 x 4 MB	2 x 4 MB	2 x 4 MB		24 MB
2 x 4 MB	2 x 8 MB			24 MB
2 x 4 MB	2 x 4 MB	2 x 8 MB		32 MB
2 x 8 MB	2 x 8 MB			32 MB
2 x 16 MB				32 MB
2 x 16 MB (ECC)				32 MB (ECC)
2 x 4 MB	2 x 16 MB			40 MB
2 x 4 MB	2 x 8 MB	2 x 8 MB		40 MB
2 x 4 MB	2 x 4 MB	2 x 16 MB		48 MB
2 x 8 MB	2 x 16 MB			48 MB
2 x 8 MB	2 x 8 MB	2 x 8 MB		48 MB
2 x 4 MB	2 x 8 MB	2 x 16 MB		56 MB
2 x 8 MB	2 x 8 MB	2 x 16 MB		64 MB
2 x 16 MB	2 x 16 MB			64 MB
2 x 16 MB (ECC)	2 x 16 MB (ECC)			64 MB (ECC)
2 x 32 MB				64 MB
2 x 32 MB (ECC)				64 MB (ECC)
2 x 4 MB	2 x 16 MB	2 x 16 MB		72 MB
2 x 4 MB	2 x 32 MB			72 MB
2 x 4 MB	2 x 4 MB	2 x 32 MB		80 MB
2 x 8 MB	2 x 16 MB	2 x 16 MB		80 MB
2 x 8 MB	2 x 32 MB			80 MB
2 x 4 MB	2 x 8 MB	2 x 32 MB		88 MB

Memory Configurations (continued)

<i>Bank 0/1</i>	<i>Bank 2/3</i>	<i>Bank 4/5</i>	<i>Bank 6/7</i>	<i>Total Memory</i>
2 x 8 MB	2 x 8 MB	2 x 32 MB		96 MB
2 x 16 MB	2 x 16 MB	2 x 16 MB		96 MB
2 x 16 MB (ECC)	2 x 16 MB (ECC)	2 x 16 MB (ECC)		96 MB (ECC)
2 x 16 MB	2 x 16 MB	2 x 16 MB		96 MB
2 x 16 MB (ECC)	2 x 32 MB (ECC)			96 MB (ECC)
2 x 4 MB	2 x 16 MB	2 x 32 MB		104 MB
2 x 8 MB	2 x 16 MB	2 x 32 MB		112 MB
2 x 16 MB	2 x 16 MB	2 x 32 MB		128 MB
2 x 16 MB (ECC)	2 x 16 MB (ECC)	2 x 32 MB (ECC)		128 MB (ECC)
2 x 32 MB	2 x 32 MB			128 MB
2 x 32 MB (ECC)	2 x 32 MB (ECC)			128 MB (ECC)
2 x 64 MB				128 MB
2 x 4 MB	2 x 32 MB	2 x 32 MB		136 MB
2 x 4 MB	2 x 64 MB			136 MB
2 x 8 MB	2 x 32 MB	2 x 32 MB		144 MB
2 x 8 MB	2 x 64 MB			144 MB
2 x 4 MB	2 x 4 MB	2 x 4 MB	2 x 64 MB	152 MB
2 x 16 MB	2 x 32 MB	2 x 32 MB		160 MB
2 x 16 MB	2 x 64 MB			160 MB
2 x 8 MB	2 x 8 MB	2 x 8 MB	2 x 64 MB	176 MB
2 x 32 MB	2 x 32 MB	2 x 32 MB		192 MB
2 x 32 MB (ECC)	2 x 32 MB (ECC)	2 x 32 MB (ECC)		192 MB (ECC)
2 x 32 MB	2 x 64 MB			192 MB
2 x 16 MB	2 x 16 MB	2 x 16 MB	2 x 64 MB	224 MB
2 x 32 MB	2 x 32 MB	2 x 64 MB		256 MB
2 x 32 MB	256 MB			
2 x 32 MB (ECC)	256 MB (ECC)			
2 x 4 MB	2 x 4 MB	2 x 64 MB	2 x 64 MB	272 MB
2 x 8 MB	2 x 8 MB	2 x 64 MB	2 x 64 MB	288 MB
2 x 32 MB	2 x 32 MB	2 x 32 MB	2 x 64 MB	320 MB
2 x 32 MB	2 x 64 MB	2 x 64 MB	2 x 64 MB	448 MB
2 x 64 MB	512 MB			

PRIORIS HX590 & HX 590 DP SIMM Locations

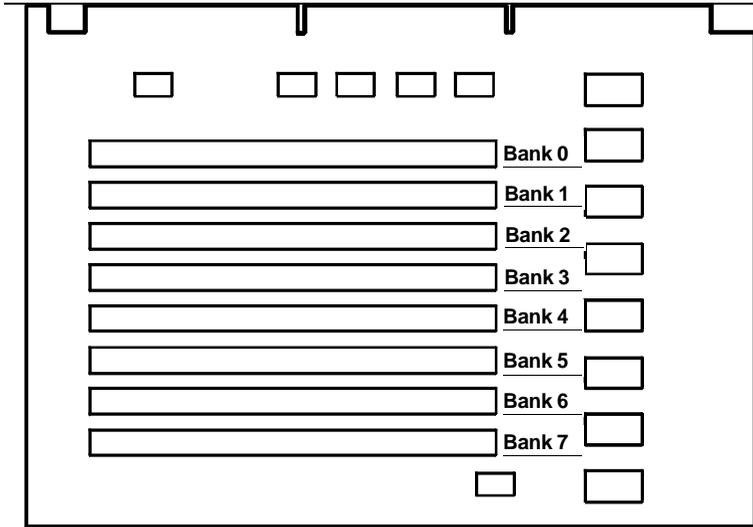


Figure 3 - 6 Memory Module

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.

