hp server tc2120
Operations and Maintenance Guide

invent

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Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations

For installation instructions, refer to the Installation Sheet included with the hp server tc2120.

Readers Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by email to serverdocumentation@hp.com.

Contents

1 Controls and Indicators

This chapter describes the controls, ports, and indicators on the front and rear of the hp server tc2120.

Front Panel

The front panel provides the controls and indicators commonly used when operating the Server.

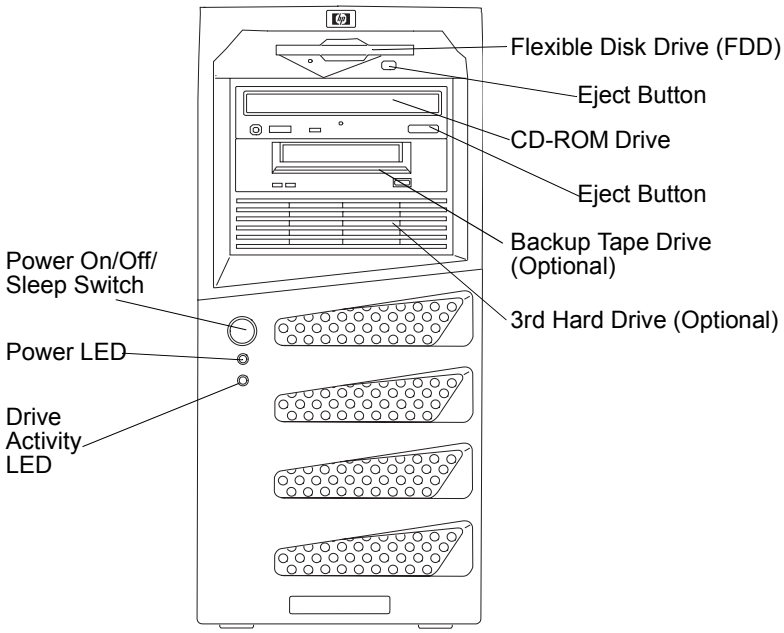
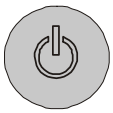


Figure 1-1. Front Panel

Table 1-1 provides the front panel power switch and the lower bezel LED indicator definitions.

Table 1-1. Control Panel Switch and Indicators

Control / Indicator	Description
Power On/Off/ Sleep LED 	This LED indicator provides the power state of the Server. **Steady green** when the Server is operating normally. **Blinking green** when the Server is in Standby mode. **Off** when the Server is powered off.
Power On/Off/ Sleep Switch 	The power switch turns the hp server power On or Off. If sleep states are available, it also transitions the Server between Power On and sleep states. Sleep states are NOS dependent and only available if your NOS supports power management based on the ACPI (Advanced Configuration and Power Management Interface) standard. Refer to *"Applying Power to the hp server"* and *"Sleep States (ACPI)"* later in this chapter.
Drive Activity LED 	**Flickering amber** LED during any IDE or SCSI device activity, including the CD-ROM drive(s), IDE hard disk drives, and SCSI devices connected to the SCSI controller board. **Off** when there is no IDE or SCSI device activity.

Additional Controls and Indicators

Storage devices provide additional front panel controls and indicators. The specific controls and indicators depend on the type and model of the storage devices used. Figure 1-2 shows the controls and indicators typically found on HP supplied devices.

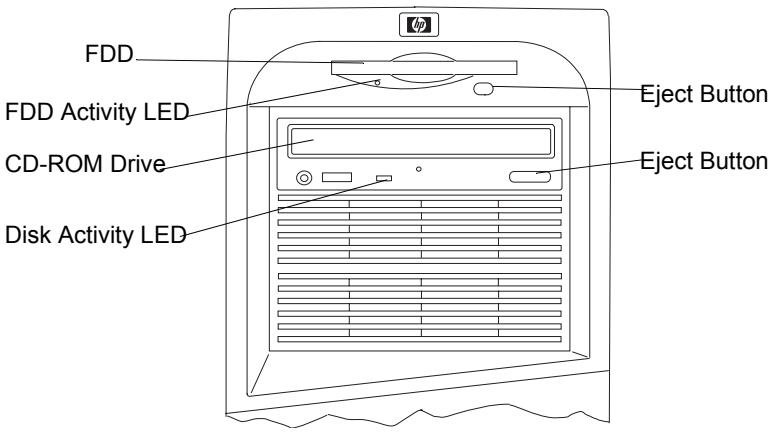


Figure 1-2. Control Panel Indicators

Rear Panel

The ports, connectors, switches, and other related items at the rear of the Server are listed below and shown in Figure 1-3.

- The power connector accepts a standard power cable to connect the hp server tc2120 with the site power source.
- The input voltage selector switch is used to adapt the power supply to the input line voltage. The two switch settings are 115 volts or 230 volts.
- The mouse port accepts a standard mouse with a PS/2 connector.
- The keyboard port accepts a standard keyboard with a PS/2 connector.
- Two USB ports are provided for a keyboard and mouse.
- One standard serial port.
- One standard parallel port which supports Extended Capabilities Port (ECP)/Enhanced Parallel Port (EPP).
- One video port; interface specifications are listed in Chapter 9, “Specifications.”
- Keylock mechanism provides mechanical security for the left side panel to prevent access to the internal components.
- The LAN port is included as an embedded controller based on the Broadcom 5702 LOM adapter (10 Base-T/100 Base-TX/1000 Base-T LAN Interface). It has an RJ-45 LAN connector on the rear panel.
- The System Fan is a variable speed fan controlled by thermal sensors on the system board.

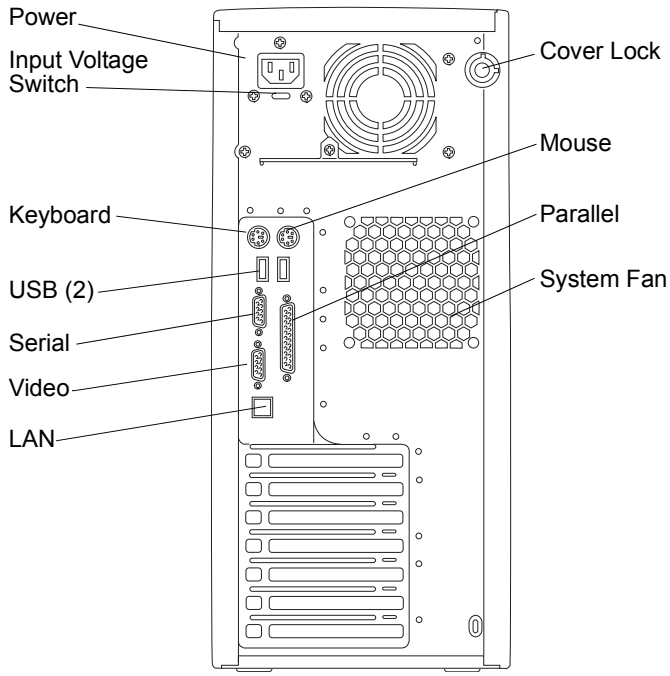


Figure 1-3. Rear Panel and Ports

Applying Power to the hp server

If you choose to use sleep states in conjunction with the hp server tc2120, refer to *"Sleep States (ACPI)"* later in this section and your respective NOS.

Connecting the Power Cords

WARNING	For your safety always connect equipment to a grounded wall outlet. Always use a power cord with a properly grounded plug, such as the one provided with the equipment, or one in compliance with your national safety standards. This equipment can be disconnected from the power by removing the power cord from the power outlet. This means the equipment must be located close to an easily accessible power outlet.

Setting the Input Voltage

Remove the warning label covering the power connector, and ensure that the voltage setting is correct for your country. Slide the switch to change the setting.

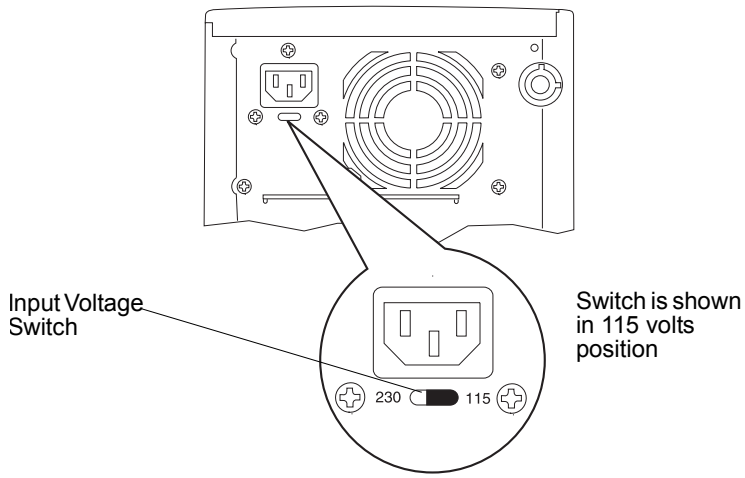


Figure 1-4. Input Voltage Selection Switch

Connecting the Power Cords

1. Connect the power cords to the rear of the monitor and the hp server. (The connectors are shaped to go in one way only.)
2. Connect the monitor's power cord and the hp server's power cord to a grounded outlet. See *Figure 1-4*.

NOTE	Hewlett-Packard does not support power supply upgrades. Power supply installation information is only intended to assist with the replacement of a defective power supply unit. For your safety, only replace your power supply unit with the one provided by HP Support Services.

Powering-Up the Server

1. Turn on power to the monitor connected to the hp server. Turning on the monitor first ensures that video output auto-configures properly as the server boots up. For information about connecting the monitor, see *"Connecting Peripheral Devices"* in *Chapter 3, Installing and Configuring*.
2. Ensure that the Input Voltage selector switch is set for the correct input voltage.
3. Press the Power button on the lower front bezel. See *Figure 1-1*. When you press the power button on the front bezel, the Server powers up and loads the operating system. The system runs a set of Power On Self Tests (POST) during this process. For details refer to *"Configuring the hp server tc2120"* in *Chapter 3, Installing and Configuring* and *Chapter 6, Troubleshooting*.

