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**MCS  
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THE NETHERLANDS**

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**Service  
Maintenance  
Manual**

**PRIORIS MTE  
Server**

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November 1995

## November 1995

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## Preface

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

Digital Equipment Corporation reserves the right to make changes to the Digital PRIORIS MTE Server without notice. Accordingly, the diagrams and procedures in this document may not apply to the computer(s) to be serviced 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 any warranty or exchange allowances.





# Chapter 1

# Product Description

## Product Introduction

The Prioris MTE servers are a family of high-performance, i486 processor-based, personal computers equipped with the latest microprocessor technology. They can be used as stand-alone computers, as clients, or as servers in a network environment.

### Features

- ◆ Upgradable system compatible P24T ZIF socket
- ◆ 8 MB system RAM, Upgradable to 128 MB on motherboard
- ◆ 128 KB external cache memory (direct-mapped), expandable to 256 KB
- ◆ On-board IDE controller
- ◆ SVGA video card, 1 MB, ISA included
- ◆ Supports up to five storage devices
- ◆ Five full-size, 32 bit EISA slots and one slot which is either a VL-bus VESA slot or an EISA slot (for a maximum of six EISA slots)
- ◆ Interfaces: two serial (RS-3232C) and one parallel (Centronics)
- ◆ Autosensing Power supply, 260 Watt

## Product Models Information

### Prioris MTE Server

<i>Model</i>	<i>CPU</i>	<i>RAM</i>	<i>Cache</i>	<i>FDD</i>	<i>HDD</i>	<i>CD-ROM</i>
<b>FR-PCT73-BV</b>	486DX2/ 66 MHz	8 MB	128 KB	1.44 MB	None	None
<b>FR-PCT73-BB</b>	486DX2/ 66 MHz	16 MB	128 KB	1.44 MB	1 GB SCSI-2	Standard
<b>FR-PCT73-LE</b>	486DX2/ 66 MHz	16 MB	128 KB	1.44 MB	535 MB SCSI-2	600 MB double speed
<b>FR-PCT74-BV</b>	486DX4/ 100 MHz	8 MB	128 KB	1.44 MB	None	None

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## Chapter 2 Server Utilities & Configuration

### Before Using the Flash Upgrade Utility

When not familiar with utility programs and their uses, carefully read and understand the information contained in this chapter before attempting to use the Flash Upgrade utility.

Have the following items available:

- ◆ Blank formatted diskette.
- ◆ Utilities diskette (supplied with the system).
- ◆ System Configuration Utility diskette (supplied with the system).

### Recovery Diskette

A recovery diskette should always be prepared before attempting to upgrade the BIOS. This diskette contains a BIOS image and a program to load the image into flash memory. If a problem occurs during the programming of BIOS into flash memory, a siren sounds when the Server is turned on. Insert the recovery diskette into drive A or B and the original BIOS is put back in flash memory.

### Using the Flash Upgrade Utility

Perform the following steps to create a recovery diskette, update the BIOS in the flash memory, and compare the BIOS image file to the flash memory:

- 1) Insert the Utilities diskette (supplied with the system) into drive A.
- 2) Turn on the computer.

- 3) At the MS-DOS prompt, type *a:upgrade*, and then press **[Enter]**. This invokes the Flash Upgrade utility. The following menu items appear on the screen:
- ```
Make Recovery Diskette from Flash
Make Recovery Diskette from Image File
Upgrade Flash from Image File
Save Flash to Image File
Compare Flash to Image File
BIOS Information
Exit
```
- For on-line help, press **[F1]**.
- 4) Select the Make Recovery Diskette from Flash menu option. The message, "Please select the diskette drive that will be used to create a Flash Recovery Diskette, or select "Cancel" to abort", appears on the screen.
- 5) Press the **[Tab]** or up and down arrow keys to highlight the desired diskette drive, then press **[Enter]**. Drive A is the default diskette drive. The message, "Insert a formatted diskette into drive A. The contents of this diskette will be lost! and replaced with system recovery software and the specified BIOS image. Select "Continue" to start writing the recovery diskette, or "Cancel" to abort," appears on the screen.
- 6) Insert a blank (formatted) diskette in drive A, and select Continue to proceed with the creation of a recovery diskette. A message window notifies when it completes. Press any key to continue.
- 7) Remove the recovery diskette from drive A and store it in a safe place.
- 8) Insert the Utilities diskette in drive A.
- 9) Select the Upgrade Flash from Image File menu option. You are prompted to select the BIOS image file to program into flash memory.
- 10) Press **[Enter]** to list a directory of .BIN (BIOS image) files. Select the desired image file. The message, "The old BIOS will now be replaced by the new BIOS image. Select "Program" to start, or "Cancel" to abort. Keep in mind that programming a new BIOS into Flash memory requires a fair amount of power. "If you are running on battery power you should have a full charge!" appears on the screen.
- 11) Press **[Enter]** to proceed with the programming of the new BIOS into flash memory. The message, "DO NOT TURN OFF THE POWER", appears on the screen. The flash memory is erased, then the new BIOS is copied. Depending on the size of flash memory, the programming takes 20-40 seconds. When the programming of the flash BIOS is complete, a message briefly appears on the screen, then the system attempts to reboot.
- 12) Remove the Utilities diskette to allow the system to reboot without error. If an error occurs the flash memory is corrupted and a siren sounds when the computer is rebooted. If this occurs, insert the recovery diskette into drive A or B and the original BIOS is put back in flash memory. If the computer does not reboot and the siren does not sound, turn off the computer. Set the main logic board jumper **J53** to recovery mode. This procedure forces a BIOS recovery process. Refer to "*Main Logic board Jumper Locations*".
- 13) Insert the Utilities diskette into drive A, invoke the Flash Upgrade utility and select the Compare Flash to Image File menu option. The message, "Select BIOS Image File Name to compare against flash memory," appears on the screen.
- 14) Press **[Enter]** to display a list of .BIN (BIOS image) files. Select the .BIN file to be compared with the flash memory. A message window displays whether the flash memory contains the same BIOS as the disk file. Press any key to continue.

- 15) If applicable, select the `Save Flash to Image File` menu option. This option reads BIOS out of flash memory and stores it on a disk file. A valid image file can be used with other upgrade commands that need an image file. The default name for the image file is `DEFAULT.BIN`. You can type in a different file name if you do not want to use the default name.
- 16) Select the `Quit` menu option to exit the Flash Upgrade utility.
- 17) Run the System Configuration Utility (SCU) to make sure the ROM Based Setup option is enabled.

## Setup

Setup allows to select and permanently store information about the computer's installed hardware and software in the battery-backed memory of the CMOS RAM. This information takes effect each time the computer boots and can be changed each time you run Setup.

## Accessing Setup

Use one of the following methods to access Setup:

- ◆ ROM Based Setup—Boot the computer and allow the POST to complete, then press **[F1]** to display the initial Setup screen.
- ◆ `SETUP.COM`—Insert the Utilities diskette in drive A. At the MS-DOS prompt, type `a:setup`. The initial Setup screen appears.

---

**NOTE** Values specified in Setup are overwritten when the System Configuration Utility (SCU) is run, therefore do not use Setup to modify most configuration settings. *Refer to the next section, "When to Use Setup", for specific situations where Setup should be used to make changes to the computer's configuration.*

---

## When to Use Setup

Since Setup values are overwritten by the SCU, it is recommended that Setup is used only if you:

- ◆ Need to enable a diskette drive.
- ◆ Do not have access to a diskette drive.
- ◆ Have only Industry Standard Architecture (ISA) expansion boards and will not be using the SCU.
- ◆ Need to disable or enable the ROM Based Setup option.

---

**NOTE** If Setup is used to make changes to the computer configuration, it is recommended to use the ROM Based Setup. Use `SETUP.COM` (on the Utilities diskette) only when enabling of the ROM Based Setup option is desired.

---

## Exiting Setup

To exit Setup, press [Esc] to display the following menu options, then press one of the function keys indicated:

| <b>Key</b> | <b>Function</b>                      |
|------------|--------------------------------------|
| <b>Esc</b> | Continue with SETUP.                 |
| <b>F4</b>  | Save values- exit SETUP- and reboot. |
| <b>F5</b>  | Load default values for all pages.   |
| <b>F6</b>  | Abort SETUP without saving values.   |

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**NOTE** If the POST fails to complete successfully, access Setup and check all settings. If necessary, press [F5] to load factory default values. Loading these values allows the computer to operate with a minimum of options.

---

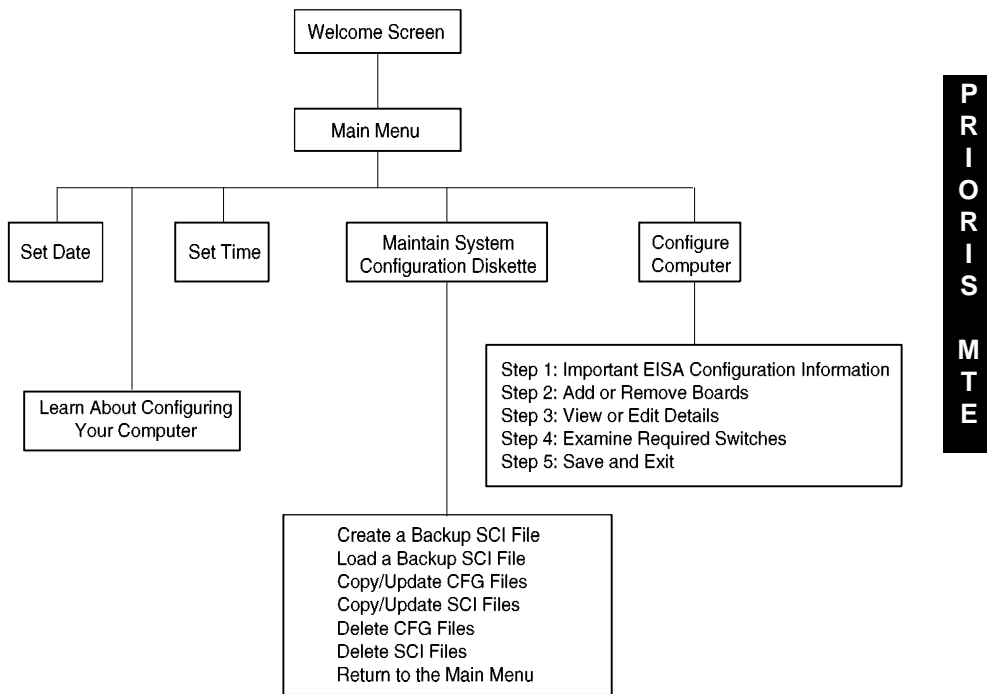
## Configuring The Server

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.