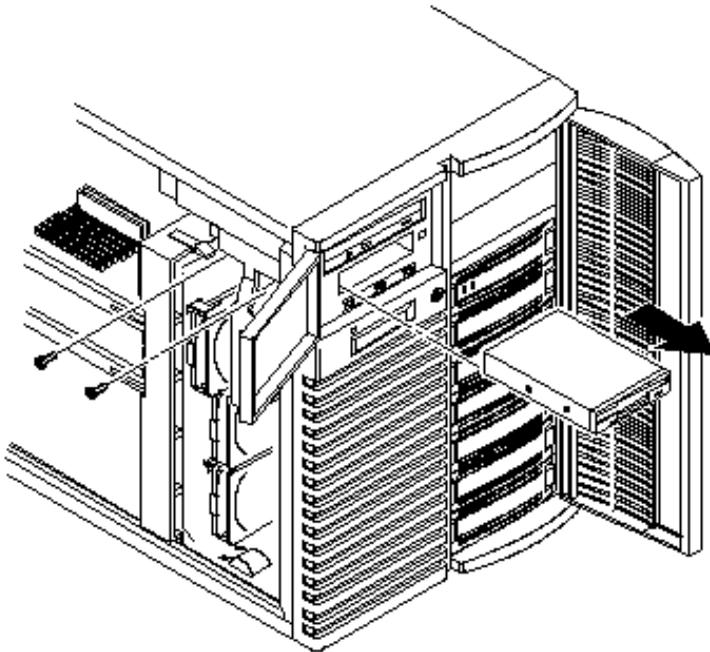
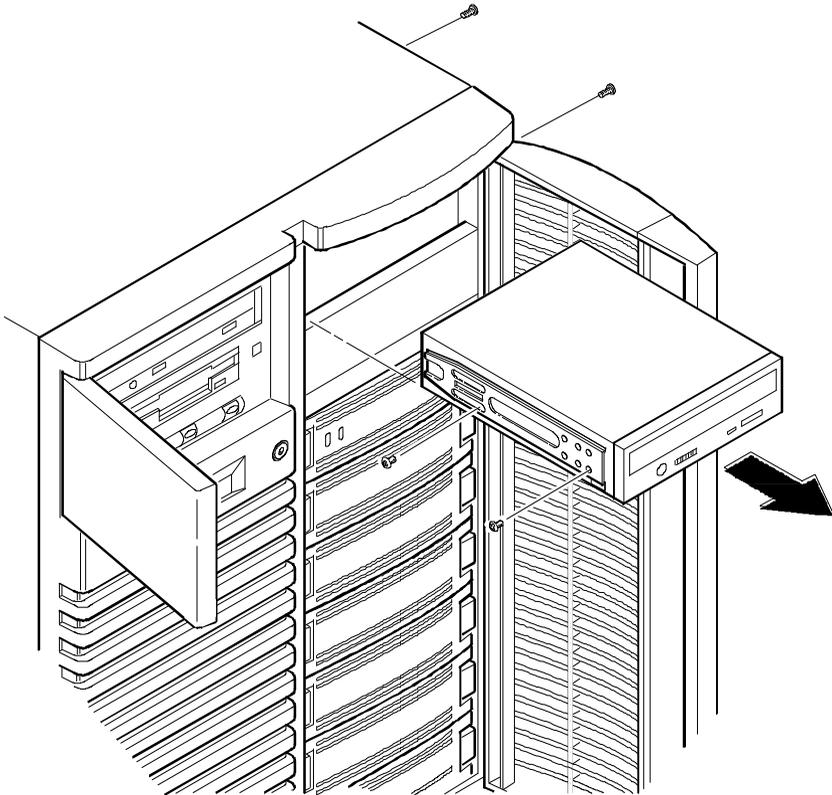


Figure 3 - 7 Replacing the 3½-inch Diskette Drive

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.



DEC00409-2

Figure 3 - 8 Removing the CD-ROM drive

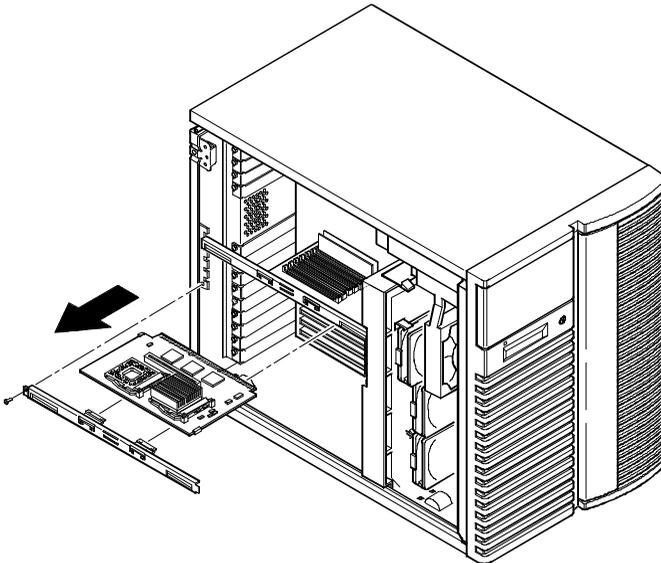
Remove the CPU Module

To remove the CPU module:

- 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 CPU module from main logic board.
- 6) Replace CPU module and retaining bracket.
- 7) Replace and lock left side panel.

NOTE The server will not operate with the side panel removed.

- 8) Connect external devices and restore power.



DEC00404-2

Figure 3 - 9 Removing the CPU module

Replacing the CPU Chip

The CPU module is equipped with a two upgradeable ZIF sockets capable of supporting future higher performance Pentium processors.