NOTE	When you disconnect the hp server from AC power, the server remembers the current power state (on or off) and returns to this state when you reconnect to AC power.

Powering-Down the Server

1. Make sure that you have exited all applications.
2. Use the shut down command in your operating system.
3. When prompted, press the power button on the hp server. If you want to force the hp server to shut down (for example after the operating system has crashed), press and hold down the power button for approximately 5 seconds.

WARNING	The power supply will continue to provide standby current to the Server until the power cord is disconnected from the rear panel.

Connecting Power to Multiple-Server Configurations

The hp server temporarily draws a large "inrush current," when first connected to an AC power source. This also occurs when the Server is in a standby mode (power is turned off, but the power cord is plugged into AC power). The inrush current is much greater than the Server's normal operating current and generally, the AC power source can handle the normal inrush current.

However, if you install several hp servers on one circuit, precautions are necessary. If there is a power failure and power is then restored, all the servers immediately begin to draw inrush current at the same time. If the circuit breakers on the incoming power line have insufficient capability, the breaker may trip and thus prevent the servers from powering up.

When preparing your site for installation, allow for the additional inrush current. Refer to *Chapter 9, Specifications*.

Sleep States (ACPI)

The hp server supports the ACPI (Advanced Configuration and Power Interface) standard, which is a key component of a NOS's directed power management. The supported features are only available when an ACPI-compliant NOS is installed on the Server. The term "sleep state" refers to any of several reduced power consumption states in which normal NOS activity has ceased.

The Server supports several sleep states. One of these is a "standby" sleep state, which has a short wake-up time. In this sleep state the Server appears to be off—the monitor appears blank and there is no CD-ROM or internal hard drive activity (IDE or SCSI); however, the power LED displays a blinking green light and the system fan continues to operate.

The Server also may support another sleep state with a slower wake-up time, sometimes referred to as "hibernate" by various operating systems. In this sleep state, the Server appears to be off as described earlier, but the system fan and the front panel power LED are also turned off. The unique feature of this sleep state (and the reason for its slower wake-up time) is that information about the Server's NOS state (open applications, screens, and so on) is saved to disk before the Server is placed in the sleep state. Upon wake-up, this information is restored from disk. This method of restoring the Server's operation is much faster than a complete rebooting of the Server. It still requires running all the start-up self-tests before starting the NOS, but loading the NOS and all the previously opened applications is much faster.

The Server supports certain types of system activity, which are used as wake-up events from these sleep states. These wake-up events can be generated from the power button, keyboard or mouse activity, and scheduled events.

NOTE	The hp server's power management policies (transitions between various power states) and the user options are specific to the particular ACPI-compliant NOS installed on the Server. If your NOS is ACPI-compliant, refer to the (BIOS) Setup Utility and the power management features provided in the NOS instructions for more information.

The hp server's power button can be configured to initiate a graceful shutdown or "soft off" of the NOS rather than an immediate shutdown of the power supply. The power button configurations are dependent on the user interface provided by the ACPI-compliant NOS. While power management is under the control of the ACPI-compliant NOS, the hp server's power button is capable of an override in case of a non-responsive NOS.

NOTE	The hp server power button will force a power down without waiting for the NOS to gracefully shut down the Server, if the power button is pressed and held for more than five seconds.

CAUTION	If the power button override is used, there is a strong possibility of corrupted or lost data.

Refer to the BIOS Setup Utility in *Chapter 3, Installing and Configuring* and your NOS documentation for instructions on setting up Sleep States and transitioning into and out of the various states.

2 External Connectors

Unless otherwise noted, the following features apply to all models. Some features are factory installed; others are optional.

Mini-DIN (PS/2) Connectors

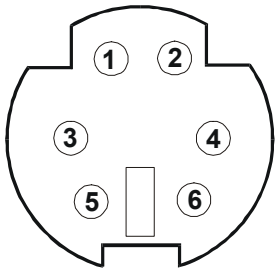


Figure 2-1. Mini-DIN Connector (female) for the Mouse and Keyboard

Table 2-1. Mini-DIN Connector Pinouts for the Mouse and Keyboard

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6	Not used

Serial Port Connector

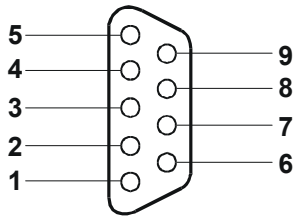


Figure 2-2. Serial Port Connector

Table 2-2. Serial Port Connector (male) Pinouts

Pin Number	Signal Description
1	Data carrier detect
2	Receive data
3	Transmit data
4	Data term ready
5	Signal ground
6	Data set ready
7	Request to send
8	Clear to send
9	Ring indicator

Parallel Port Connector

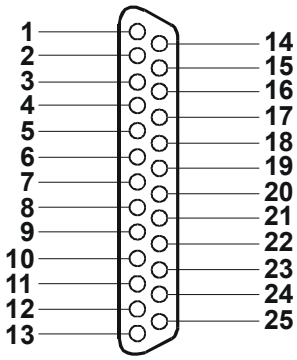


Figure 2-3. Parallel Port Connector

Table 2-3. Parallel Port Connector (female) Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	Strobe5	10	Acknowledge[b]
2	Data bit 06	11	Busy
3	Data bit 1[a]	12	Paper end
4	Data bit 2[a]	13	Select
5	Data bit 3[a]	14	Auto line feed[b]
6	Data bit 4[a]	15	Error1
7	Data bit 5[a]	16	Initialize Printer[b]
8	Data bit 6[a]	17	Select in[b]
9	Data bit 7[a]	18-25	Signal ground

a. All data bits are sent to a printer in an 8-bit parallel format.
b. The signal is active low.

USB Connector

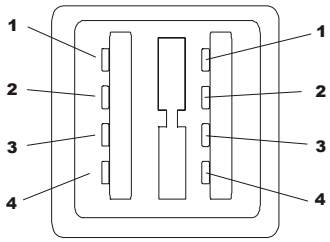


Figure 2-4. USB Connector

Table 2-4. Universal Serial Bus Connector Pinouts

Pin Number	Signal Description
1	VBUS
2	D+
3	D-
4	GND

NOTE Use of the USB port is supported for printers, scanners, and external modems.

Standard LAN Connector

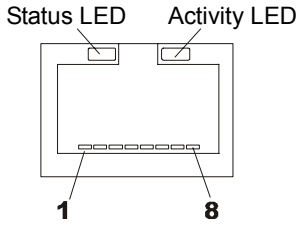


Figure 2-5. LAN Connector

Table 2-5. LAN Connector Pinouts

Pin Number	Signal Description
1	Data signal
2	Not used
3	Ground
4	Power (+5 V dc)
5	Clock signal
6-8	Not used

Standard Video Connector

The built-in video uses the standard 15-pin analog display pinout configuration. The pinouts for your monitor may be different than those shown. Refer to the manual provided with your monitor for pinout information.

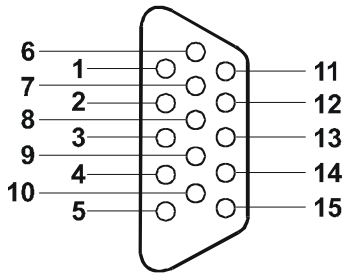


Figure 2-6. Standard Video Connector

Table 2-6. Standard Video Connector Pinouts

Pin	Function	Pin	Function
1	Red	9	Key (no pin)
2	Green	10	Sync return (ground)
3	Blue	11	Monitor ID bit 0
4	Monitor ID bit 2	12	Monitor ID bit 1
5	Monitor self test (ground)	13	Horizontal sync (+)
6	Red return (ground)	14	Vertical sync (-)
7	Green return (ground)	15	Not used
8	Blue return (ground)		

3 Installing and Configuring

Opening and Closing the hp server

This section describes how to remove and replace the left side cover and the upper front bezel of the hp server tc2120.

WARNING	Before removing the cover, always disconnect the power cord and unplug telephone cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages.

The left side cover must be removed to access the internal components and mass storage devices; the upper front bezel must be removed to access the mass storage devices in the front drive bays (or shelves). To remove the upper front bezel, you first need to remove the left side cover.

NOTE	You do not need to remove the lower front bezel of the hp server tc2120 to install internal accessories, such as memory or mass storage.

Removing the Left Side Cover

To remove the left side cover, follow these steps: Switch off the monitor and hp server, and disconnect all power cords and any telecommunication cables. If necessary, label each one to expedite re-assembly.

1. If necessary, unlock the left side cover (using the key) at the rear of the server. Initially, the keys are attached to the rear of the hp server.

2. Pull outward on the latch, grasp the edges of the cover and lift the cover upward to remove it. See *Figure 3-1*.

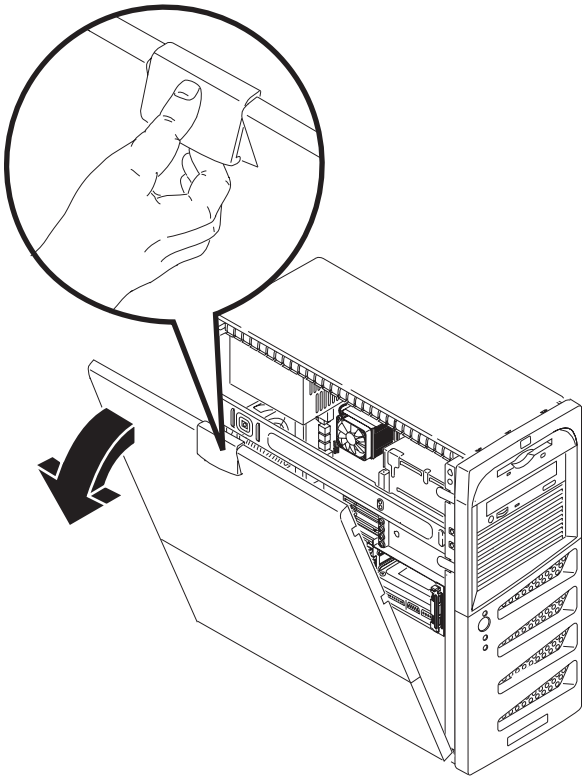


Figure 3-1. Removing the Left Side Cover

3. Place the left side cover in a safe place for re-installation later.

WARNING	Parts inside the server may be hot; wait for them to cool before touching them.