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Figure 2 - 1 SCU Main Menu Options

## Before 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 next section, "SCI Files and CFG Files", for more information about CFG files.
- ◆ Kit installation instructions for any installed optional hardware.

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## SCI Files and CFG Files

The SCU creates a System Configuration Information (SCI) file each time the server is configured. This SCI file can be used on any PRIORIS MTE Server that are 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 additional EISA, PCI, or ISA expansion boards are installed, 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 need to reconfigure the server. 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 that 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 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.

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- 3) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server. The SCU introduction 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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- 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 get familiar 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 installed boards and 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.

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**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 to be installed 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.
- 4) Turn off the server and install the ISA boards.

**CAUTION**

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

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

**SCU and Setup Options** (continued)

| <b>Menu Fields</b>                                 | <b>Settings</b>                                                                                                          | <b>Comments</b>                                                                                                                                                                                                                                                             |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System Processor Type</b>                       | Not user selectable                                                                                                      | Displays the currently installed processor type.                                                                                                                                                                                                                            |
| <b>System Processor Clock</b>                      | Not user selectable                                                                                                      | Displays the currently installed processor clock speed.                                                                                                                                                                                                                     |
| <b>System Base Memory</b>                          | Not user selectable<br>(640 KB)                                                                                          | Sets the size of base (conventional) memory.                                                                                                                                                                                                                                |
| <b>System Extended Memory</b>                      | Not user selectable                                                                                                      | Displays the current amount of extended memory.                                                                                                                                                                                                                             |
| <b>System BIOS</b>                                 | Not user selectable                                                                                                      | Displays the BIOS version.                                                                                                                                                                                                                                                  |
| <b>Onboard Diskette Controller</b>                 | Enabled<br>Disabled                                                                                                      | Enabled when it is the primary interface to the diskette drive.<br>Disabled if an external diskette controller performs the interfacing to the diskette drives.                                                                                                             |
| <b>Diskette Drive A</b><br><b>Diskette Drive B</b> | 3½-inch<br>720 KB<br>3½-inch<br>1.44 MB<br>3½-inch<br>2.88 MB<br>5¼-inch<br>360 KB<br>5¼-inch<br>1.2 MB<br>Not installed | Selects the size and density of 3½-inch diskette drives.<br><br>Selects the size and density of 5¼-inch diskette drives.<br><br>Disables the selected diskette drive.                                                                                                       |
| <b>Exchange Diskette Drives</b>                    | Enabled<br>Disabled                                                                                                      | Enables the logical exchange of physical diskette drive designations.<br>Disables the logical exchange of physical diskette drives.                                                                                                                                         |
| <b>Boot from Diskette Drive A</b>                  | Enabled<br>Disabled                                                                                                      | Enables diskette drive A as a logical boot device.<br>Disables diskette drive A as a logical boot device.                                                                                                                                                                   |
| <b>Onboard IDE Hard Disk Controller</b>            | Enabled<br>Disabled                                                                                                      | Enables the on-board IDE controller interface; the controller can be used as the primary interface to the bootable hard disk.<br>Disables the on-board IDE controller when it is not being used and another disk controller is the primary interface to the bootable drive. |
| <b>Hard Drive 1</b><br><b>Hard Drive 2</b>         | Drive types<br>1-49<br><br>Not Installed                                                                                 | Enables hard drive size and specific parameters from a predetermined list of drive types. Drive types 2 and 3 or 48 and 49 are user definable for hard drives not listed in the BIOS drive table.<br>Disables the selected hard disk.                                       |
| <b>User Definable Hard Drives</b>                  | Type<br>48 and 49<br>Type 2 and 3                                                                                        | See Hard Drive 1 and Hard Drive 2.                                                                                                                                                                                                                                          |

**SCU and Setup Options** (continued)P  
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| <i>Menu Fields</i>                                                            | <i>Settings</i>                                                   | <i>Comments</i>                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Boot from Hard Disk Drive C</b>                                            | Enabled<br>Disabled                                               | Enables IDE drive C as a logical boot device.<br>Disables IDE drive C as a logical boot device.                                                                                                                                                             |
| <b>Serial Port 1<br/>Serial Port 2</b>                                        | Enabled at COM1, COM2, COM3, COM4<br>Disabled                     | Enables any desired on-board serial port.<br><br>Disables any desired on-board serial port at the specified base address.                                                                                                                                   |
| <b>Parallel Port</b>                                                          | Enabled at base address 378h, 278h, 3BCh (compatible)<br>Disabled | Enables on-board printer port.<br><br>Disables any desired on-board printer port.                                                                                                                                                                           |
| <b>Video Type</b>                                                             | VGA or EGA<br>CGA 40 columns<br>CGA 80 columns<br>Monochrome      | Allows to specify the type and mode of the video module that is installed.                                                                                                                                                                                  |
| <b>Shadow Video BIOS ROM</b>                                                  | Enabled<br>Disabled                                               | Enables the shadowing request for Video BIOS ROM. When shadowing of this area is enabled, caching is also enabled.<br>Disables the shadowing request for Video BIOS ROM.                                                                                    |
| <b>Shadow C8000h-CFFFFh<br/>Shadow D0000h-D7FFFh<br/>Shadow D8000h-DFFFFh</b> | Enabled<br>Disabled                                               | Disables the shadowing request for optional ROM.<br>Enables the shadowing request for optional ROM.                                                                                                                                                         |
| <b>Primary Cache Control</b>                                                  | Enabled<br>Disabled                                               | Enables the microprocessor's internal (primary) cache. Enabling the cache controller significantly improves computer performance by reducing the average number of wait states seen by the microprocessor.<br>Disables the microprocessor's internal cache. |

**SCU and Setup Options** (continued)

| <b>Field</b>                      | <b>Settings</b>     | <b>Comments</b>                                                                                                        |
|-----------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Secondary Cache Control</b>    | Enabled             | Enables the secondary (external) cache (if installed).                                                                 |
|                                   | Disabled            | Disables the secondary cache.                                                                                          |
| <b>Cache System BIOS ROM</b>      | Enabled             | Enables the caching request for system BIOS ROM.                                                                       |
|                                   | Disabled            | Disables the caching request for system BIOS ROM.                                                                      |
| <b>Power-On Password</b>          | Not Installed       | A power-on password is not set.                                                                                        |
|                                   | Installed           | A power-on password is set. You are prompted for the password when the system is rebooted.                             |
| <b>CPU Speed</b>                  | Fast                | CPU operates at its full rated speed.                                                                                  |
|                                   | Slow                | CPU operates at 8 MHz.                                                                                                 |
| <b>NumLock at Boot</b>            | Off                 | Turns off the keyboard's NumLock feature each time you boot the computer.                                              |
|                                   | On                  | Turns on the keyboard's NumLock feature each time you boot the computer.                                               |
| <b>Keyboard</b>                   | Not Installed       | Set this option to Not Installed if you plan to operate the computer as a network server without a keyboard installed. |
|                                   | Installed           | Enables to check the keyboard during the POST.                                                                         |
| <b>Concurrent Refresh</b>         | Disabled            | Disables the concurrent refresh feature of the chip set.                                                               |
|                                   | Enabled             | Enables the concurrent refresh feature of the chip set.                                                                |
| <b>Reserved System Resources</b>  | Not user selectable | Configuration File and Overlay Version.                                                                                |
| <b>86C805/928 GUI Accelerator</b> | Not Installed       | Select Not Installed only if the VID 805/928 VGA module GUI Accelerator is not going to be installed with the system.  |
|                                   | Graphics: Color     | Allows to specify the presence of the VID 805/928 VGA module.                                                          |
|                                   | Graphics: Mono      |                                                                                                                        |
|                                   | Text: Color         |                                                                                                                        |
|                                   | Text: Mono          |                                                                                                                        |
| <b>Vertical Retrace Interrupt</b> | Interrupt Enabled   | Enables the resource allocation at vertical retrace interrupt - IRQ 2(9).                                              |
|                                   | Interrupt Disabled  | Disables the resource allocation at vertical retrace interrupt - IRQ 2(9).                                             |
|                                   |                     |                                                                                                                        |

**SCU and Setup Options** (continued)

| <i>Field</i>              | <i>Settings</i>                                                                                                                                                                                                                                                 | <i>Comments</i>                                                                                                                                                                                                                  |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Monitor Type (805)</b> | 640x480@<br>60Hz/NI<br>640x480@<br>72Hz/NI<br>800x600@<br>60Hz/NI<br>800x600@<br>72Hz/NI<br>800x600@<br>56Hz/NI<br>1024x768@<br>43Hz/I<br>1024x768@<br>60Hz/NI<br>1024x768@<br>72Hz/NI<br>1280x1024@<br>43Hz/I                                                  | Enables to select the resolution and refresh rate (vertical synchronization) of the optional local bus VGA module. This setting should match the capabilities of the monitor (see the monitor documentation for specifications). |
| <b>Monitor Type (928)</b> | 640x480@<br>60Hz/NI<br>640x480@<br>72Hz/NI<br>800x600@<br>60Hz/NI<br>800x600@<br>72Hz/NI<br>800x600@<br>56Hz/NI<br>1024x768@<br>43Hz/I<br>1024x768@<br>60Hz/NI<br>1024x768@<br>72Hz/NI<br>1280x1024@<br>43Hz/I<br>1280x1024@<br>60Hz/NI<br>1600x1280@<br>43Hz/I |                                                                                                                                                                                                                                  |

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## Additional Option Information

SCU options are explained in further detail in the next section.