CAUTION

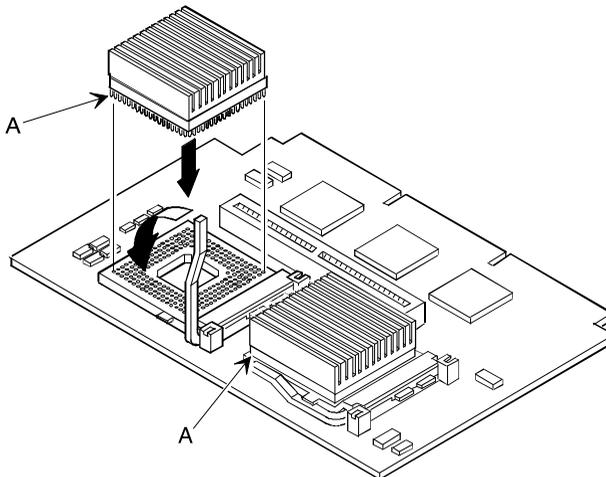
When replacing the CPU make sure the new chip is a 5V device. If only 3.3V devices are available see "To set CPU voltage to 3.3V".

To replace the CPU:

- 1) Remove the CPU module.
- 2) Place the CPU module on an anti-static surface.
- 3) Lift up on the release lever for the ZIF socket.
- 4) Remove the CPU from the ZIP socket pulling it straight up.
- 5) Install the new CPU and return the release lever to its original position.
- 6) Set any appropriate jumpers.
- 7) Install and secure the CPU module to the main logic board.

NOTE

Make sure pin 1 on the CPU is aligned with pin 1 on the ZIF socket (A, Figure 3 - 10). Pin 1 is located at the notched corner of the CPU (You can see the notched corner by looking at the CPU from the pin side). Also, the CPU is keyed so it cannot be installed incorrectly.



DEC00260-2

Figure 3 - 10 Replacing the CPU Chip

CPU Module Jumper Settings

Feature	Description	Setting
CPU core/bus frequency ratio	2/1 speed bus 3/2 speed bus	J4, jumpered J4, open ⁽¹⁾
Reserved	Factory use only	J8, jumpered ⁽¹⁾ J8, open

⁽¹⁾ Factory default setting

Set the CPU voltage to 3.3V

- 1) Remove the 5V Jumper Module from the 5V connector J100 on the CPU Module.
- 2) Push the 3.3 V Jumper Module on the pins of 3.3V connector J101 on the CPU Module. Make sure pin's 1 of both connector J101 and the jumper module are aligned.

NOTE Digital recommends to NOT change the factory default jumper settings. Earlier versions of the CPU Module did not have voltage regulator sockets as shown in B of figure 3 - 11.

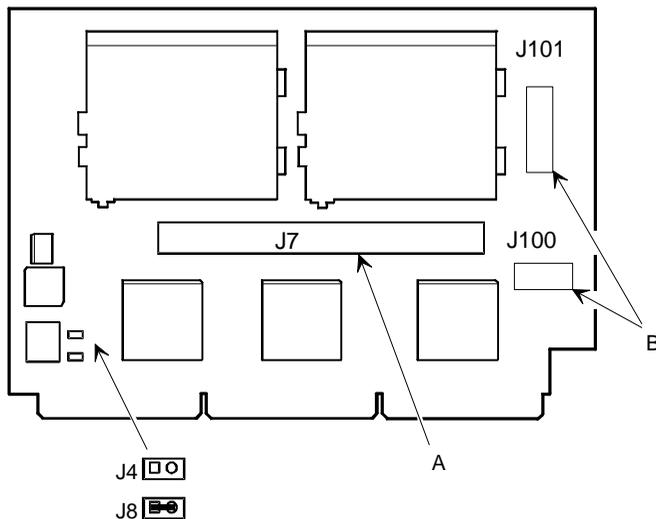
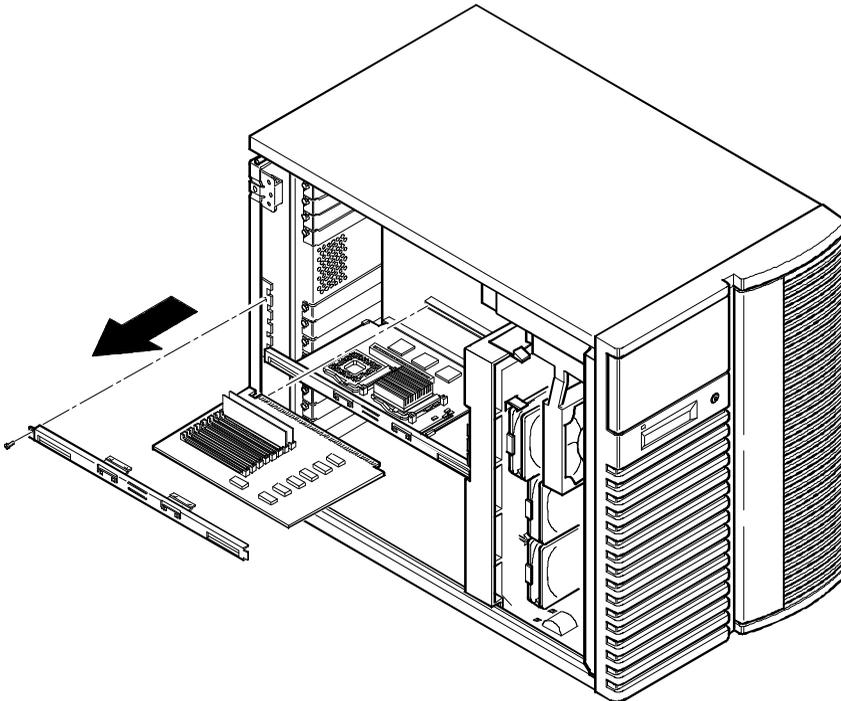


Figure 3 - 11 Set the CPU Voltage to 3.3 Volt

Remove the Memory Module

To remove the 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 a higher performance memory module or add additional server memory on existing memory module.
- 7) Replace memory module retaining bracket.
- 8) Replace and lock left side panel.
- 9) Connect external devices and restore power.