Replacing the Left Side Cover

To replace the left side cover, follow these steps:

1. If you have been installing accessories or servicing the server, return the server to its normal upright position.
2. Use two hands to place the side cover's lower edge at an angle to the hinge tabs along the bottom of the chassis. The hinge tabs are keyed to accept the side cover in only one position.
3. With the side cover resting on the hinge tabs, tilt the side cover up until it engages the locking mechanism at the top of the chassis.

4. Lift the latch to engage the lock and completely close the side cover. The side cover should snap into place when securely closed.

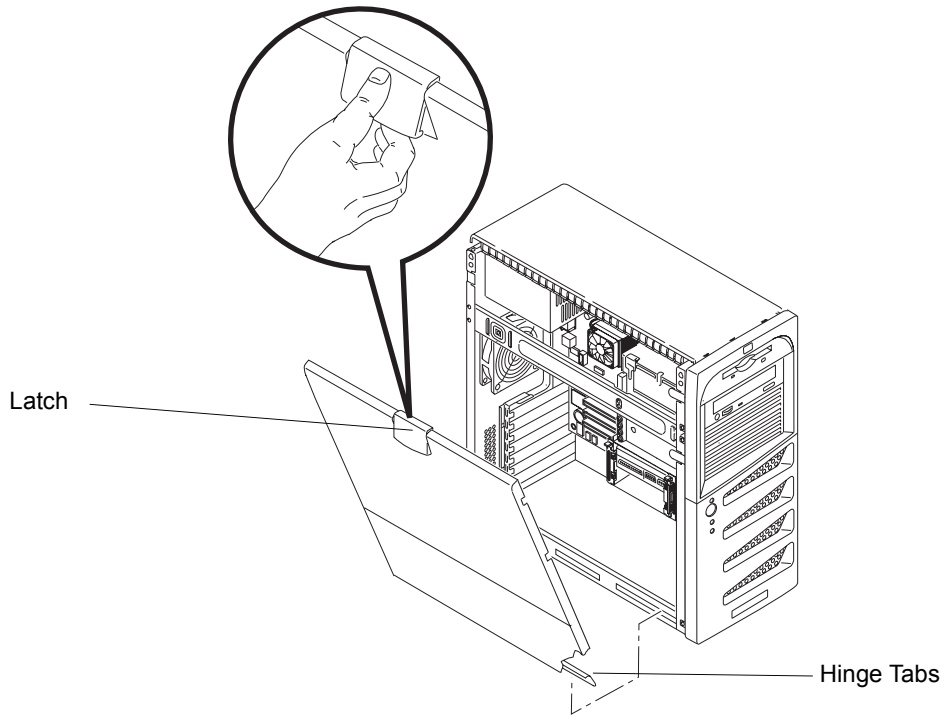


Figure 3-2. Replacing the Left Side Cover

5. Lock the cover using the key provided, if required. Reconnect all the power and telecommunication cables.

Removing the Upper Bezel

The upper front bezel must be removed to install or replace mass storage devices in the first four shelves (common trays).

To remove the upper bezel:

1. Switch off the monitor and hp server, and disconnect all power cords and any telecommunication cables.

   If necessary, label each one to expedite re-assembly.

2. Remove the left side cover, as described earlier in this chapter.
3. Locate the upper bezel release tabs just behind the front bezel, as shown below.
4. Pull the release tabs outward, releasing the upper bezel and pull the tabs/upper bezel forward.

   The upper front bezel swings open on its hinge teeth.

5. Swing the upper bezel completely open and remove it from the front of the server.

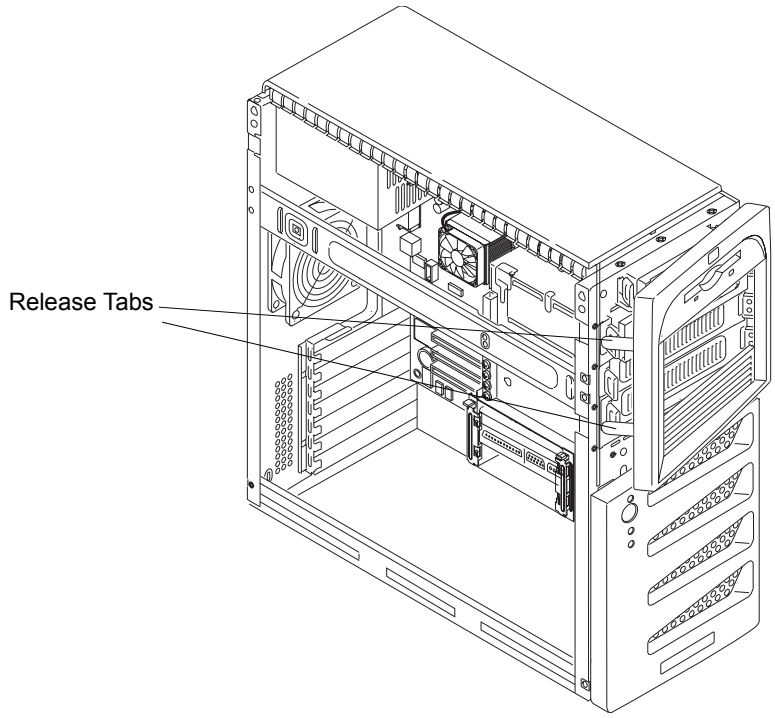


Figure 3-3. Removing the Upper Front Bezel

Replacing the Upper Bezel

1. Hold the upper bezel next to the chassis, and align the hinge teeth, both upper and lower, as shown in the following illustration.

   The hinge teeth can only fit together within the space allowed, so it should fit on the first try.

2. Close the upper bezel, swinging it to the left, where it will engage the release tabs.
3. Push the upper bezel closed so it engages the release tabs.

The release tabs should snap into place.

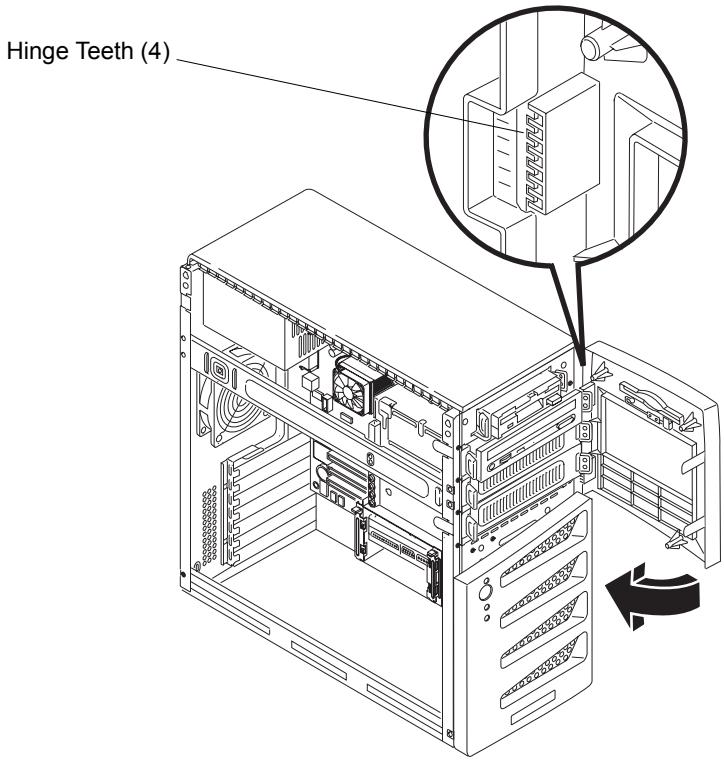


Figure 3-4. Replacing the Upper Bezel

Mass Storage

This section describes how to install the internal mass storage devices, including the internal hard disk drives (IDE or SCSI) and the optional tape backup (DAT) drive. The hp server tc2120 comes standard with one flexible disk drive, one IDE CD-ROM, and at least one SCSI or IDE hard disk drive, depending on the model. The mass storage cage can hold two hard disk drives. A third hard disk drive may be installed in the fourth drive bay, located behind the upper front bezel.

Please refer to the appropriate topics listed in this section according to your server configuration (IDE or SCSI).

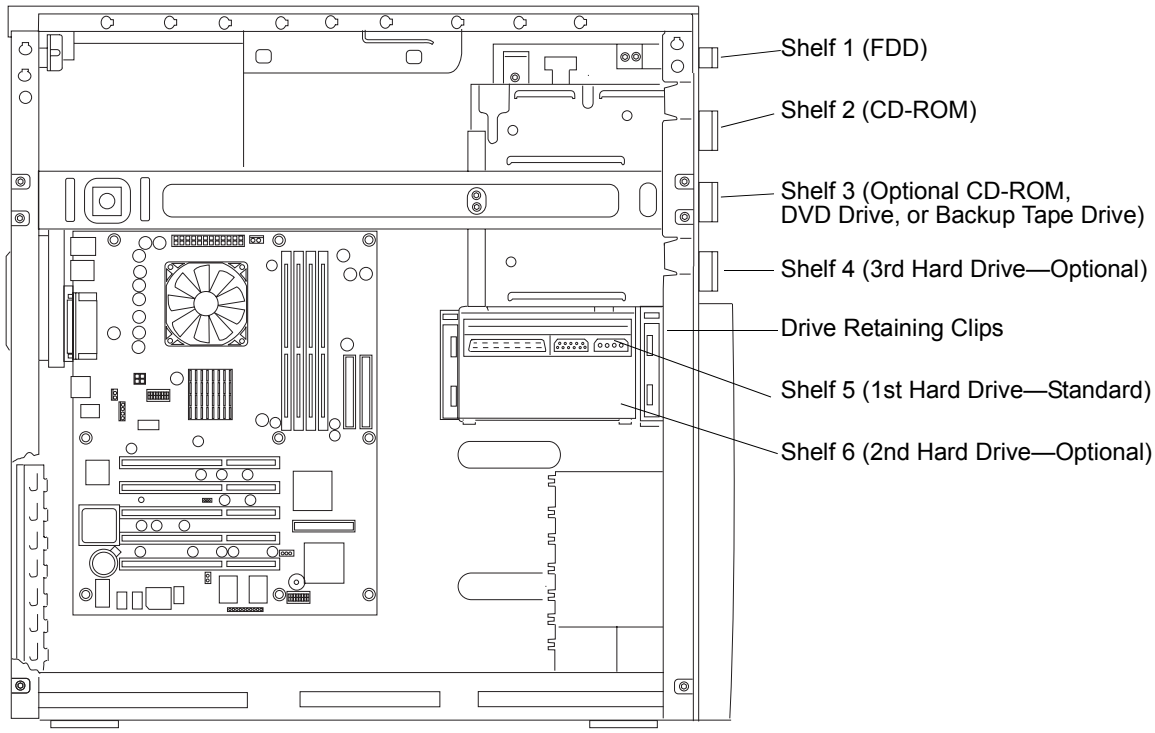


Figure 3-5. Mass Storage Locations

Mass Storage Guidelines

- General Guidelines
  - o Use care when unpacking and handling the hard disk drives.