## System Base Memory

System base memory is automatically detected by the POST. It selects 640 KB unless an expansion board has been installed that uses the address space between 512 KB and 640 KB.

## System Board Extended Memory

This function indicates the amount of extended memory (memory addressable beyond 1 MB) resident on the system board and an optional memory module (if installed). The amount of extended memory is automatically detected and cannot be modified using SCU.

Extended memory installed on EISA or ISA boards is not included in the quantity of extended memory indicated.

## User Definable Hard Disk Drive

System BIOS contains a table of drive types for hard disk drives. Of these, the number of sectors, cylinders, heads, and so on can be defined for types 2 and 3 or types 48 and 49. Choose types 48 and 49, unless the Local Area Network (LAN) software does not recognize them. Otherwise, use types 2 and 3. Note that this option does not apply to SCSI devices.

## Hard Drive 1/Hard Drive 2

This option must be configured to determine drive-specific parameters. Choose the drive type for the drive from types 1 and 47. If hard drive 1 is not installed, then select "Disabled".

User-definable types 2, 3, 48, and 49 require to enter specific parameters (cylinders, heads, precompensation, landing zone, and sectors). Either types 2 and 3 or types 48 and 49 can be selected as user-definable. IDE drives are usually selected as drive type 1. Because certain operating systems do not recognize BIOS drive type parameters above type 47, the parameters for drives types 48 and 49 should be aliased to types 2 and 3 using this option.

## CPU Speed

This option determines the speed used by the computer each time you turn it on or reboot it. Fast is the normal speed and causes the CPU to run at its rated speed. Slow (equivalent to 8 MHz) is used to reduce the effective CPU speed to be compatible with some speed-dependent application programs. If an application program does not run correctly at full speed, try changing the CPU speed to slow.





## 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 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 Server systems. Note that test equipment must be calibrated:

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

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### 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* , Server 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.

- 5) To unlock the side panels, turn the chassis key clockwise to a horizontal position (see Figure 3 - 1).
- 6) To remove the side panels, pull each one toward the rear of the server and then lift away.

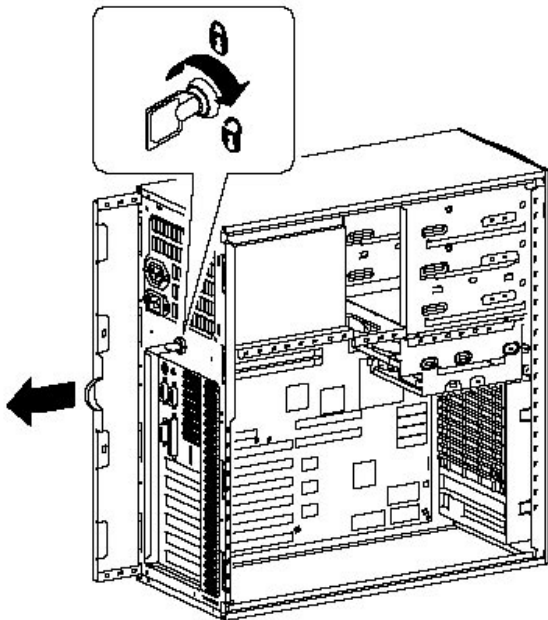
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Figure 3 - 1 Unlocking and Removing the Side Panels

## Server Components

| <i>Legend</i> | <i>Component</i>                                                                           |
|---------------|--------------------------------------------------------------------------------------------|
| 1             | Power supply                                                                               |
| 2             | Three 5¼-inch half-height drive bays                                                       |
| 3             | 3½-inch diskette drive                                                                     |
| 4             | Fan / Speaker assembly                                                                     |
| 5             | Main logic board                                                                           |
| 6             | One EISA or VL-Bus local bus expansion slot (VESA compliant) and five EISA expansion slots |
| 7             | Dedicated local bus video slot                                                             |

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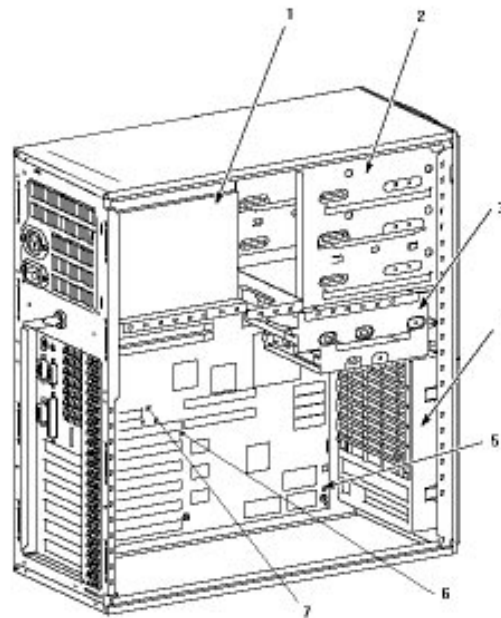


Figure 3 - 2 Server Components

## Expansion Boards

The PRIORIS MTE Server contains seven expansion board slots for installing up to five EISA expansion boards. The PRIORIS MTE Server features one dedicated local bus video slot, one EISA or VL-Bus slot (VESA). An Industry Standard Architecture (ISA) board can be installed in EISA slots.

| <i>Expansion Slot Designation</i> | <i>Description</i>                                                                                 |
|-----------------------------------|----------------------------------------------------------------------------------------------------|
| EISA slots 1 to 5                 | Supports extended industry standard 32-bit EISA expansions boards.                                 |
| EISA / VL-Bus slot                | Supports extended industry standard 32-bit EISA expansions board or VL-Bus local expansion boards. |
| Local Bus Video Slot              | Supports industry standard 32-bit.                                                                 |

PRIORIS MTE

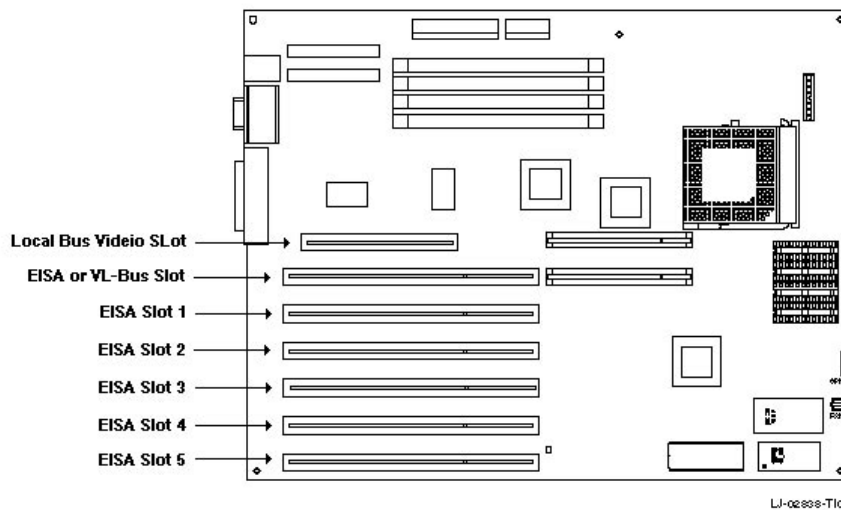


Figure 3 - 3 PRIORIS MTE Server Expansion Board Slots

## Main Logic Board Jumpers

Jumper pins allow to set specific computer 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.

Note that the square pin of each jumper block is pin 1.



### CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from your fingers can result in permanent damage to electronic components.

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## Main Logic Board Jumper Settings

Setting in *bold italics* are factory default settings.

| <i>Feature</i>              | <i>Description</i>                                     | <i>Setting</i>                                                                                                             |
|-----------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| BIOS top 8K reprogram       | <i>Reserved for factory use only</i>                   | <i>J43, open</i>                                                                                                           |
| CPU Select                  | P24T<br><i>486 DX or DX2</i>                           | J52, pin 1 and 2 jumpered<br><i>J52, pin 2 and 3 jumpered</i>                                                              |
| RESET switch                | Enable<br>Disable                                      | <i>J46, jumpered</i><br>J46, open                                                                                          |
| Parallel port type          | Printer<br>Bi-directional                              | <i>J20, pin 1 and 2 jumpered</i><br>J20, pin 2 and 3 jumpered                                                              |
| Factory test/clear password | <i>Normal Operation</i><br>Factory test/clear password | <i>J23, open/parked</i><br>J23, jumpered                                                                                   |
| Display type                | Color<br><i>Mono</i>                                   | J25, jumpered<br><i>J25, open</i>                                                                                          |
| CPU Clock input             | 50 MHz<br>40 MHz<br>33 MHz<br>25 MHz                   | J34, J35, J36, J37 open<br>J36 jumpered, 34, 35, 37 open<br>J35 open, 34, 36, 37 jumpered<br>J36 open, 34, 35, 37 jumpered |
| Cache size select           | <i>128 KB</i><br>256 KB                                | <i>J29, J30, J31 pin 1 and 2 jumpered</i><br>J29, J30, J31 pin 2 and 3 jumpered                                            |
| VL-Bus write wait state     | <i>Zero wait write</i><br>One wait write               | <i>J51, pin 1 and 2 jumpered</i><br>J51, pin 2 and 3 jumpered                                                              |