DEC00404-3

Figure 3 - 12 Removing the Memory Module

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.

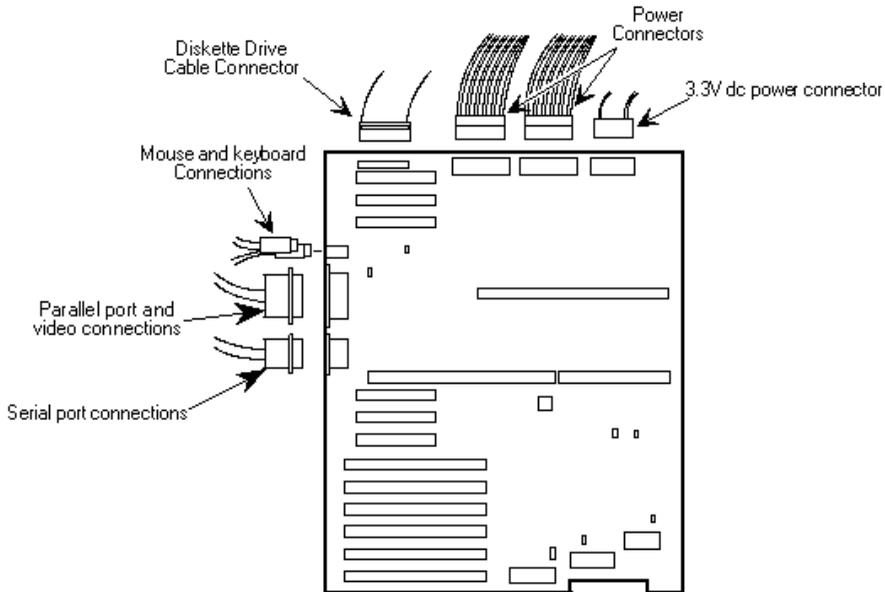


Figure 3 - 13 Removing the Main Logic Board

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.

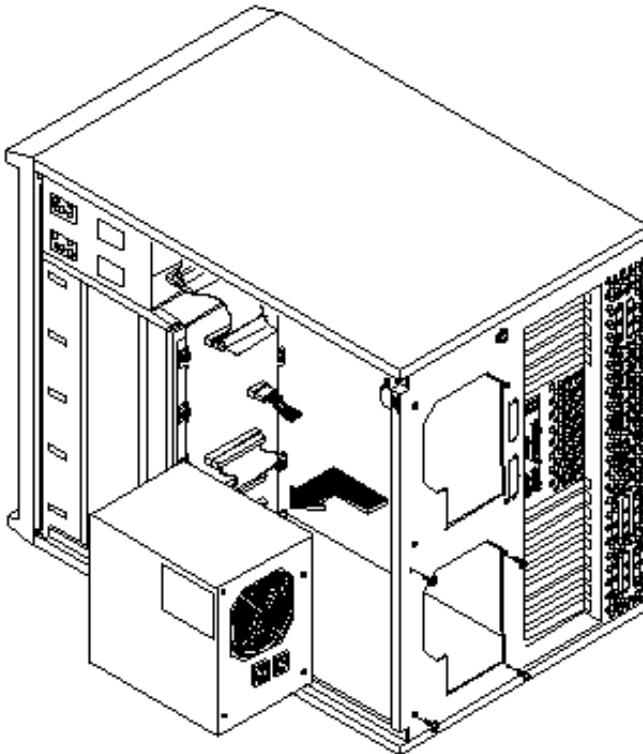
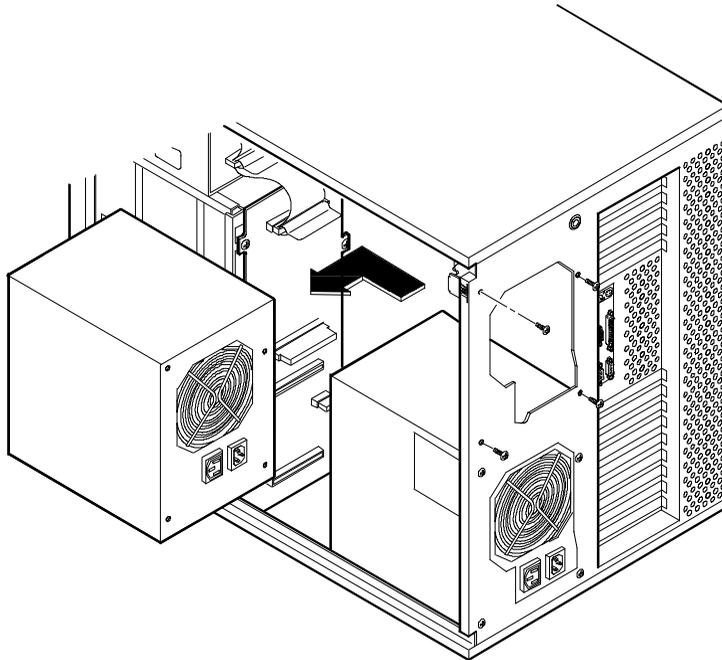


Figure 3 - 14 Removing the Power Supply

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 - 15 Removing the Optional Power Supply

Replacing Secondary Cache Memory

The CPU module comes with standard or burst secondary cache memory in the form of a single in-line cache module. Secondary cache memory is designed to greatly improve the performance of the installed CPU(s). Note that “standard” cache refers to asynchronous cache and “burst” cache to synchronous (higher performance) cache.