    The hard disk drives are very susceptible to mechanical shock and can be easily damaged by a drop as short as one-quarter of an inch. If the drop would crack an egg, it will damage the drive.
  - o Do not stack drives.
  - o The server is internally limited to 6 mass storage shelves.

    The flexible disk drive and CD-ROM drive, which are standard on all models of the hp server tc2120, occupy shelves 1 and 2 respectively. The first four mass storage shelves may also be referred to as common trays, or drive trays. See *Figure 3-5*.
- IDE Devices
  - o The embedded IDE controller is an Enhanced-IDE dual channel controller and provides two connectors (IDE-1 and IDE-2) for IDE devices.

    Refer to *"System Board Layout"* in *Chapter 9, Specifications*.
  - o The IDE CD-ROM uses one connector on the cable from the IDE-2 connector, leaving one connector for an optional third hard drive or IDE device on the IDE model. The CD-ROM is configured as the master device, unless a third HDD is installed, which should be configured as the master device.

    For the SCSI model the second IDE-2 connector could be used for any additional IDE device, such as IDE hard drive.
  - o The primary IDE connector (IDE-1) and cable is used for the first or standard hard IDE drive and the second optional hard drive.

The bundled IDE CD-ROM and hard disk drive were put on separate IDE connectors to improve performance.

- SCSI Devices
  - o Use only low voltage differential (LVD) SCSI devices.
  - o Do not use high voltage differential (HVD) SCSI devices in the server or damage to the controller and other devices may occur.
  - o Ensure that the SCSI devices you install do not have terminations installed.

    The SCSI drives are connected to a terminated cable and do not require termination on the SCSI drive.
  - o Use only HP Ultra 160 SCSI LVD (1-inch) low profile 3.5-inch hard disk drives for the hard disk drive cage.
  - o The optional HP backup tape drive comes with a 50-to-68-pin adapter to connect to the 68-pin SCSI connector on the SCSI cable used for connection of backup tape drive.

    The optional HP backup tape drive may slow down access time for the Ultra-160 SCSI hard drives. If this is the case, HP recommends adding another single channel SCSI controller to control the slower backup tape drive.

Boot Priority

The hp server tc2120 is provided in two models, IDE or SCSI, and the model type affects the boot priority. The hp server searches for bootable devices in a specific order, which is set up in the BIOS Setup Utility. The SCSI Controller in the server scans for a boot device starting at device ID 0 and works up through the ID numbers (0-15). The SCSI controller board is always SCSI ID 7. The optional backup tape drive will use SCSI address ID 3.

NOTE	The boot order can be changed by pressing F8 during the POST or by using the server's (BIOS) Setup Utility. Refer to *"BIOS Setup Utility"* later in this chapter for more information. You may also activate the Network Boot by pressing F12 during the POST.

Default Boot Order:

1. CD-ROM drive
2. Flexible disk drive
3. IDE hard drive (if present)
4. SCSI hard drive in any PCI slot (if present)
5. Other bootable devices in any PCI slot

Mass Storage Devices

This section provides the configuration of the IDE and SCSI mass storage devices in the hp server tc2120.

IDE Model Controller Configuration

The embedded IDE controller is available for both models (IDE or SCSI) of the hp server. The embedded IDE controller is an Ultra ATA 33/66/100 dual channel controller, which provides IDE-1 and IDE-2 connectors. Each channel can only control two IDE devices.

The IDE server model uses the IDE-1 for the boot drive and the IDE-2 connector for the IDE CD-ROM. The BIOS Setup Utility can be used to change the boot order of the flexible disk drive and the IDE devices. Refer to *"BIOS Setup Utility"* later in this chapter for more information.

SCSI Model Controller Configuration

The base SCSI model of the hp server tc2120 has at least one SCSI hard drive (shelf 5) located in the drive cage and connected to the factory installed SCSI controller. The single channel SCSI controller board provided with the SCSI model uses the SCSI Select Utility to control the SCSI controller board settings. If you order the SCSI model, you typically do not need to configure the SCSI controller, because the utility will automatically recognize all SCSI devices connected to it.

Run the SCSI Select Utility to verify or modify the SCSI controller settings, low-level format SCSI disks, or verify SCSI media. Refer to *"SCSI Configuration Utility"* later in this chapter for further information.

The single channel Ultra-160 PCI SCSI controller board provided with the SCSI model includes three internal SCSI connectors and is normally installed in PCI slot 1. Two of the internal connectors are used for legacy products, and the third is used for your SCSI drives. The SCSI cable provided has 5 connectors, (4 for SCSI devices and 1 for the SCSI controller board) and one terminator on the end of the cable.

CAUTION	You must not connect high voltage differential (HVD) SCSI devices on the SCSI bus or you will damage the other LVD SCSI devices.

Mass Storage Devices

Table 3-1 lists the number and types of mass storage devices that may be added to the hp server.

Table 3-1. Mass Storage Devices

Device Type	Interface Type	Maximum Devices	Installed Devices and Addresses
FDD		1	• Factory installed flexible disk drive (FDD) in shelf 1
CD-ROM DVD IDE Hard Disk Drive	IDE-2*	2	• Factory installed CD-ROM drive in shelf 2 • Optional IDE device (backup tape drive, CD-ROM, DVD drive, or IDE hard drive) in shelf 3 or 4 (shelf 3 is recommended)
IDE Hard Disk Drive	IDE-1	2	• Factory installed IDE hard drive in shelf 5 • Optional 2nd IDE hard drive in shelf 6
SCSI Backup Tape Drive**	SCSI controller board	1	• Optional SCSI backup tape drive in shelf 3 (address = ID 3)
SCSI Hard Disk Drive	Internal SCSI cable (Ultra-160 SCSI Adapter)	4	• Factory installed SCSI HDD (shelf 5, address = ID 0 • Optional 2nd SCSI HDD (shelf 6, addresses = ID 1). • Optional 3rd SCSI HDD (shelf 4, address = ID 2) • SCSI controller (address = ID 7)

* The secondary IDE (IDE-2) cable is connected to the factory-installed CD-ROM drive. The primary IDE connector (IDE-1) is available on the SCSI model.

** A 50-to-68-pin SCSI adapter is provided with the HP backup tape drive.

Tools Required

Use an anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Installing a Second Hard Disk Drive (Drive Cage Mounted)

The first hard disk drive (IDE or SCSI) is always mounted in the top (shelf 5) of the hard disk drive cage. The second hard disk drive should be mounted just below it (shelf 6).

1. If the server is already installed and operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the side cover from the server.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

4. Press and release the retaining clips at the sides of the drive cage. See *Figure 3-6*.

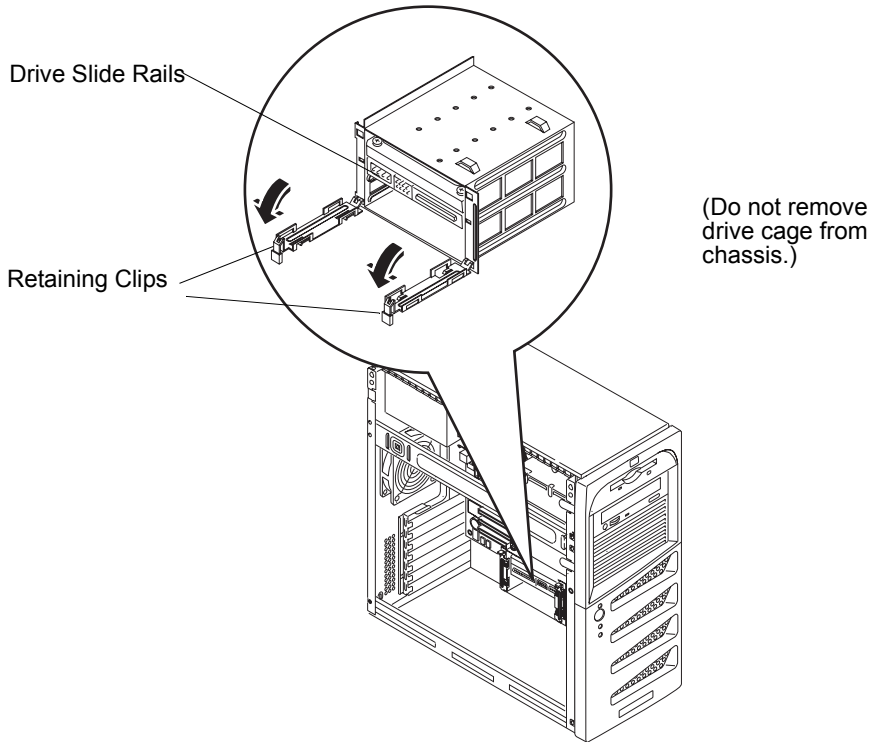


Figure 3-6. Releasing the Retaining Clips

5. Remove the hard disk drive from its protective bag and check, or set the following items:
   a. Check for bent pins on any of the connectors and carefully straighten any bent pins.
   b. If mounting a SCSI hard drive, ensure it is not terminated and set the SCSI ID jumper for address = ID 1.