**NOTE** J20 is functional for 87c311 only. When the I/O system uses 87c312, this jumper is ignored.

### Main Logic Board Jumper Locations

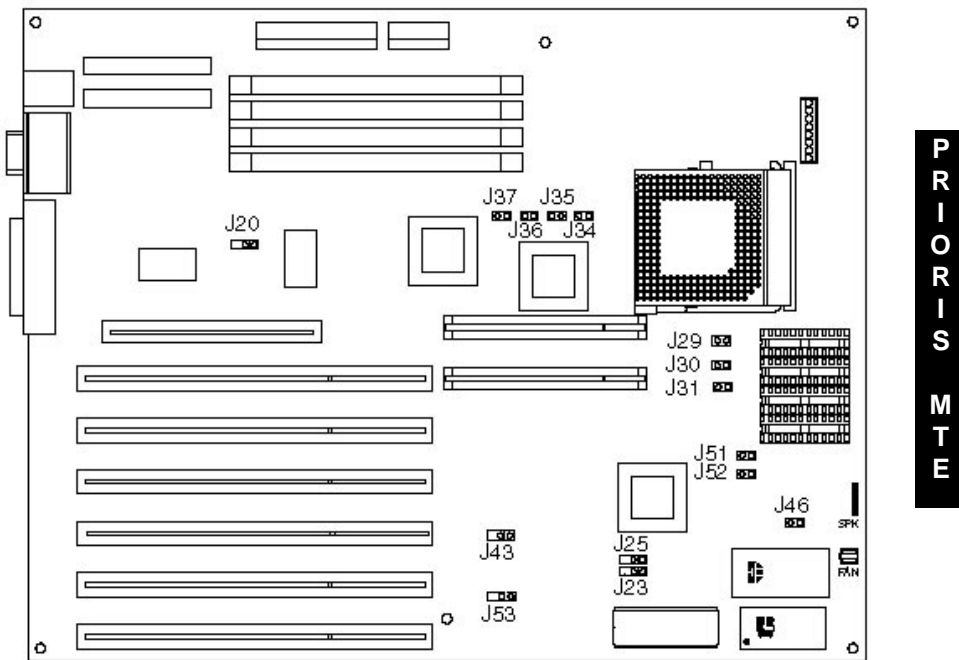


Figure 3 - 4 Main Logic Board Jumper Locations

## SVGA Video Card (86C805) Jumpers

The PRIORIS MTE models comes standard with a SVGA Video Card with 1 MB video memory.

### SVGA Video Card jumper settings

Setting in *bold italics* are factory default settings.

| <b>Jumper</b> | <b>Description</b>                                             | <b>Setting</b>                          |
|---------------|----------------------------------------------------------------|-----------------------------------------|
| <b>J1</b>     | VGA - Contr. Main Loigc Board IRQ9: Enabled<br><i>Disabled</i> | In<br><i>Out</i>                        |
| <b>J2</b>     | VGA: <i>Enabled</i><br>Disabled                                | <i>1 - 2 Jumpered</i><br>2 - 3 Jumpered |
| <b>J10</b>    | Video RAM : <i>1 MB</i><br>2 MB                                | <i>1 - 2 Jumpered</i><br>2 - 3 Jumpered |

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### SVGA Video Card jumper Locations

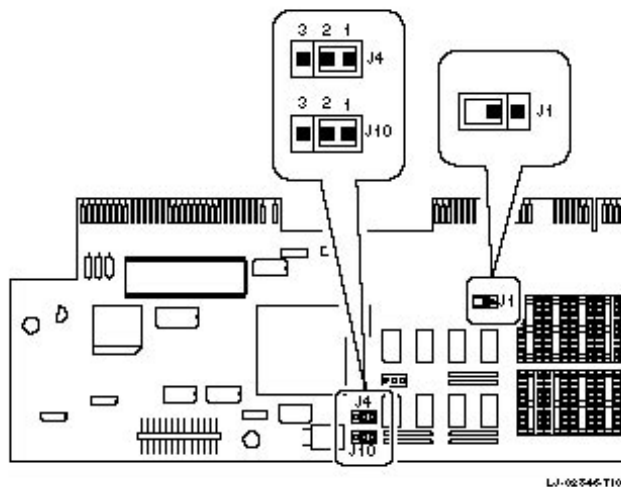


Figure 3 - 5 SVGA Video Card Jumper Locations



## Computer Memory Configurations

Adding more memory allows the PRIORIS MTE Server to run larger, more complicated software and to run it faster.

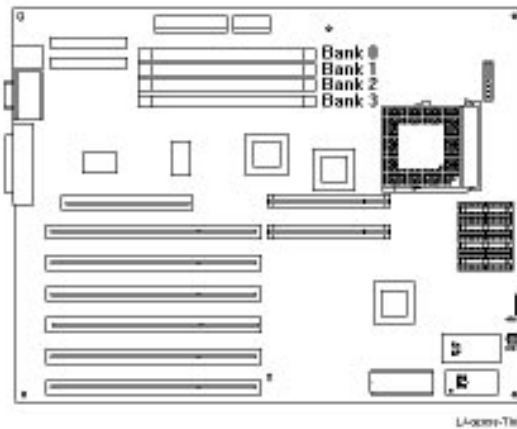
The computer contains at least 8 MB of memory. You can increase the memory up to 128 MB.

4 MB, 16 MB or 64 MB single in-line memory modules (SIMMs) can be added. The PRIORIS MTE Server requires 36-bit SIMMs that have an access time of 70 ns or less.

### Memory Configurations

| <i>Bank 0</i> | <i>Bank 1</i> | <i>Bank 2</i> | <i>Bank 4</i> | <i>Total</i>  |
|---------------|---------------|---------------|---------------|---------------|
| 4 MB          | 4 MB          |               |               | <b>8 MB</b>   |
| 4 MB          | 4 MB          | 4 MB          |               | <b>12 MB</b>  |
| 4 MB          | 4 MB          | 4 MB          | 4 MB          | <b>16 MB</b>  |
| 4 MB          | 16 MB         |               |               | <b>20 MB</b>  |
| 4 MB          | 4 MB          | 16 MB         |               | <b>24 MB</b>  |
| 4 MB          | 16 MB         | 16 MB         |               | <b>36 MB</b>  |
| 4 MB          | 4 MB          | 16 MB         | 16 MB         | <b>40 MB</b>  |
| 16 MB         |               |               |               | <b>16 MB</b>  |
| 16 MB         | 16 MB         |               |               | <b>32 MB</b>  |
| 16 MB         | 16 MB         | 16 MB         |               | <b>48 MB</b>  |
| 16 MB         | 16 MB         | 16 MB         | 16 MB         | <b>64 MB</b>  |
| 64 MB         |               |               |               | <b>64 MB</b>  |
| 64 MB         | 64 MB         |               |               | <b>128 MB</b> |

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**Figure 3 - 6 Main Logic Board Memory Banks locations**

## Part Removal and Replacement Procedures

### Removing Devices in the Lower Drive Bay Area

The lower drive bay area holds two 3½-inch devices, typically a diskette drive and a hard drive. To remove the devices in the lower drive bay area, remove the entire drive bay assembly from the server and then remove the devices from the assy.

Perform the following steps:

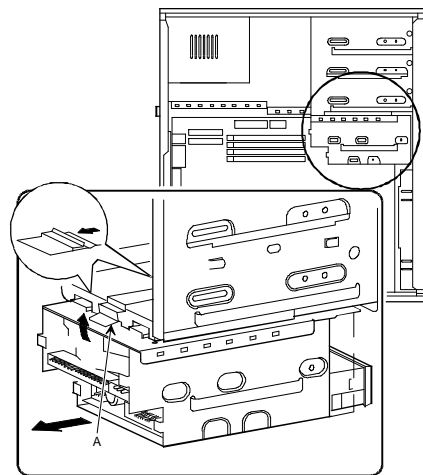
- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet.
- 2) Unplug the power cord and monitor cord from the back of the server.
- 3) Unlock and remove the left side panel.
- 4) Remove the cables from the devices in the lower drive bay.
- 5) Note the position of the cables so that they can be reconnected to the correct devices later.
- 6) Lift up on the retaining clip at the rear top of the drive bay assembly and slide the assembly to the rear of the server (A, Figure 3 - 6).
- 7) Remove a device by removing the screws on the side and sliding the device out of the lower bay assembly.

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#### CAUTION

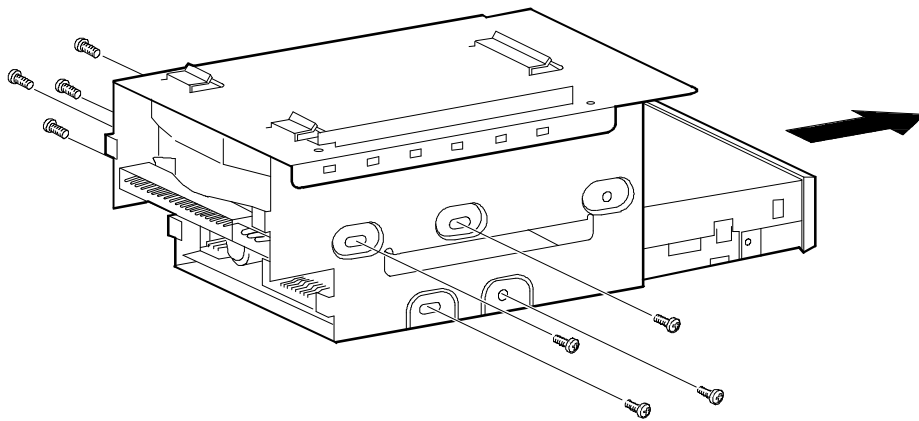
Be sure to support the drive bay assembly so that it does not fall and damage circuit boards.