To replace secondary cache memory:

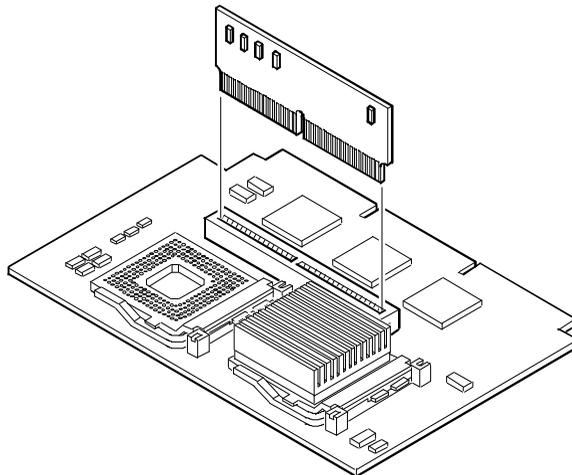
- 1) Remove the CPU module.
- 2) Place the CPU module on an anti-static surface.
- 3) Locate the secondary cache memory socket on the CPU module and remove the currently installed cache memory module.



CAUTION

Static electricity can cause damage to components. Before handling any cache module, make sure to discharge all static electricity from the body by touching an exposed metal surface of the computer's chassis.

- 4) Remove the new cache memory module from its anti-static packaging, handling it only by the edges.
- 5) Install the cache memory module into the socket (Figure 3 - 16). Make sure it is firmly seated into the socket.
- 6) Install and secure the CPU module to the main logic board.



DEC00262

Figure 3 - 16 Replacing the Secondary Cache Module

Replacing a Device Into the Hot-Swap Drive Bay

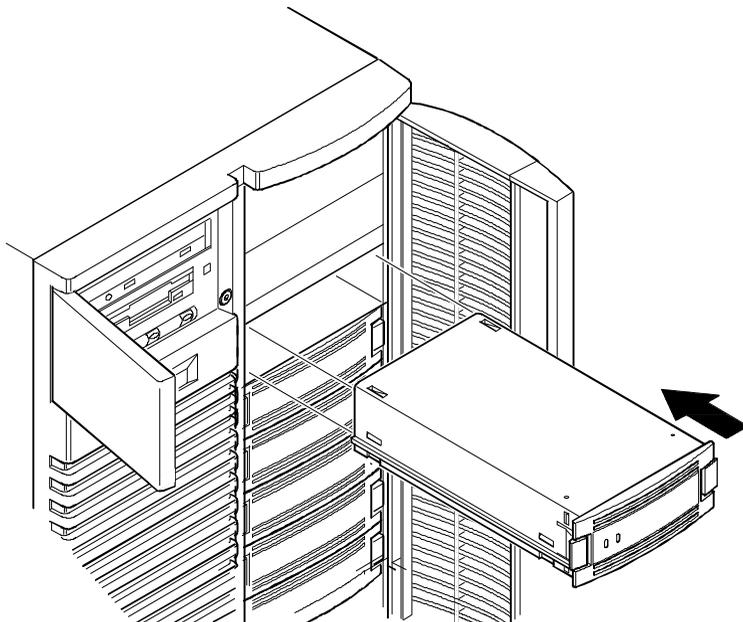
Hot-swapping allows to remove or install an SBB (Storage Building Block) while the server remains online and active, eliminating interference with the server's operation. For SBBs, the hot-swap method can be used to replace a device providing that the device is not active (green activity LED is off).

Refer to the next section "SBB LED Status Indicators".

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 installed devices.

Use the following procedure to install or 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.



DEC00443-2

Figure 3 - 17 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.



CAUTION

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

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

<i>Activity Status LED</i>	<i>Fault Status LED</i>	<i>Indication</i>
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.

Replacing the Server 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, you need to replace the server's battery.

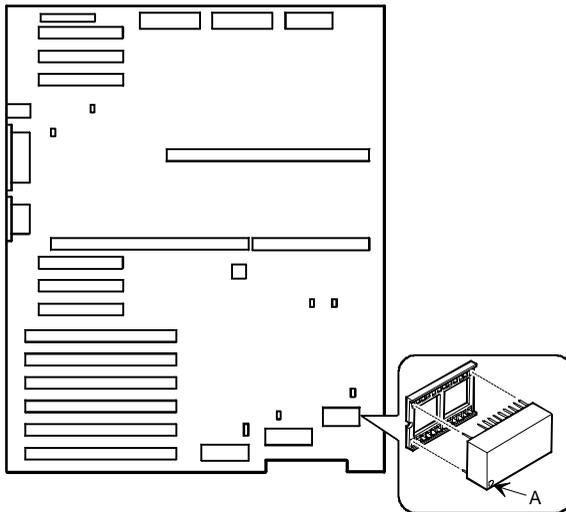
To replace the battery, perform the following:

- 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 1 on the socket (A).
- 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 the 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.



DEC00400-4

Figure 3 - 18 Replacing the Server Battery/Real Time Clock (RTC)

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 storage backplane supports seven hot-swap devices split between two SCSI bus sections, SCSI bus A and SCSI bus B. 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. See the relevant topic below for information on single or dual SCSI channel configurations.

The server has been supplied with a standard wide (68-pin) SCSI cable that attaches to the SCSI host adapter at one end and to SCSI bus A at the other end. The three middle device connectors support the upper left and right drive bays. Three wide-to-narrow cable adapters were provided to connect narrow devices in the upper drive bay areas. A SCSI bus jumper connects SCSI bus A and SCSI bus B. A wide internal terminator is installed at the end of SCSI bus B.

SCSI Configuration Guidelines

The PRIORIS HX590 & HX590 DP Server has a hot-swap backplane that supports one or two channel SCSI host adapters and up to seven 3½-inch SBBs. Multiple SCSI host adapters can also be used to improve server performance or to increase the number of SCSI devices that you connect to the server.

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

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, you must remove or disable the terminator from the device before you complete the installation.

NOTE The server uses a single-ended actively terminated cable. Use only the SCSI cable supplied with the server.