      Refer to the documentation provided with the hard drive.
6. Remove the two side rails from the vacant space in the drive tray and screw them to the new hard drive. See *Figure 3-7*.

   The screws are located just above the drive cage.

NOTE	If the hard disk drive you are planning to install already has a mounting bracket attached, you must remove it in order to attach the side rails to the drive.

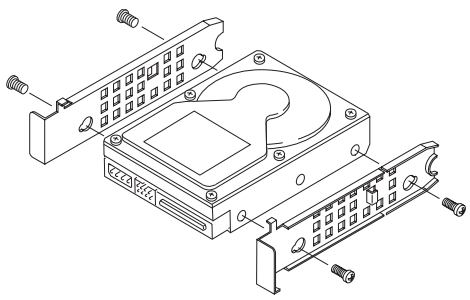


Figure 3-7. Attaching Side Rails to the Hard Drive

7. Slide the drive into the lower cage opening with the data and power connectors facing out of the drive cage. See *Figure 3-8*.

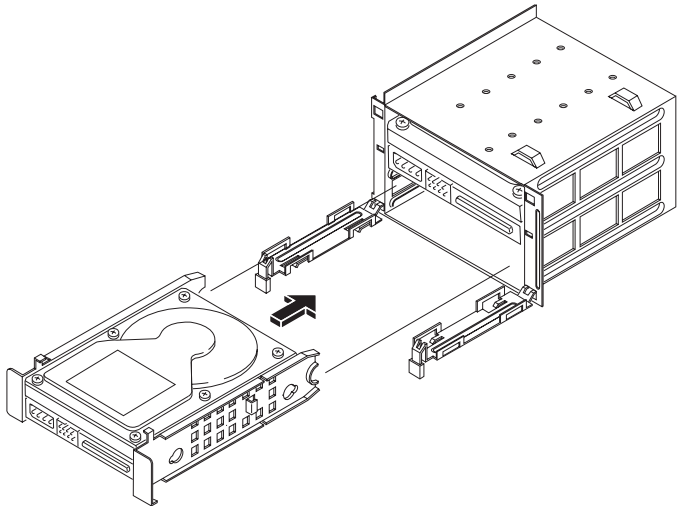


Figure 3-8. Drive Cage Mounting

8. Attach the data connectors to the drives.

   Assuming that you want to boot from the original hard drive, attach the end connector (marked DRIVE 0) to this drive and the other connectors to the remaining drive(s). If mounting a SCSI hard drive, connect the SCSI cable to both drives.

9. Connect the power cable to the rear of the hard drive.
10. Replace the left side cover and external cables.
11. Replace the power cord and restore power to the server.
12. Verify the new configuration by checking the HP Summary screen that appears during startup.

    The BIOS and SCSISelect utilities automatically detect the new hard drives (IDE or SCSI) but you should check the BIOS and SCSISelect settings and make any necessary changes.

Installing a Third Hard Disk Drive (Tray Mounted)

The first and second hard disk drives (IDE or SCSI) are mounted in the drive cage; the third hard drive must be mounted in the fourth drive tray. The secondary IDE cable, which is connected to the IDE CD-ROM in the second drive tray, has an available connector that may be used for an IDE device in either the third or fourth tray.

1. If the server is already installed and operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the side cover and the upper front bezel.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

4. Press in on both tab latches to release the fourth drive tray, and then pull it out. See *Figure 3-9*.
5. Remove the hard disk drive from its protective bag, and check, or set, the following items:

   a. Check for bent pins on any of the connectors and carefully straighten any bent pins.

   b. If mounting a third SCSI hard drive, ensure that it is not terminated and set the SCSI ID jumper for address = ID 2.

Refer to the documentation provided with the hard drive.

NOTE	If the hard disk drive (HDD) you are planning to install already has a mounting tray attached, you must remove it from the tray.

6. Install the hard disk drive as described below:
   a. Place the hard disk drive into the tray and use the screws provided to secure it to the tray from the bottom.
   b. Insert the hard disk drive assembly into the fourth shelf. See *Figure 3-9*.

      The tabs should snap into place when the drive is pushed all the way into the fourth shelf.

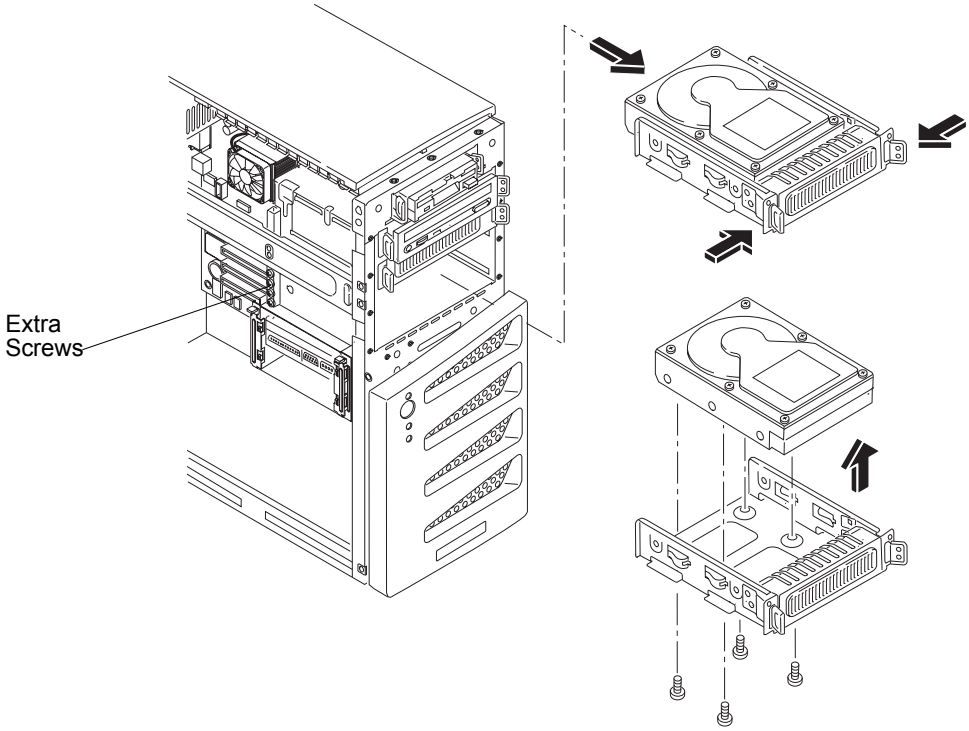


Figure 3-9. Installing a Disk Drive (Tray Mounted)

7. Connect the data cable to the hard drive, as described below:
   - If mounting a third IDE hard drive, connect the secondary (IDE-2) cable to the hard drive.
   - If mounting a third SCSI hard drive, connect the SCSI cable to the drive and ensure all SCSI drives are connected to the SCSI cable.
   - There are five connectors on the standard SCSI cable; with four of the connectors intended for the three hard disk drives and one optional backup tape drive. The standard SCSI cable has a terminator at the end of the cable.
8. Connect the power cable to the rear of the hard disk drive.
9. Replace the upper bezel and left side cover.
10. Replace the external cables, and power cord, and then restore power to the server.

    The BIOS and SCSISelect utilities automatically detect the new hard drives (IDE or SCSI), but you should check the BIOS and SCSISelect settings and make changes as necessary.

Installing an Optional CD-ROM or DVD Drive

You may install an optional IDE CD-ROM or DVD drive in the third drive tray. The secondary IDE cable, which is connected to the IDE CD-ROM in the second drive tray, has an available connector that may be used for an IDE device in either the third or fourth tray.

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

4. Remove the upper bezel.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

5. Press in on both tab latches to release the third drive tray and pull it out at the same time. See *Figure 3-10*.

6. Remove the RFI shield from the third drive tray.

7. Remove the CD-ROM from the shipping container.

8. Make any settings required by the CD-ROM documentation (primary or slave, etc.).

9. If not already mounted, place the CD-ROM into the CD-ROM tray and secure it using the four screws.

10. Guide the CD-ROM tray into the chassis opening, with the cable connectors of the CD-ROM toward the rear of the chassis.

11. Push the CD-ROM tray all the way into the chassis until the CD-ROM tray snaps into place.

    The two release tabs should click when in place.

12. At the rear of the CD-ROM, carefully connect the power and data cables.

    The IDE CD-ROM uses one connector on the cable from the IDE-2 connector, leaving one connector that may be used for an IDE device in the third tray.