DEC00600

Figure 3 - 7 Removing the Lower Drive Bay Assembly

**Removing Devices in the Lower Drive Bay Area** (continued)



**Figure 3 - 8 Removing the Lower Drive Bay Devices**

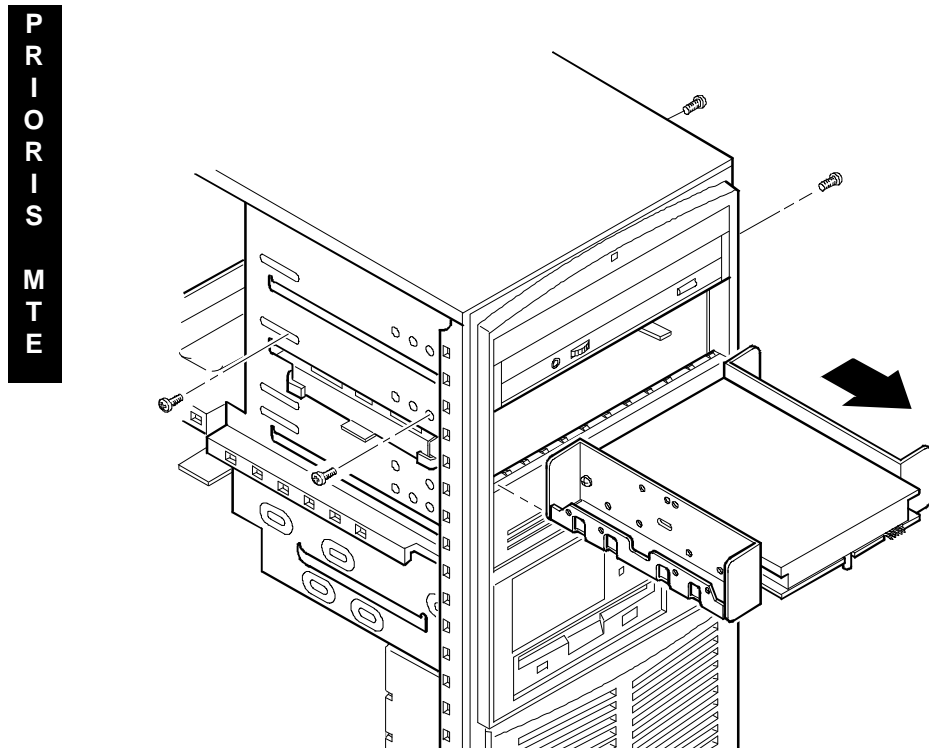
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### Removing Devices in the Upper Drive Bay Area

To remove a device from the upper drive bay area perform the following steps:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove both side panels.
- 3) Disconnect power and ribbon cables.
- 4) Remove screws securing device to chassis.
- 5) Slide device drive out of the upper drive bay.



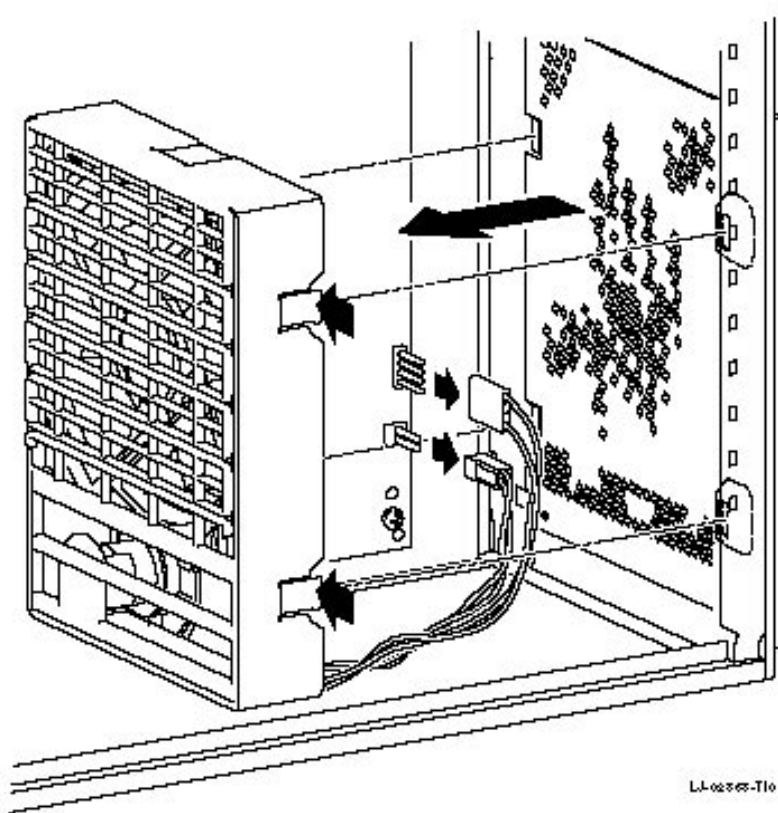
DEC00594-3

Figure 3 - 9 Removing a Device from the Second Drive Bay

## Removing Fan / Speaker Assembly

To remove the Fan/Speaker Assembly perform the following steps:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove the left side panel.
- 3) Remove fan and speaker connections.
- 4) Depress tabs.
- 5) Pull Fan/Speaker assembly forward.



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Figure 3 - 10 Removing the Fan/Speaker Assembly

## Removing Main Logic Board

To remove the main logic board:

- 1) Turn off external devices and server.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove side panel.
- 4) Remove all connectors.
- 5) Remove CPU module retaining bracket and CPU module.
- 6) Remove all expansion boards.
- 7) Remove mounting screws.
- 8) Carefully rotate the main logic board out, bottom first.

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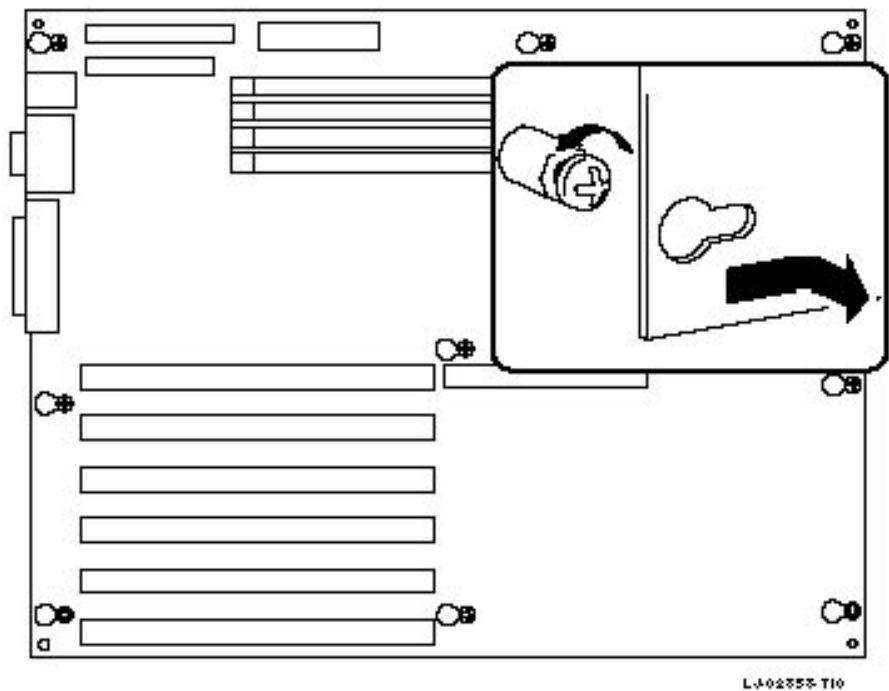
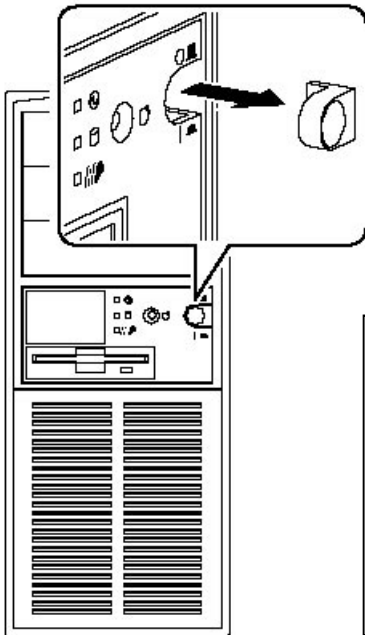


Figure 3 - 11 Removing the Main Logic Board

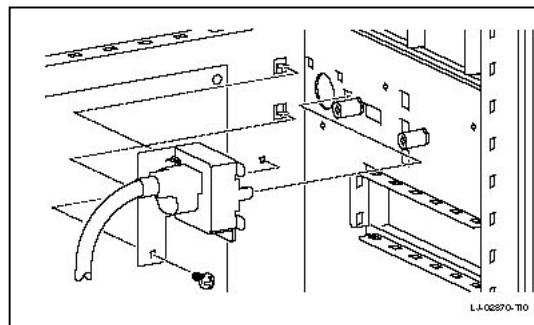
## Removing Power Supply

To remove the power supply:

- 1) Turn off external devices and server.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove side panel.
- 4) Remove metal shield.
- 5) Remove the upper and lower devices.
- 6) *Step 1:* Remove ON/OFF switch (see **Figure 3 - 12**).
- 7) *Step 2:* Remove screw from the Powerplug and pull out the power plug (see **Figure 3 - 13**).
- 8) *Step 3:* Remove four screws from the rear. (See **Figure 3 - 14**).
- 9) *Step 4:* Carefully remove power supply from server. (See **Figure 3 - 15**).