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. Use SCSI ID 0 through 6 (narrow devices) and 0 through 15 (wide devices) for the remaining SCSI devices.

The server is supplied with a wide (68-pin) five connector cable assembly. A wide-to-narrow cable adapter is used to connect narrow (50-pin) devices for SCSI operation. Three cable adapters, two 68-pin internal terminators, and one 68-pin-to-68-pin jumper cable are supplied with the standard wide SCSI cable.

SCSI device drivers are required to operate the SCSI devices.

Refer to the System and Options Configuration Guide for ordering and configuration information on additional SCSI cables and devices. Ordernumber ER-880WW-CA.A01.

External SCSI Bus Guidelines

- ◆ Make sure that the SCSI addresses select for the external SCSI devices do not conflict with other SCSI devices in the storage system cabinet.
- ◆ 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.

SCSI Drive IDs

SCSI bus device addresses are automatically assigned in the hot-swap drive bay depending on the slot number in which they 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.
- ◆ You must 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	0	8	0	8	8	8
SBB slot1 ID	1	1	1	9	1	9	9	9
SBB slot2 ID	2	2	2	10	2	10	10	10
SBB slot3 ID	3	3	3	11	3	11	11	11
SBB slot4 ID	0	4	8	0	12	4	8	12
SBB slot5 ID	1	5	9	1	13	5	9	13
SBB slot6 ID	2	6	10	2	14	6	10	14

SCSI Jumper Locations

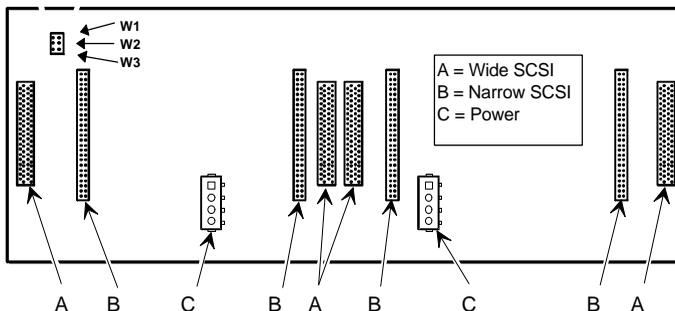


Figure 3 - 19 SCSI Jumper Locations

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, you might want to distribute the SCSI devices 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.

Connecting a Single Channel SCSI Bus

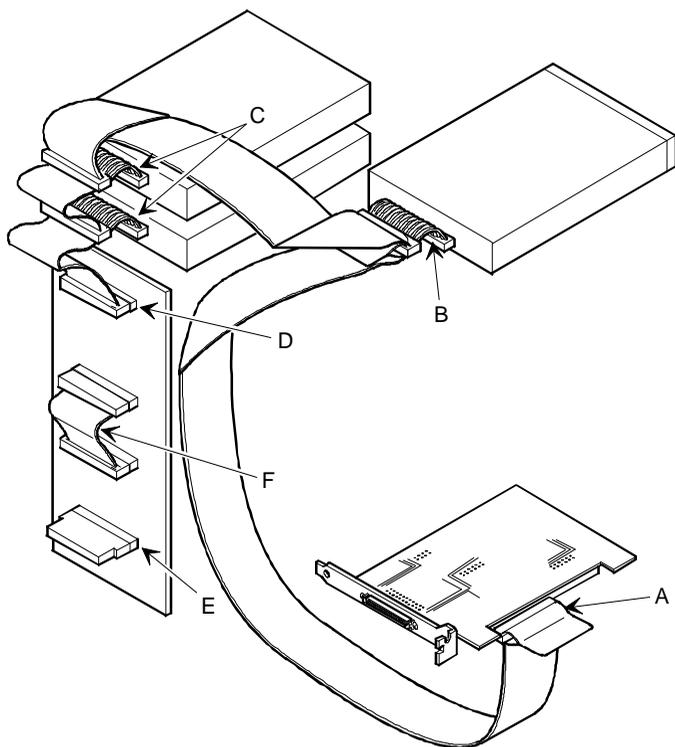
To connect SCSI devices to a single channel, perform the following:

- 1) Connect the 68-pin SCSI cable connector to the SCSI host adapter.
- 2) Connect the SCSI cables as shown in the illustration.
- 3) If necessary, connect appropriate power cable to device.
- 4) Replace and lock side panels.
- 5) Connect external devices and restore power.
- 6) Run SCU to configure server.

Single Channel SCSI Bus - Legend

<i>Legend</i>	<i>Component</i>
A	SCSI host adapter (ID7, channel A, host termination)
B	68-pin-to-50-pin adapter cable to CD-ROM
C	68-pin-to-50-pin adapter cable to top-right drive bay
D	Backplane, 68-pin connector
E	Terminator
F	Jumper cable

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



DEC00402

Figure 3 - 20 Connecting a Single Channel SCSI Bus

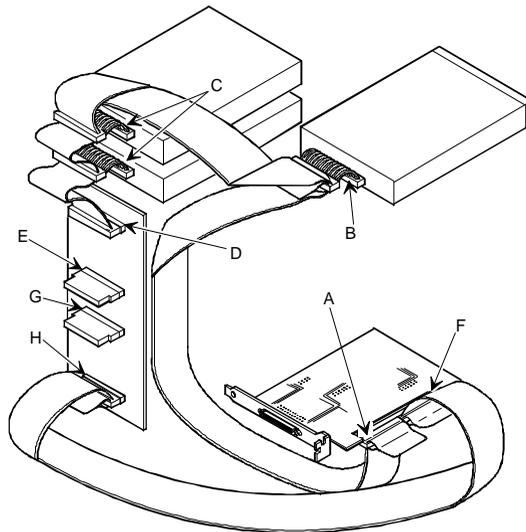
Connecting a Dual Channel SCSI Bus

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

- 1) Connect the 68-pin SCSI cable connector to the SCSI host adapter.
- 2) Connect the SCSI cables as shown in the illustration.
- 3) If necessary, connect appropriate power cable to device.
- 4) Replace and lock side panels.
- 5) Connect external devices and restore power.