13. Replace the upper bezel.

14. Replace the left side cover.

15. Replace the external cables and power cord.

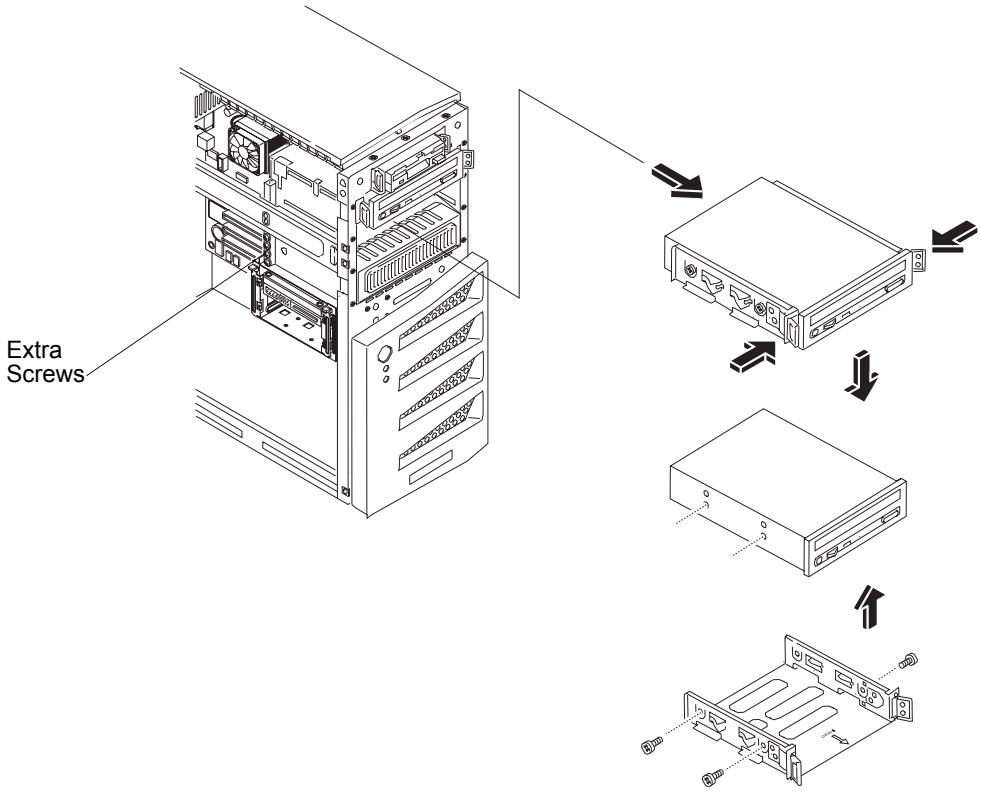


Figure 3-10. Installing an Optional CD-ROM or DVD Drive

Installing an Optional Backup Tape Drive

The optional HP SureStore DAT 24i backup tape drive is a single-ended device and may slow down the disk access time for the Ultra-160 SCSI drives. A second SCSI controller board may be required to separately control the backup tape drive.

1. If the server is already installed and operating, power-down the server.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover from the server.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

4. Remove the upper front bezel.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

5. Press in on both tab latches to release the third drive tray and pull it out at the same time. See *Figure 3-11*.

6. Remove the RFI shield from the third drive tray. See *Figure 3-11*.

7. Ensure that the backup tape drive is not terminated and ensure that the SCSI ID jumper is set for address = ID 3 on the tape drive.

   The optional HP SureStore DAT 24i backup tape drive is shipped with the default setting of SCSI address = ID 3. Refer to the documentation provided with the tape drive.

8. Install the backup tape drive, as described below:

a. Place it into the tray and use the screws provided to secure it to the tray. See *Figure 3-11*.

The optional HP SureStore DAT 24i backup tape drive is a single-ended drive and normally comes with the 5¼ inch mounting brackets installed on the tape drive. If the brackets are not pre-installed, follow the instructions provided with the tape drive to connect the 5¼-inch mounting brackets to the tape drive before installing the tape drive into the third drive tray.

b. Insert the backup tape drive mounted in the tray into the third shelf.

The tabs should snap into place when the third drive tray is pushed all of the way into the third shelf.

CAUTION	Install and remove connectors carefully, and avoid displacing any of the pins.

9. Connect the SCSI data and power cables to the rear of the backup tape drive.

The SCSI data and power cables for the tape drive should already be routed to the tape drive. If they are not, locate the free SCSI and power connectors and route them to the tape drive.

NOTE	The slower speed of the tape drive may slow disk access time for the Ultra-160 SCSI drives. You should install an additional SCSI controller board to control the backup tape drive separately from the Ultra-160 SCSI drives. You may use the internal SCSI cable provided with the second SCSI controller board to connect to the tape drive.

10. Replace the upper bezel and the left side cover.
11. Replace the external cables, power cord, and then restore power to the server.

The SCSISelect Utility automatically detects the new SCSI backup tape drive, but you should check the SCSISelect settings and make changes as necessary.

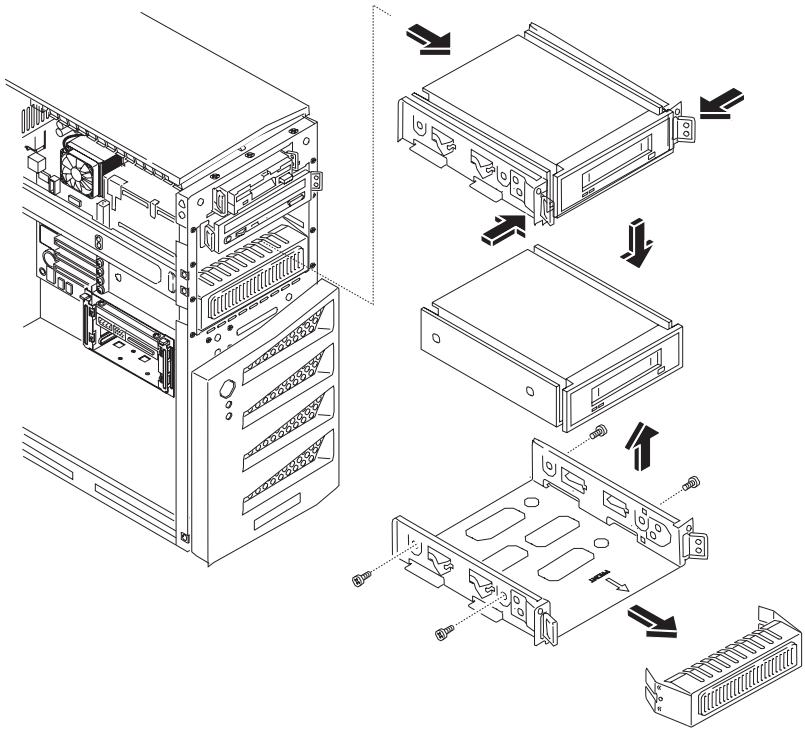


Figure 3-11. Installing the Optional Backup Tape Drive

Memory Modules

The main memory for the hp server tc2120 is implemented using four memory slots on the system board and it supports up to 4 GB (1 GB x 4) of memory. The server only supports HP 184-pin, PC2100 (266 MHz), 3.3V, buffered, ECC DDR DIMMs and ships with at least one 128 MB DIMM installed.

NOTE	Use only memory modules provided for your hp server model. The use of other memory modules is not supported. Install only 128 MB, 256 MB, 512 MB, or 1 GB buffered ECC DDR DIMM modules.

To ensure you have the correct DIMMs before installation, refer to one of the following for a list of qualified DIMMs:

- HP web site at: http://www.hp.com/
- HP Customer Service

Tools Required

Use an anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Memory Installation Guidelines

The hp server tc2120 uses PC2100 (266 MHz) buffered ECC DDR DIMMs, which are electrically different from the EDO and PC100 SDRAM memory modules used in previous hp server models.

- DIMMs sizes supported are 128 MB, 256 MB, 512 MB, or 1 GB in any combination.
- Supported memory capacity ranges from 128 MB to 4 GB maximum (1 GB x 4 DIMM slots total). The minimum capacity is 128 MB (one DIMM).
- DIMM sizes may be mixed on the system board and may be loaded in any order (1 through 4). However, HP recommends loading the DIMMS by size, starting at slot 4 with the smallest DIMM size and filling the slots in reverse order (4, 3, 2, 1). See *Figure 3-12* for DIMM slot locations.
- Open slots between DIMMs are permitted.
- When handling DIMMs, observe anti-static precautions to avoid damage.

Installing Additional DIMMs

1. If the system is already installed and working, power off the system.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and any external cables connected to the system.

   If necessary, label each one to expedite re-assembly.

3. Remove the side cover and lay it aside.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

WARNING	The power supply will continue to provide standby current to the hp server tc2120 until the power cable is disconnected.

4. Lay the server on its side (components showing) for the best access to the DIMM slots.

CAUTION	The memory modules (DIMMs) are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the accessory kit: Leave the memory module in the anti-static container until you are ready to install it. Always use an anti-static wrist strap and a grounding mat. Before you remove a memory module from the anti-static container, touch a grounded, unpainted metal surface on the hp server to discharge static electricity.

5. Locate the DIMM slots and select a DIMM slot for installation.
   See *Figure 3-12*.

   DIMMs may be installed in any combination, in any slot, but HP recommends loading the DIMMS by size, starting at slot 4 with the smallest DIMM size and filling the slots in reverse order (4, 3, 2, 1).

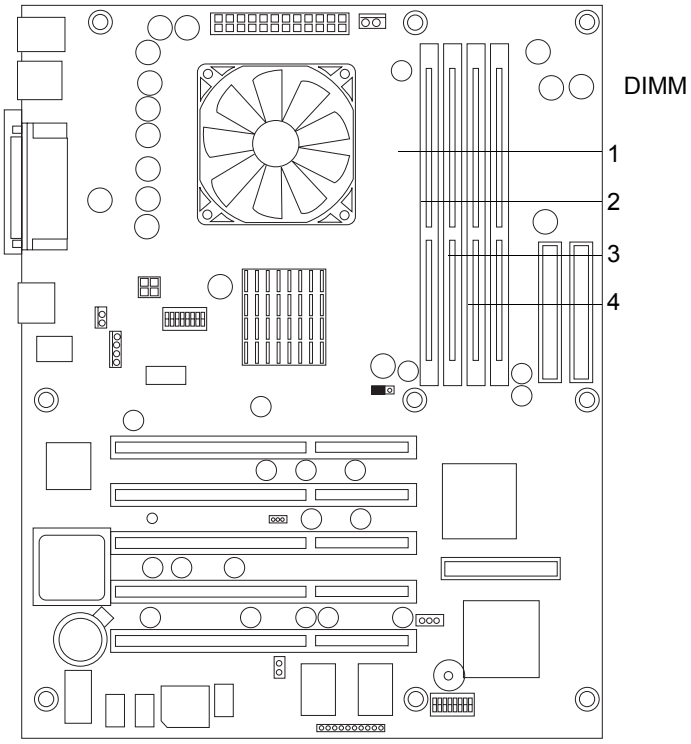


Figure 3-12. DIMM Locations on System Board

6. Remove the new DIMM from its container, handling the module by its edges.

   Use only HP PC2100 (266 MHz) buffered ECC DDR DIMMs.