**Figure 3 - 12** Removing the ON/OFF Switch



**Figure 3 - 13** Removing the power plug

**Removing Power Supply (continued)**

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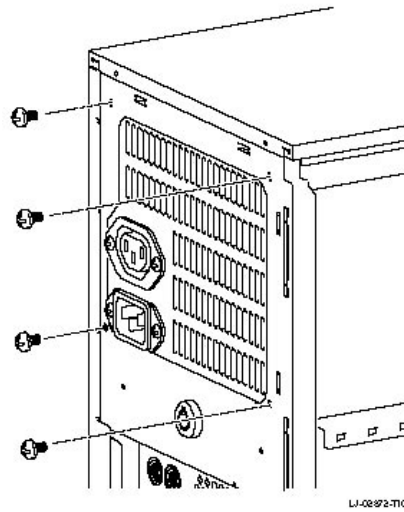


Figure 3 - 14 Removing the screws at the rear

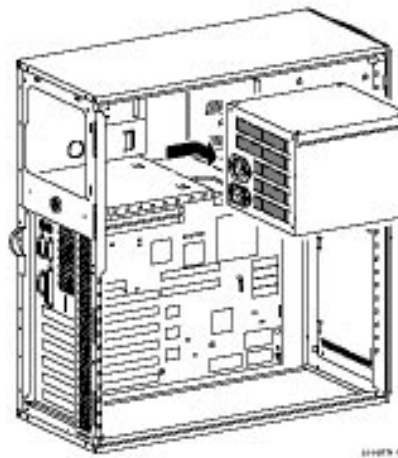


Figure 3 - 15 Removing the Power Supply



## Replacing the Server Battery

The server 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 turned on, replace the server's battery.

To replace the battery, perform the following steps:

- 1) Record the server's configuration settings using the SCU.
- 2) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 3) Unlock and remove the left side panel.
- 4) Remove the battery.
- 5) Install the new battery.



### CAUTION

Make sure pin 1 on the battery is correctly aligned with the pin 1 location on the socket (A, Figure 3 - 16). The pin 1 location on the battery is designated by a white dot in the lower left corner of the battery. Incorrect installation may cause faulty server operation.

- 6) Replace and lock the left side panel.
- 7) Reconnect the power cord and monitor cord to the back of the server. Reconnect any external devices and plug the power cord into the wall outlet.
- 8) Reboot and run the SCU and configure the server using the recorded configuration settings from step 1.

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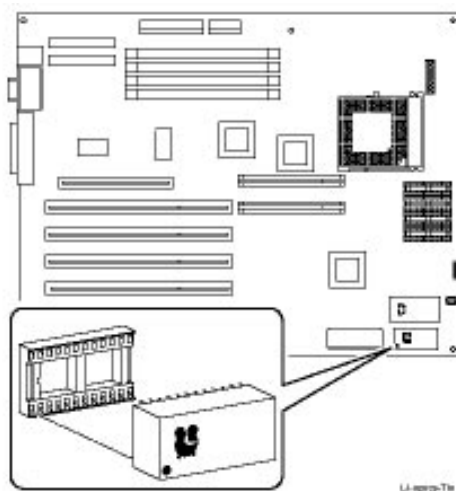


Figure 3 - 16 Installing the Server Battery

## Upgrading Procedures

### Upgrading the CPU

To upgrade the CPU in the computer, perform the following steps:

- 1) Turn off the computer. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the system box.
- 2) Unlock and remove the left side panel.
- 3) Lift up the release lever and move the lever to the right.
- 4) Remove the CPU chip and note the location of pin 1. The pin 1 location on the chip is designated by a white dot and a notch on the lower right corner of the chip (Figure 3 - 17).
- 5) Install the new CPU chip. Make sure pin 1 on the chip is aligned with pin 1 on the main logic board.
- 6) Return the release lever to its original position.
- 7) Replace and lock the left side panel.
- 8) Connect the power cord and monitor cord to the back of the system box. Connect any external devices and plug the power cord into the wall outlet.

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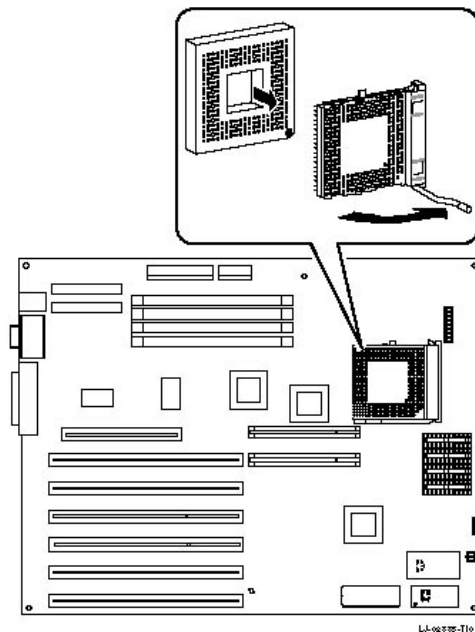


Figure 3 - 17 Upgrading the CPU

### Secondary Cache Memory

The *DECpc 400* MTE Series computer is equipped with 128 KB direct-mapped write back secondary cache memory. The secondary cache memory is designed to improve the performance of the microprocessor. An additional 128 KB cache memory option is available to increase secondary cache memory to 256 KB. This kit consists of four 20 ns, 32 KB × 8 SRAM DIP chips installed in sockets provided on the main logic board.



**CAUTION.**

Make sure pin 1 on each SRAM chip is correctly aligned with the pin 1 location on the socket (Figure 3- 18). The chip is correctly installed when the notched side of both the chip and the socket are aligned. Incorrect installation may cause faulty computer operation.

PRIORIS MTE

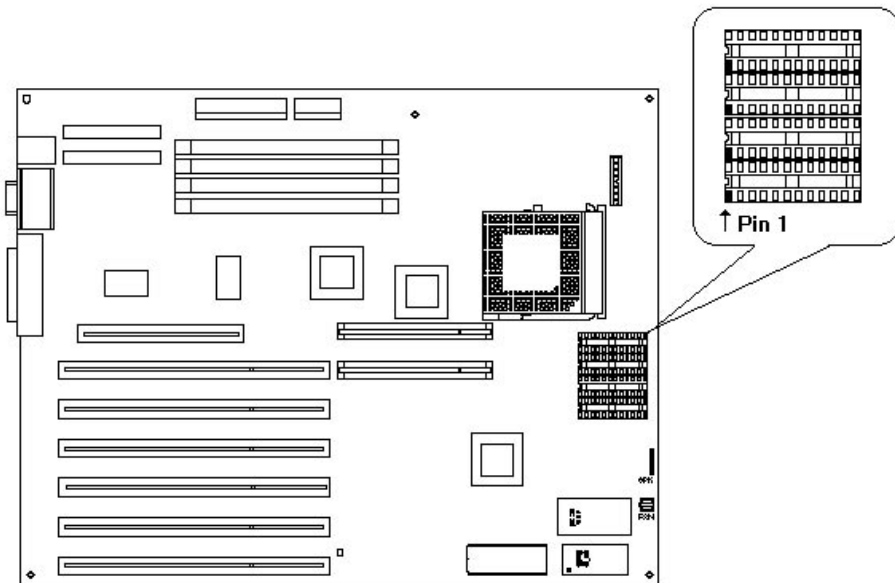


Figure 3 - 18 Cache Memory Upgrade

### Installing Video Memory upgrade on the SVGA Video Card

The PRIORIS MTE models comes standard with a SVGA Video Card with 1 MB video memory. This amount can be increased to 2 MB by installing a 1 MB video memory VRAM chips in the designated socket on the SVGA Video card.

To install the video memory upgrade chips:

- 1) Turn off the computer.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove cover.
- 4) Remove SVGA video card and install the VRAM chips the in upgrade sockets.
- 5) Make sure pin 1 on chip is aligned with pin 1 on socket.
- 6) Set all appropriate SVGA card jumpers. *Refer to "SVGA video card jumper settings"*.
- 7) Replace and lock cover.
- 8) Connect external devices and restore power.
- 9) Reboot the computer to configure it for additional video memory.

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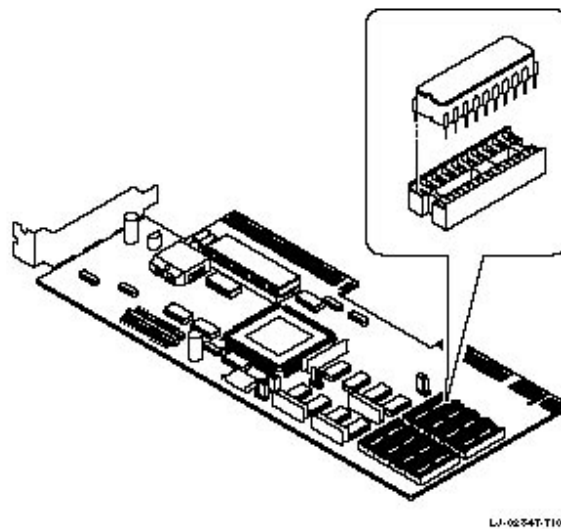


Figure 3 - 19 Installing Video Memory upgrade

## Adding Mass Storage Devices

The PRIORIS MTE Server has the following two drive bay areas. Mass storage devices such as hard disk drivers, floppy diskette drives, CD-ROM drives and tape backup systems are installed in these drive bay areas.

- ◆ Upper drive bay area—This area has room for three 5¼-inch half-height devices. Each drive bay is equipped with a removable panel to accommodate devices requiring front panel access. The bottom two bays of this area can be used to mount one full-height drive. The drive rails are removable to accommodate a full-height device.
- ◆ Lower drive bay area—This area has a drive bay assembly that holds a 3½-inch floppy diskette drive (standard on all *DECpc 400* MT Series computers) and one hidden 3½-inch half-height device that needs no front panel access. This hidden bay is typically used for mounting the system's primary hard disk drive.