Dual Channel SCSI Bus - Legend

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



DEC00403

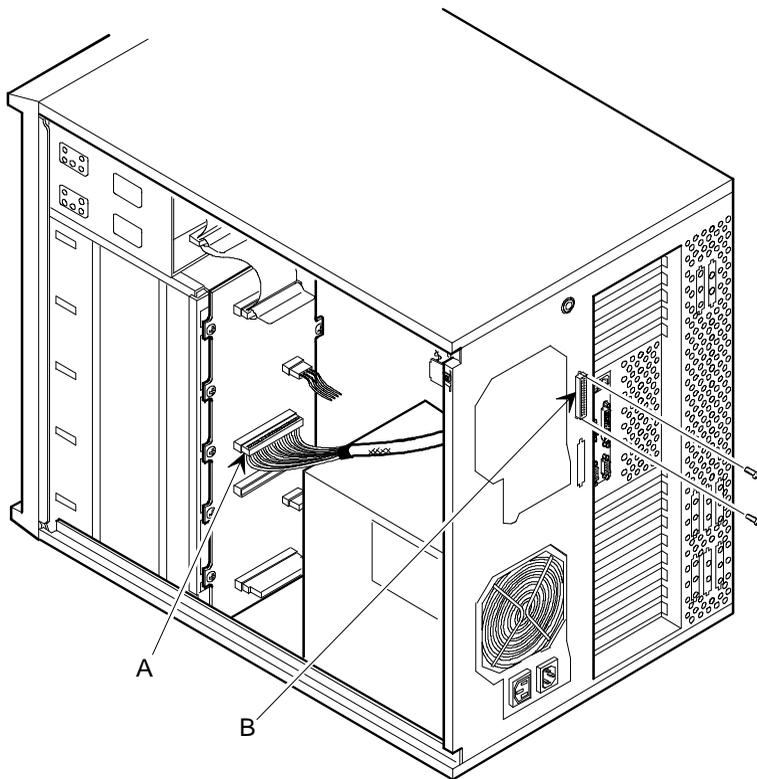
Figure 3 - 21 Connecting a Dual Channel SCSI Bus

External SCSI Bus

additional SCSI cables and/or host adapters can 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 you want to connect.
- 2) Connect the 68-pin unshielded cable connector to the storage backplane (A).
- 3) Using a screwdriver, gently pry away one of the SCSI knockouts at the rear panel.
- 4) Screw the 68-pin or 50-pin external shielded connector to the rear panel (B).
- 5) Connect the external SCSI device, making sure the external device is properly terminated.



DEC00444

Figure 3 - 22 Connecting a external SCSI Bus

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 configuring it or after installing optional hardware or software.

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

Initial Troubleshooting

Follow these general procedures to troubleshoot the computer:

- ◆ 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 this chapter 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. During POST, if the video configuration fails or if an external ROM module fails a checksum test, then the server beeps three times.

BeepCode	Error
1 long - 2 shorts	Video configuration fails External ROM module fails a checksum test

The following table lists other fatal error 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.).

BeepCode	Error
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 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 initialized, 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.

POST and Boot Messages (continued)

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. If the problem persists-replace the diskette drive.
Entering SETUP	SCU runs.
Extended RAM Failed at offset: nnnn	Extended memory failed or configured incorrectly. Make sure SIMMs are installed correctly. If the problem persists replace the defective RAM. Run the BIOS Setup utility and restore all settings to original values.
nnnn 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 which failed the memory test. Run the SCU and restore all settings to original values.
Fixed Disk 1 Failure Fixed Disk Controller failure	Run the SCU. Check all connections. If the problem persists contact your Digital SERVIC REPRESENTATIVE.
Incorrect Drive A type - run SETUP Incorrect Drive B type - run SETUP	Diskette drive A and/or B not correctly identified in the BIOS Setup utility. 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. If the problem persists replace the defective component.
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. If the problem persists replace the defective component.
Monitor type does not match CMOS - Run SETUP	Run the BIOS Setup utility 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.
Parity check 1 nnnn	Parity error found in the server bus. The BIOS attempts to locate the address and display it on the monitor screen.
Parity check 2 nnnn	Run the SCU and restore all settings to original values. If the problem persists replace the defective component.
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 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.

POST and Boot Messages (continued)

Message	Description/Solution
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 BIOS Setup utility to restore previous configuration information.
System BIOS shadowed	This indicates that the servers 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. If the problem persists replace the defective component.
System CMOS checksum bad - run SETUP	Run the SCU and ensure that all settings are correct. Save the configuration even when no changes are made. If the problem persists replace the defective component.
System RAM failed at offset: nnnn	System RAM failed. Run the SCU and restore all settings to original values. If the problem persists replace the defective component.
nnnn System RAM passed	Where nnnn is the amount of system RAM (in kilobytes) that tested successfully.

POST and Boot Messages (continued)

Message	Description/Solution
System timer error	The servers timer test failed. Run the SCU and restore all settings to original values. If the problem persists replace the defective component.
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 servers video BIOS was successfully copied to shadow RAM.