CAUTION	The DIMM should be left in the anti-static container or placed on an anti-static surface, until you are ready to install it into the DIMM slot.

7. Spread the two retaining latches on the slot and align the notches on the DIMM with the keys on the slot. See *Figure 3-13*.

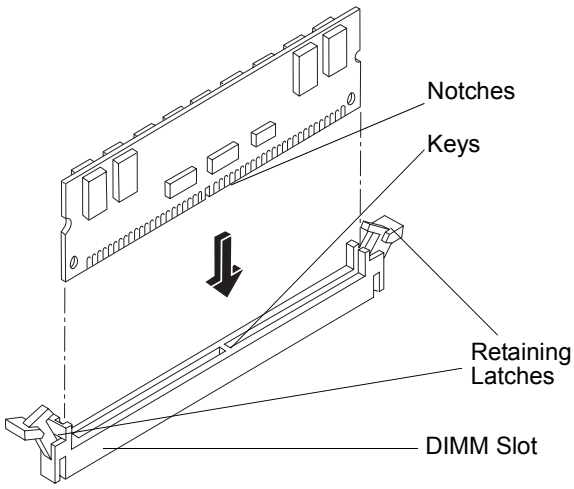


Figure 3-13. DIMM to Slot Alignment

8. Holding the DIMM at 90 degrees to the system board, press the DIMM fully into the slot until the retaining latches close. See *Figure 3-13*.

   If the latches do not close, the DIMM is not inserted correctly.

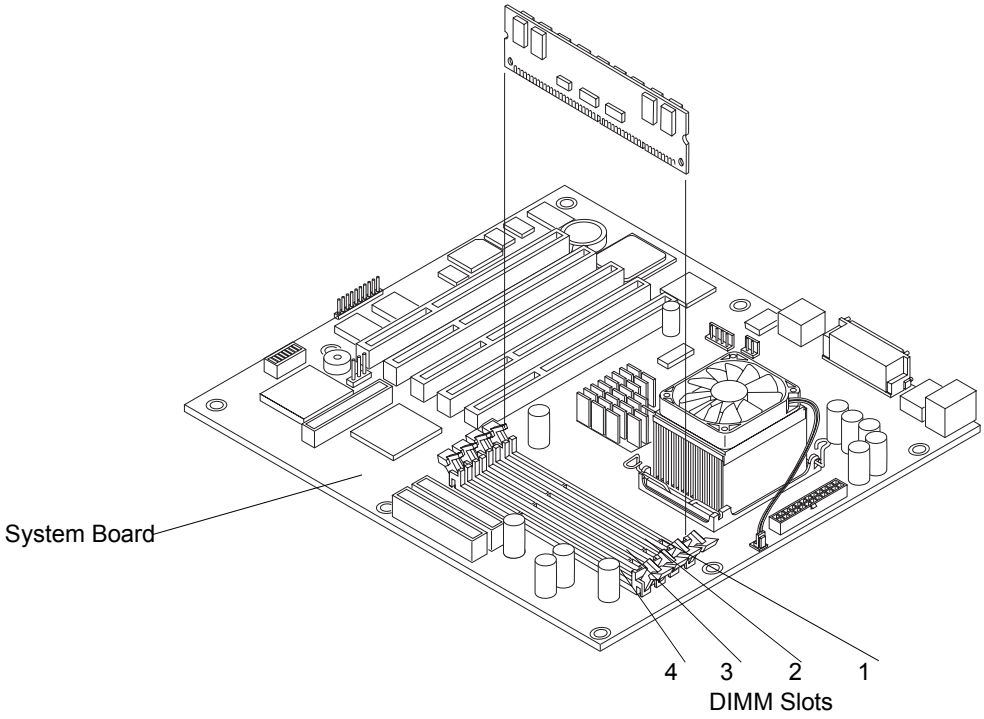


Figure 3-14. DIMM Insertion

9. Repeat Steps 7-8 to install the remaining DIMMs of your memory configuration.

Removing DIMMs

You may need to remove a DIMM module to downsize your memory configuration or to replace a defective DIMM.

1. If the server is already installed and working, power down the server.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and all external cables.

   If necessary, label each one to support re-assembly.

WARNING	The power supply will continue to provide standby current to the server until the power cable is disconnected.

3. Remove the left side cover from the server and lay it aside.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

4. Lay the server on its side with the components up.
5. Open the retaining latches.
6. Lift the DIMM completely away from the slot.
7. Place the DIMM in its anti-static container.
8. Repeat Steps 5-7 for as many DIMMs as you need to remove.
9. When you have completed removal and installation of DIMMs as required, close the server and restore power.

Processor

The procedures listed here for removing and replacing a processor and its heat sink-cooling fan are the same for all of the processors used in this hp server.

CAUTION	Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

Tools Required

Use an anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Removing the Heat Sink and Cooling Fan

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

WARNING	The power supply will continue to provide standby current to the hp server until the power cord is disconnected from the AC power source.

3. Remove the left side cover.
4. Lay the server on its side (components showing).
5. Disconnect the heat sink cooling fan power cable from the connector on the system board.
6. Open the heat sink release latches by pressing down on the latches and unhooking them from the heat sink bracket. Then, remove the heat sink by lifting it. See *Figure 3-15*.

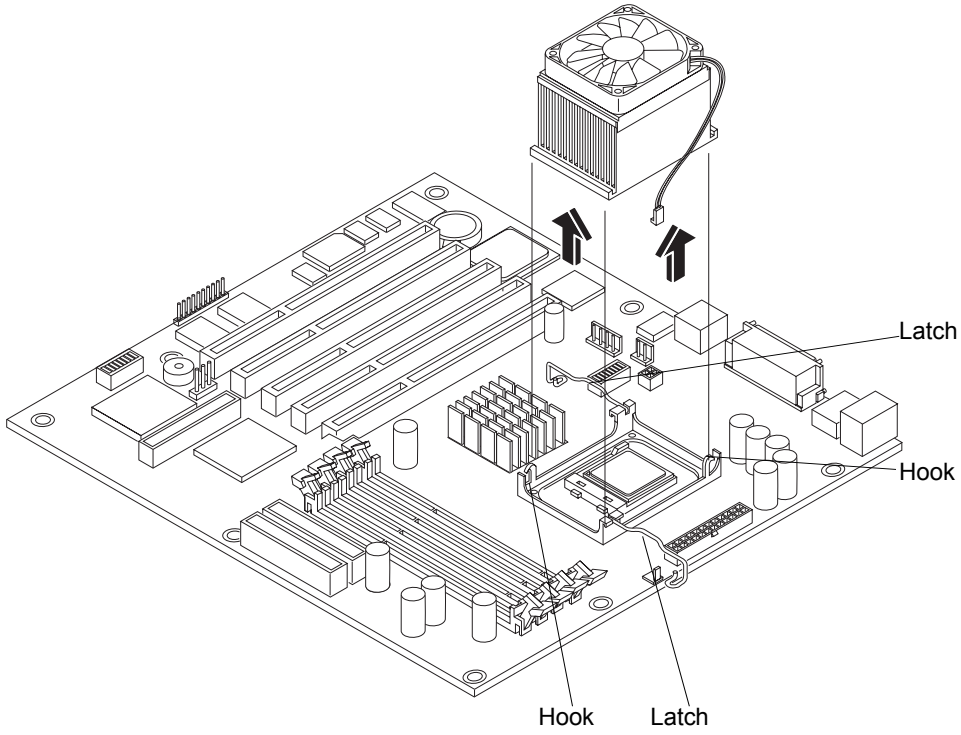


Figure 3-15. Removing Heat Sink and Cooling Fan

Removing the Processor

1. If you have not removed the heat sink cooling fan assembly, do so now before continuing.

CAUTION	Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

2. Open the ZIF (Zero Insertion Force) lever completely to allow removal of the processor.

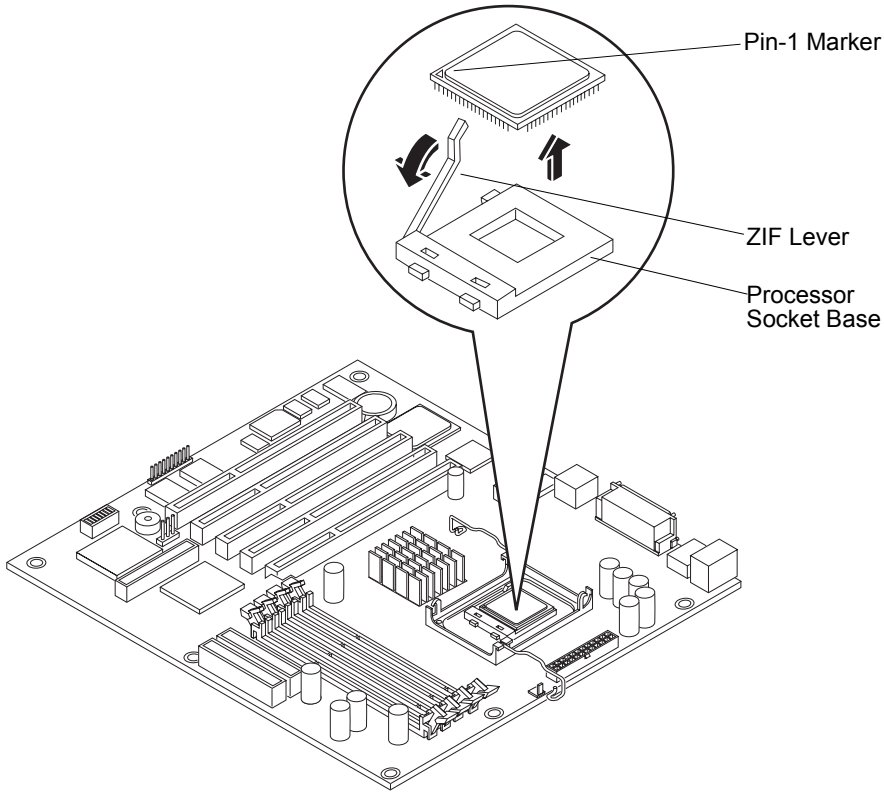


Figure 3-16. Removing the Processor

3. Grasp the processor by its edges and lift it out of the processor socket.
4. Place the processor on a static-dissipating work surface or into an anti-static bag.