## 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 or installing optional hardware or software.

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

### 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 spin down completely, and then turn it back on.
- ◆ If the POST detects an error, 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!!**

## POST and Boot Messages

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

Each time the POST displays a message on the screen, the computer's speaker beeps twice. If an error occurs before the monitor is initialized, specific beep codes sound to alert to a problem. The table below lists a general grouping of system messages arranged by the POST countdown number. 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.*

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| <i>POST Countdown Number</i> | <i>Message Number</i> | <i>Message</i>                                                                                             | <i>Solution</i>                                                                                                                      |
|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 240                          | 0007                  | No timer tick                                                                                              | Replace main logic board.                                                                                                            |
| 200                          | 0001                  | Shutdown failure                                                                                           | Replace main logic board.                                                                                                            |
| 190                          | 0009                  | Timer 2 failure                                                                                            | Replace main logic board.                                                                                                            |
| 180                          | 0010                  | Keyboard stuck key<br>Keyboard controller<br>Keyboard clock line<br>Keyboard data line<br>Keyboard failure | Check the keyboard connection. If the connection is secure, the keyboard or keyboard controller might have failed. Replace keyboard. |
| 170                          | 0041                  | Mouse failure                                                                                              | Check the mouse connection. If the problem persists, replace the mouse.                                                              |
| 160                          | —                     | 640 KB base memory<br>0 KB extended memory                                                                 | —                                                                                                                                    |
| 150                          | 0017                  | Time-of-day clock stopped                                                                                  | Replace RTC.                                                                                                                         |
| 100                          | 0018                  | Invalid configuration information                                                                          | Run the SCU.                                                                                                                         |
| 090                          | 0011                  | Diskette drive failure                                                                                     | Run the SCU. Check all connections. If the problem persists, replace the diskette drive.                                             |
| 080                          | 0015                  | Hard disk controller failure                                                                               | Run the SCU. Check all connections. If the problem persists, replace the controller.                                                 |



**POST and Boot Messages** (continued)

| <i>POST Countdown Number</i> | <i>Message Number</i> | <i>Message</i>                        | <i>Solution</i>                                                                     |
|------------------------------|-----------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| 080                          | 0016                  | Hard disk 0 failure                   | Run the SCU. Check all connections. If the problem persists, replace the hard disk. |
| 060                          | 0021                  | .xxx0h optional ROM bad checksum = xx | Correct the address conflict. If the problem persists, replace the ROM chip.        |
| 050                          | 0019                  | Time-of-day not set                   | Run SCU and set the time and date.                                                  |
| 040                          | 0020                  | Keyboard is locked                    | Unlock the keyboard.                                                                |
| 020                          | —                     | Enable NMI                            | —                                                                                   |
| 010                          | —                     | Enable cache                          | —                                                                                   |
| 000                          | —                     | Boot                                  | —                                                                                   |

**Beep Codes**

If the POST finds an error and cannot display a message, the server's speaker emits a series of beeps to indicate the error. For example, a failure of bit 3 in the first 64 KB of RAM is indicated by a 2-1-4 beep code (a burst of two beeps, a single beep, and a burst of four beeps).

The following tables list the beep codes when it encounters an error. The first table lists fatal errors that lock up the server. The second table lists nonfatal errors that do not lock up the server.

Fatal errors are generally the result of a failed Main Logic Board or some other add-on component (SIMM, server battery, etc.). Nonfatal errors can occur due to an improper connection between the server's rear panel video connector and the monitor.

**Beep Codes for Fatal Errors**

| <i>Beep Code</i> | <i>Error Message</i>                    |
|------------------|-----------------------------------------|
| 1-1-3            | CMOS write/read failure                 |
| 1-1-4            | ROM checksum failure                    |
| 1-2-1            | Interval timer failure                  |
| 1-2-2            | DMA failure                             |
| 1-2-3            | DMA page register write/read failure    |
| 1-3-1            | RAM refresh failure                     |
| 1-3-3            | 1st 64 KB RAM chip or data line failure |
| 1-3-4            | 1st 64 KB RAM odd/even logic failure    |
| 1-4-1            | 1st 64 KB RAM address line failure      |
| 1-4-2            | 1st 64 KB RAM parity failure            |
| 2-1-1            | Bit 0 1st 64 KB RAM failure             |

**Beep Codes for Fatal Errors (continued)**

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| <i>Beep Code</i> | <i>Error Message</i>                   |
|------------------|----------------------------------------|
| 2-1-2            | Bit 1 1st 64 KB RAM failure            |
| 2-1-3            | Bit 2 1st 64 KB RAM failure            |
| 2-1-4            | Bit 3 1st 64 KB RAM failure            |
| 2-2-1            | Bit 4 1st 64 KB RAM failure            |
| 2-2-2            | Bit 5 1st 64 KB RAM failure            |
| 2-2-3            | Bit 6 1st 64 KB RAM failure            |
| 2-2-4            | Bit 7 1st 64 KB RAM failure            |
| 2-3-1            | Bit 8 1st 64 KB RAM failure            |
| 2-3-2            | Bit 9 1st 64 KB RAM failure            |
| 2-3-3            | Bit A 1st 64 KB RAM failure            |
| 2-3-4            | Bit B 1st 64 KB RAM failure            |
| 2-4-1            | Bit C 1st 64 KB RAM failure            |
| 2-4-2            | Bit D 1st 64 KB RAM failure            |
| 2-4-3            | Bit E 1st 64 KB RAM failure            |
| 2-4-4            | Bit F 1st 64 KB RAM failure            |
| 3-1-1            | Slave DMA register failure             |
| 3-1-2            | Master DMA register failure            |
| 3-1-3            | Master interrupt mask register failure |
| 3-1-4            | Slave interrupt mask register failure  |
| 3-2-1            | No recovery diskette or disk error     |
| 3-2-3            | Boot block checksum failure            |
| 3-2-4            | Keyboard/mouse controller failure      |
| 4-2-1            | Timer tick interrupt failure           |
| 4-2-2            | Shutdown failure                       |
| 4-2-3            | Gate A20 failure                       |
| 4-2-4            | Unexpected interrupt in protected mode |
| 4-3-1            | RAM failure (above 0FFFFh)             |
| 4-3-3            | Interval timer 2 failure               |
| 4-3-4            | Time-of-day clock failure              |
| 4-4-1            | Serial port failure                    |
| 4-4-2            | Parallel port failure                  |
| 4-4-3            | Math coprocessor failure               |

### Beep Codes for Nonfatal Errors

The table below lists the beep codes when it encounters a nonfatal error. This table lists nonfatal errors that do not lock up the computer. Fatal errors that lock up the computer are listed in a separate table.

| <i>Beep Code</i> | <i>Error Message</i>          |
|------------------|-------------------------------|
| 3-3-4            | Screen memory failure         |
| 3-4-1            | Screen initialization failure |
| 3-4-2            | Screen retrace failure        |

### Server Troubleshooting

| <i>Problem</i>                                            | <i>Possible Cause</i>                                                                                                                                                                                                                                                                                                                                                                         | <i>Action</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>No response when the computer is turned on</b>         | Main logic board failure.                                                                                                                                                                                                                                                                                                                                                                     | Replace Main logic board.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Power is on, but there is no screen display</b>        | Brightness and contrast controls are not correctly set.<br>Monitor cable is incorrectly installed                                                                                                                                                                                                                                                                                             | Adjust the brightness and contrast controls.<br>Check all monitor connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Computer does not boot from an IDE hard disk drive</b> | Operating system software is not installed on the IDE hard disk drive.<br><br>IDE hard disk drive is not correctly formatted or the requested partition does not exist.<br><br>There is no software on the requested partition.<br><br>IDE hard disk drive jumpers incorrectly set.<br><br>IDE drive type incorrect.<br><br>IDE main logic board jumper incorrectly set.<br><br>Loose cables. | Install the appropriate operating system.<br><br>Format the IDE hard disk drive or correctly partition the IDE hard disk drive using the supplied operating system software.<br><br>Install software on the requested partition.<br><br>Refer to the supplied IDE hard disk drive kit installation instructions.<br><br>Run the SCU to identify the correct drive type. See drive type label on drive or consult drive documentation.<br><br>Set the jumper for IDE operation; refer to the SCU.<br><br>Secure all cable connections. |

**Server Troubleshooting** (continued)

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| <i><b>Problem</b></i>                                        | <i><b>Possible Cause</b></i>                                        | <i><b>Action</b></i>                                                                            |
|--------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Computer does not boot from a target diskette drive</b>   | 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 does not contain start-up files.                           | Insert a diskette with the correct start-up files.                                              |
|                                                              | Loose cables.                                                       | Secure all cable connections.                                                                   |
| <b>No response to keyboard commands</b>                      | Keyboard is password protected.                                     | Enter the keyboard password.                                                                    |
|                                                              | Keyboard is connected to the mouse port.                            | Connect the keyboard to the keyboard port.                                                      |
| <b>No response to mouse commands</b>                         | Mouse is password protected.                                        | Enter the keyboard and mouse password.                                                          |
|                                                              | Mouse is connected to the keyboard port.                            | Connect the mouse.                                                                              |
|                                                              | Mouse driver not installed.                                         | Install the appropriate mouse driver; refer to the supplied application software documentation. |
| <b>IDE hard disk drive cannot read or write information.</b> | Incorrect disk drive jumper settings.                               | Refer to the supplied kit installation instructions.                                            |
|                                                              | Loose or incorrectly installed cables.                              | Make sure all cables are correctly installed.                                                   |
|                                                              | IDE/SCSI hard disk drive is not correctly formatted or partitioned. | Format and partition as required using the supplied operating system.                           |
|                                                              | IDE drive type incorrect.                                           | Run the SCU to identify the correct drive type.                                                 |
|                                                              | IDE main logic board jumper incorrectly set.                        | Set the jumper for IDE or operation.                                                            |