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is on	Main logic board failed.	Replace the failed component.
	Main logic board jumpers incorrectly set.	Set all appropriate jumpers.
	CPU module has failed.	Replace the failed component.
	CPU module jumpers incorrectly set.	Make sure the jumpers are correctly set.
	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 cable is incorrectly installed.	Check all monitor connections.
	Video controller has failed.	Replace the failed component.
	Incorrect VGA drivers installed.	Install the correct VGA drivers.
Power is on-but there is no screen 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 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 the 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 Troubleshooting (continued)

<i>Problem</i>	<i>Possible Cause</i>	<i>Action</i>
Server operates incorrectly after installing optional memory (SIMMs) on the memory module	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 connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
	Keyboard is not connected.	Power down the server and connect the keyboard.
No response to mouse commands	Mouse is password protected.	Enter the keyboard and mouse password.
	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. Refer to SCU and Setup Options.
	Having external cache enabled causes conflict with application software.	Run the SCU and disable external cache. Refer to SCU and Setup Options.
Target diskette drive cannot read or write information	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Remove the write-protect.
	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.	Correct SCSI jumper setting.
	SCSI ID conflicts.	Refer to SCSI ID settings in Chapter 3.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors.
	SCSI host adapter has failed.	Replace the failed component.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between SCSI host adapter-SCSI device or backplane.	Refer to “ <i>SCSI Configuration Guidelines</i> ” in Chapter 3.
Server does not boot from an internal SCSI hard disk drive	SCSI boot hard disk drive not formatted.	Format the SCSI hard disk 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 SCU to enable the diskette drive.
	Diskette boot option disabled.	Run the SCU and set boot option A then C.
SCSI hard disk drive cannot read or write information	Incorrect drive jumper settings.	Correct SCSI Drive Jumper settings.
	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 LED Status Indicators (SBBs) 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.
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 " <i>Main Logic Board Jumpers</i> ".
	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.
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.	Adjust accordingly.
	Monitor signal cable incorrectly installed.	Straighten any bent connector pins and then reconnect.
Color monitor displaying monochrome	Server was turned on before the monitor was turned on.	Turn off the server, turn on the monitor, then turn the server back on.
	Video jumper incorrectly set.	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 Troubleshooting (continued)

<i>Problem</i>	<i>Possible Cause</i>	<i>Action</i>
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

Run 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.

QAPlus/FE Error Messages

<i>Component</i>	<i>Messages</i>	<i>Solution</i>
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

QAPLus/FE Error Messages (continued)

<i>Component</i>	<i>Messages</i>	<i>Solution</i>
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 Time-out 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 Memory Address Map (Full Range, 590 CPUs)

<i>Range</i>	<i>Function</i>	<i>Notes</i>
0 KB to 512 KB	Main memory	PC compatibility range
512 KB to 1024 KB	Main memory	PC compatibility range (EISA/ISA memory lower limit)
1 MB to 16 MB	Main memory Memory space gap	ISA memory upper limit
16 MB to 512 MB	Main memory	Computer memory upper limit
512 MB to 4 GB	PCI memory	

CPU Memory Address Map (PC Compatibility Range)

<i>Address Range</i>	<i>Function</i>	<i>Size</i>
00000 to 7FFFF	Main memory	512 KB
80000 to 9FFFF	Main/PCI/ISA memory	128 KB
A0000 to BFFFF	PCI/ISA video buffer memory	128 KB
C0000 to C7FFF	Video memory BIOS	32 KB
C8000 to DFFFF	PCI/ISA card BIOS and buffer memory	96 KB
E0000 to EBFFF	ISA/PCI adapter RAM after POST completes Used by BIOS Setup during POST	48 KB
EC000 to EFFFF	SCSI BIOS (if enabled)	16 KB
F0000 to FFFFF	System BIOS memory	64 KB

CPU I/O Address Map

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

DMA Channel Assignment

<i>Channel</i>	<i>Controller</i>	<i>Function</i>
0	1	Refresh
1	1	Available for use by option cards
2	1	Diskette controller (if enabled)
3	1	Available for use by option cards
4	2	Cascade DMA
5	2	Available for use by option cards
6	2	Available for use by option cards
7	2	Available for use by option cards

I/O Address Map

<i>Range (hexadecimal)</i>	<i>Function</i>
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)
2F8 to 2FF	COM2 (if enabled)
378 to 37F	LPT1 (if enabled)
3BC to 3BE	LPT3 (if enabled)
3F0 to 3F7	Diskette controller (if enabled)
3F8 to 3FF	COM1 (if enabled)

PCI Configuration Space Address Map

<i>Range (hexadecimal)</i>	<i>Function</i>
C0xx	CPU bridge
C1xx	PCI/PCI bridge (PCI slots 4,5,6)
C2xx	PCI/EISA bridge
C6xx	PCI slot 1
C7xx	PCI slot 2
C8xx	PCI slot 3

Server Interrupt Levels

<i>Interrupt Number</i>	<i>Interrupt Source</i>
IRQ1	Keyboard controller
IRQ3	COM2 (if enabled)
IRQ4	COM1 (if enabled)
IRQ6	Diskette drive (if enabled)
IRQ7	LPT1, LPT2, LPT3 (if enabled)
IRQ12	Mouse interrupt
IRQ13	Math co-processor
IRQ14	Hard disk drive (if enabled)

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 **(Destructive Test !!)**
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
- ◇ Windows NT and Windows NT Server 3.5
- ◇ OS/2 version 2.1
- ◇ SCO Unix with MPX, SCO Network System
- ◇ SCO ODT v3.0, SCO Enterprise System
- ◇ Novell Netware 3.12 and 4.1
- ◇ Novell SFTIII 3.11
- ◇ Banyan Vines

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

Service 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]

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

<i>Document Titles</i>	<i>Order #'s</i>
Prioris HX Server Quick Reference Guide	EK-A0825-RG
Prioris HX Server User's Guide	ER-880WW-UA
Prioris HX Server Quick Setup Guide	ER-880WW-IA
Prioris HX Server System & Options Configuration Guide	ER-880WW-CA
Pentium CPU Modules	ER-78XWW-CA
Pentium CPU Modules (Multilingual)	ER-78XWW-CM
Quick Reference Guide, Spares Catalogue	EK-A0836-RG
Service Maintenance Manual, Spares Catalogue	EK-A0815-SV

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].

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