## Disk Drive Troubleshooting

| <b>Problem</b>                                                   | <b>Possible Cause</b>                                               | <b>Action</b>                                                           |
|------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>IDE/SCSI hard disk drive cannot read or write information</b> | Incorrect disk drive jumper settings.                               | Refer to the supplied kit installation instructions.                    |
|                                                                  | Loose or incorrectly installed cables.                              | Make sure all cables are correctly installed.                           |
|                                                                  | IDE/SCSI hard disk drive is not correctly formatted or partitioned. | Format and partition as required using the supplied operating system.   |
|                                                                  | IDE drive type incorrect.                                           | Run the SCU to identify the correct drive type.                         |
| <b>Target diskette drive cannot read or write information</b>    | Diskette is not formatted.                                          | Format the diskette.                                                    |
|                                                                  | Diskette is worn or damaged.                                        | Try another diskette.                                                   |
|                                                                  | Diskette write protection enabled.                                  | Run the SCU and set the Diskette Write Protection option to "Disabled." |

## Monitor Troubleshooting

| <b>Problem</b>                                                                   | <b>Possible Cause</b>                                                                 | <b>Action</b>                                                                            |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>No screen display</b>                                                         | Configuration error.                                                                  | Run the SCU to configure the server for VGA operation. Set the jumper for VGA operation. |
| <b>No monitor display while loading Windows video drivers</b>                    | Monitor type incorrectly set.                                                         | Set the correct monitor type.                                                            |
| <b>Distorted, rolling, or flickering screen display, or wrong / uneven color</b> | Monitor incorrectly adjusted.                                                         | Adjust accordingly.                                                                      |
|                                                                                  | Monitor signal cable incorrectly installed.                                           | Straighten any bent connector pins and then reconnect.                                   |
| <b>Color monitor displaying monochrome</b>                                       | 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.                                                        |
| <b>Monitor fails to switch to high-resolution mode</b>                           | Appropriate high-resolution video drivers are not installed or incorrectly installed. | Correctly install all appropriate high-resolution video drivers.                         |

**Monitor Troubleshooting** (continued)

| <i>Problem</i>                                                          | <i>Possible Cause</i>         | <i>Action</i>                 |
|-------------------------------------------------------------------------|-------------------------------|-------------------------------|
| <b>Monitor display not centered while loading Windows video drivers</b> | Monitor type incorrectly set. | Set the correct monitor type. |

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**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.

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**

| <i>Component</i>             | <i>Messages</i>                                                                                                                              | <i>Solution</i>                                                                                                                 |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>CPU</b>                   | Arithmetic Function Failed<br>General Functions Failed<br>Exception Interrupt in Protected Mode<br>Refresh Failure<br>Logic Functions Failed | Reset CPU<br>Replace CPU                                                                                                        |
| <b>Hard disk</b>             | Butterfly Cylinder Access Test Failed<br>Cylinder 0 Errors<br>Random Cylinder Access Failed<br>Linear Cylinder Access Failed                 | Low-level format hard disk<br>Replace disk                                                                                      |
| <b>Hard drive/controller</b> | Controller Diagnostic Test Failed<br>Questionable Controller Card<br>Hard drives failed                                                      | Run Setup, Check connections,<br>Reset controller, Replace controller,<br>Replace disk                                          |
| <b>Floppy diskette</b>       | Media Mismatch<br>Drive Not Ready<br><br>Write Protected Media<br>Unformatted Media                                                          | Use known good diskette<br>Check size and density of diskette<br>Close drive door<br>Remove write protection<br>Format diskette |
| <b>Floppy drive</b>          | Floppy Drives Failed                                                                                                                         | Check connections, Replace drive                                                                                                |
| <b>Battery/clock</b>         | Clock Stopped<br>Invalid Date<br>RTC Interrupt Failed                                                                                        | Run Setup<br>Replace battery/clock                                                                                              |

**QAPIus/FE Error Messages** (continued)

| <i>Component</i>     | <i>Messages</i>                                                                      | <i>Solution</i>                                                                   |
|----------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>CMOS</b>          | CMOS Clock Test Failed                                                               | Change time from Setup menu in QAPLUS                                             |
| <b>Serial port</b>   | COM port failed<br>Serial Chip Error<br>Serial Compare Error<br>Serial Timeout Error | Check COM device<br>Check connections<br>Replace COM device<br>Replace COM device |
| <b>Video adapter</b> | Video Failed<br>Error in Video Buffer                                                | Replace video adapter<br>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 Server 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.

### Computer Memory Map

| <i>Address Range</i>       | <i>Function</i>                      | <i>Size</i> |
|----------------------------|--------------------------------------|-------------|
| <b>0h to 9FFFFh</b>        | Base memory                          | 640 KB      |
| <b>A0000h to BFFFFh</b>    | Display buffer                       | 128 KB      |
| <b>C0000h to C7FFFh</b>    | VGA BIOS                             | 32 KB       |
| <b>C8000h to DFFFFh</b>    | BIOS Extension ROM<br>(AT bus usage) | 96 KB       |
| <b>E0000h to EFFFFh</b>    | Reserved                             | 64 KB       |
| <b>F0000h to FFFFFh</b>    | Computer BIOS                        | 64 KB       |
| <b>100000h to 7FFFFFFh</b> | Extended memory                      | 127 MB      |

## I/O Address Map

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| <i>Range (hexadecimal)</i> | <i>Function</i>                             |
|----------------------------|---------------------------------------------|
| 000 - 00F                  | DMA Controller one                          |
| 020 - 021                  | Interrupt controller one                    |
| 040 - 043                  | Interval timer                              |
| 060 - 06F                  | Keyboard controller                         |
| 070 - 07F                  | Real-time clock (RTC), NMI                  |
| 080 - 08F                  | DMA Page register                           |
| 0A0 - 0A1                  | Interrupt controller two                    |
| 0C0 - 0CF                  | DMA Controller two                          |
| 0F0                        | Clear math coprocessor busy                 |
| 0F1                        | Reset math coprocessor                      |
| 0F8 - 0FF                  | Math coprocessor                            |
| 1F0 - 1F7                  | IDE Controller                              |
| 26E - 26F                  | NS 87c312 Index register                    |
| 2F8 - 2FF                  | COM2                                        |
| 378 - 37F                  | LPT                                         |
| 3B0 - 3DF                  | VGA Registers                               |
| 3F0 - 3F7                  | Diskette controller                         |
| 3F6 - 3F7                  | IDE Controller (alt status, device address) |
| 3F8 - 3FF                  | COM1                                        |
| 46E8                       | VGA Enable register                         |
| C00                        | EISA config. PAGE register                  |
| 800 - 8FF                  | EISA config. DATA register                  |
| C18                        | Index register (Sis 85c411V)                |
| C1C                        | Data register (Sis 85c411V)                 |
| C80 - C83                  | System board ID                             |
| CA0                        | Index register (Sis 85c406)                 |
| CA1                        | Data register (Sis 85c406)                  |

## Computer Interrupt Levels

| <i>Priority</i> | <i>Interrupt Controller</i> | <i>Interrupt Number</i> | <i>Interrupt Source</i> |
|-----------------|-----------------------------|-------------------------|-------------------------|
| 1               | 1                           | IRQ0                    | Timer tick              |
| 2               | 1                           | IRQ1                    | Keyboard controller     |
|                 | 1                           | IRQ2                    | Cascade interrupt       |
| 3               | 2                           | IRQ8                    | Real-time clock (RTC)   |
| 4               | 2                           | IRQ9                    | Reserved                |
| 5               | 2                           | IRQ10                   | Reserved                |
| 6               | 2                           | IRQ11                   | Reserved                |
| 7               | 2                           | IRQ12                   | Mouse interrupt         |
| 8               | 2                           | IRQ13                   | Math coprocessor        |
| 9               | 2                           | IRQ14                   | Hard disk drive         |
| 10              | 2                           | IRQ15                   | Reserved                |

**Computer Interrupt Levels** (continued)

| <i>Priority</i> | <i>Interrupt Controller</i> | <i>Interrupt Number</i> | <i>Interrupt Source</i> |
|-----------------|-----------------------------|-------------------------|-------------------------|
| 11              | 1                           | IRQ3                    | COM2                    |
| 12              | 1                           | IRQ4                    | COM1                    |
| 13              | 1                           | IRQ5                    | Reserved                |
| 14              | 1                           | IRQ6                    | Diskette drive          |
| 15              | 1                           | IRQ7                    | LPT                     |

**DMA Channel Assignment**

| <i>Channel</i> | <i>Controller</i> | <i>Function</i>     |
|----------------|-------------------|---------------------|
| 0              | 1                 | Refresh             |
| 1              | 1                 | Not used            |
| 2              | 1                 | Diskette controller |
| 3              | 1                 | Not used            |
| 4              | 2                 | Not used            |
| 5              | 2                 | Not used            |
| 6              | 2                 | Not used            |
| 7              | 2                 | Not used            |



## 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 Tests !!**))
  - ◆ 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
- ◇ OS/2 version 1.3
- ◇ OS/2 version 2.11
- ◇ SCO UNIX System V Release 3.2.4 and later
- ◇ SCO Open Desktop Release 2.0 and later
- ◇ Windows NT
- ◇ Novell UnixWare v1.1
- ◇ Novell Netware 3.12 and 4.1
- ◇ PATHWORKS v5.0

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

When completed carefully clean the outside of the 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].*

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## Appendix B

## Useful Information

### Related documentation

| <i>Document Titles</i>                              | <i>Orders</i> |
|-----------------------------------------------------|---------------|
| <b>Prioris MTE Quick Reference Guide</b>            | EK-A0826-RG   |
| <b>Prioris MTE Server User's Guide</b>              | EK-A0817-SV   |
| <b>Quick Reference Guide, Spares Catalogue</b>      | EK-A0836-RG   |
| <b>Service Maintenance Manual, Spares Catalogue</b> | 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 Server product information, device drivers, shareware and freeware.  
For access to the DECpc BBS, dial : **xx33 9260312**

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# Personal Notes

## **Personal Notes**

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