Replacing the Processor

1. Locate the pin-1 marker on the processor before installing the processor.
2. Open the ZIF lever to allow access to the processor socket.

   Pull the ZIF lever up and away from the ZIF socket and then raise it to a full 90° to the system board.
3. Align the processor over the empty processor socket.

   The socket has a mark for pin-1 that should match the mark for pin-1 on the processor near the end of the ZIF lever.

CAUTION	Ensure that you align pin-1 of the processor with pin-1 of the processor socket or pin damage will occur.

4. Insert the processor into the socket and close the ZIF lever to fully seat the processor.

You should hear the ZIF lever click when it closes properly.

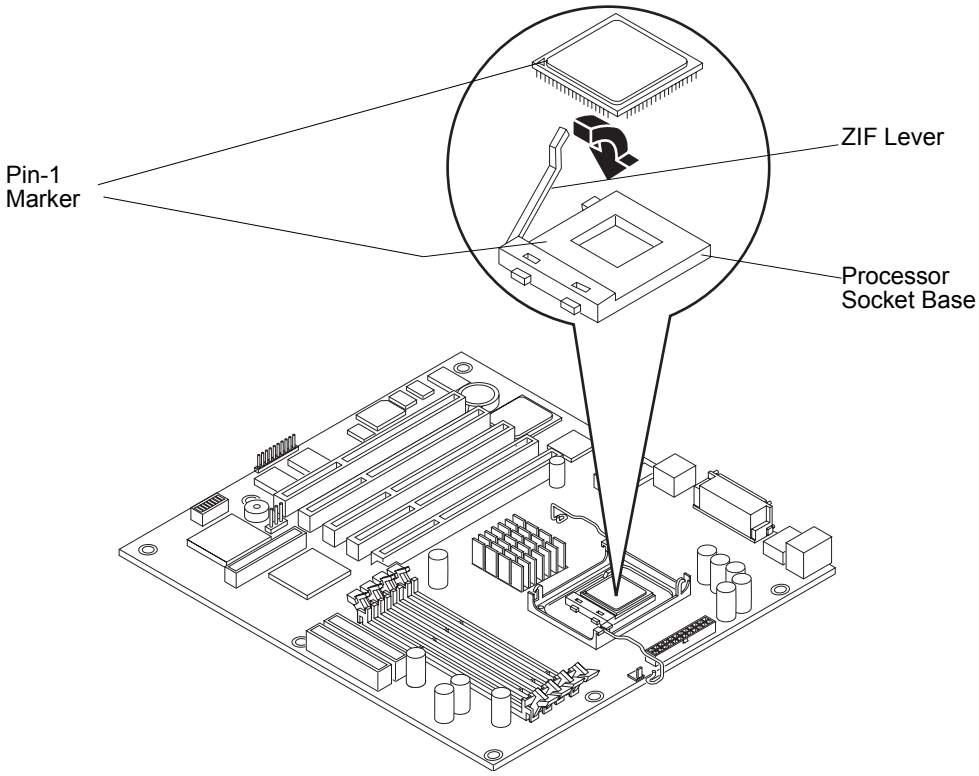


Figure 3-17. Replacing the Processor

Replacing the Heat Sink and Cooling Fan

Once the processor is installed, the heat sink-cooling fan must be installed on top of the processor. The thermal patch on the bottom of the heat sink provides thermal bonding between the heat sink and processor. If the thermal patch on the old heat sink is damaged, you will need to install a new heat sink (a new heat sink comes with the thermal patch pre-applied).

1. Place the heat sink on top of the processor.
2. Hold the heat sink in place and close the latches to secure the heat sink to the bracket. Make sure the latches engages the hooks on the heat sink bracket. See *Figure 3-18*.

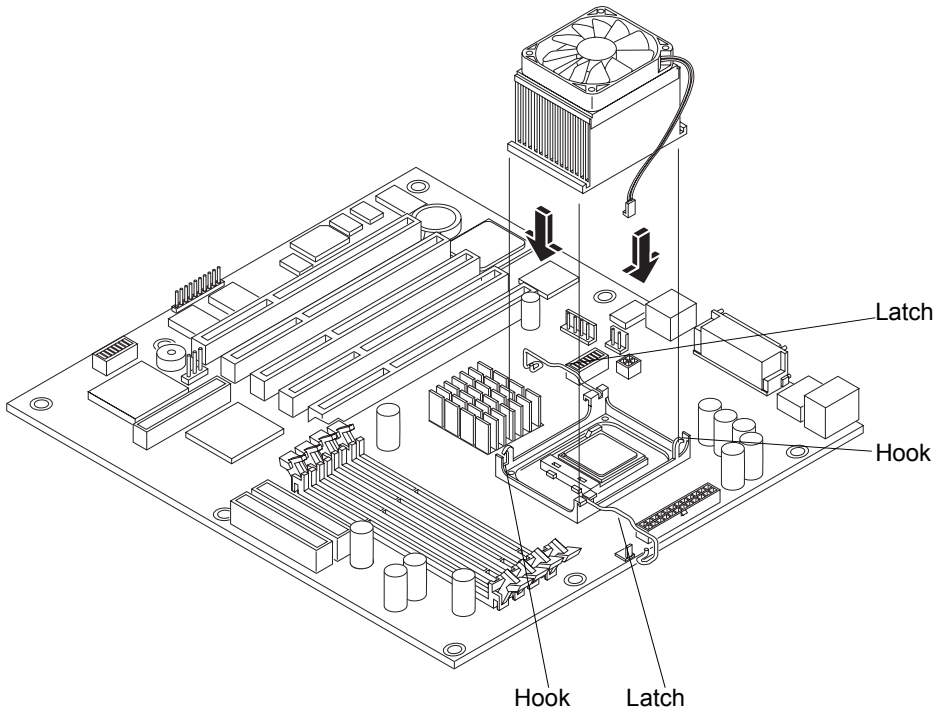


Figure 3-18. Replacing Heat Sink and Cooling Fan

3. Connect the heat sink cooling fan power cable to the fan connector on the system board.

CAUTION	Ensure that you connect the fan to the correct system board connector. If necessary, see *"System Board Layout"* in *Chapter 9, Specifications*.

4. Replace the left side cover.
5. Replace the external cables and power cord.
6. Power on the server as described in *Chapter 1, Controls and Indicators*.

   The BIOS automatically recognizes the new processor. Ensure that the latest version of BIOS is installed. To learn which version of BIOS is currently installed, press F10 during startup, and then select Summary from the list of options. To get the latest BIOS version for the hp server tc2120, connect to HP's support web site at:

   http://www.hp.com/

Accessory Boards

The system board in the hp server tc2120 provides five PCI slots (P1 through P5), 64-bits at 33 MHz bus speed. Four of the slots support 3.3 volt cards; the fifth (blue) slot supports a +5 volt card. Some PCI slots may come with pre-installed boards. The SCSI model requires the first slot, (P1) for the SCSI controller board.

Tested PCI Boards

For a list of tested PCI boards, check for compatibility in the Hardware Tested Products list for the hp server tc2120 under the Technical Support topic for the specific NOS used in the server at HP's web site at:

http://www.hp.com/

CAUTION	Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the National Electrical Code.

NOTE	All Hewlett-Packard accessory boards comply with the U.S. National Electrical code (NFPA 70) Class 2.

Tools Required

These tools may be needed for preparing the accessory boards for installation in the server:

- Torx T-15 screwdriver
- ¼-inch flat blade screwdriver
- An anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Guidelines

The following sections provide the guidelines necessary to install the PCI accessory boards into the server.

NOTE	Some full-length PCI boards may need a plastic "handle" (board extension) on one end to stabilize the board in the server. If the board requires one and it is not installed, you may need to install the handle on the board, before installing it in the hp server. See *Figure 3-23*.

IRQ Settings

The IRQ settings are automatically assigned and do not require user intervention. The hp server uses the Plug-and-Play feature of the PCI boards to correctly assign its resources automatically.

Boot Priority

The server's boot priority (BIOS search order for a boot drive) should be considered when selecting a PCI slot on the system board. This is especially important if you are installing a board that requires an early number in the boot order. The accessory board's boot priority is set by its slot location in the boot order. See *Figure 3-19*.

If the single SCSI controller board is used to control internal SCSI drives (SCSI model), it will be early in the boot order. The single SCSI controller board has two SCSI connectors, but only one SCSI connector can be active at a time. The server scans the active SCSI connector for a boot device starting at device ID 0 and works up from there.

By default the server searches for boot devices in the following order depending on the server model:

Default Boot Order:

1. CD-ROM drive
2. Flexible disk drive
3. IDE hard drive (if present)
4. SCSI hard drive in any PCI slot (if present)
5. Other bootable devices in any PCI slot)

NOTE	The boot order can be changed by pressing F8 during the POST, or by using the server's (BIOS) Setup Utility. For more information, refer to *"BIOS Setup Utility"* later in this chapter. You may also activate the Network Boot by pressing F12 during the POST.

Installing an Accessory Board

Use this procedure to install accessory boards and observe the installation guidelines listed earlier.

1. If the server is already installed and working, power down the server.

   Refer to *Chapter 1, Controls and Indicators*.

2. Disconnect the power cables and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the side cover and lay it aside.

   Refer to *"Opening and Closing the hp server"* earlier in this chapter.

WARNING	The power supply will continue to provide standby current to the server until the power cable is disconnected.

CAUTION	Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

4. Lay the server on its side (components showing) for the best access to the accessory board slots.
5. Read the documentation included with the accessory board and follow any special instructions.
6. Identify the accessory slot number to be used. See *Figure 3-19*.

   The SCSI model should already have the SCSI controller board installed in PCI slot P1.

NOTE	Refer also to *"System Board Layout"* in *Chapter 9, Specifications* for connections not shown in *Figure 3-19*.

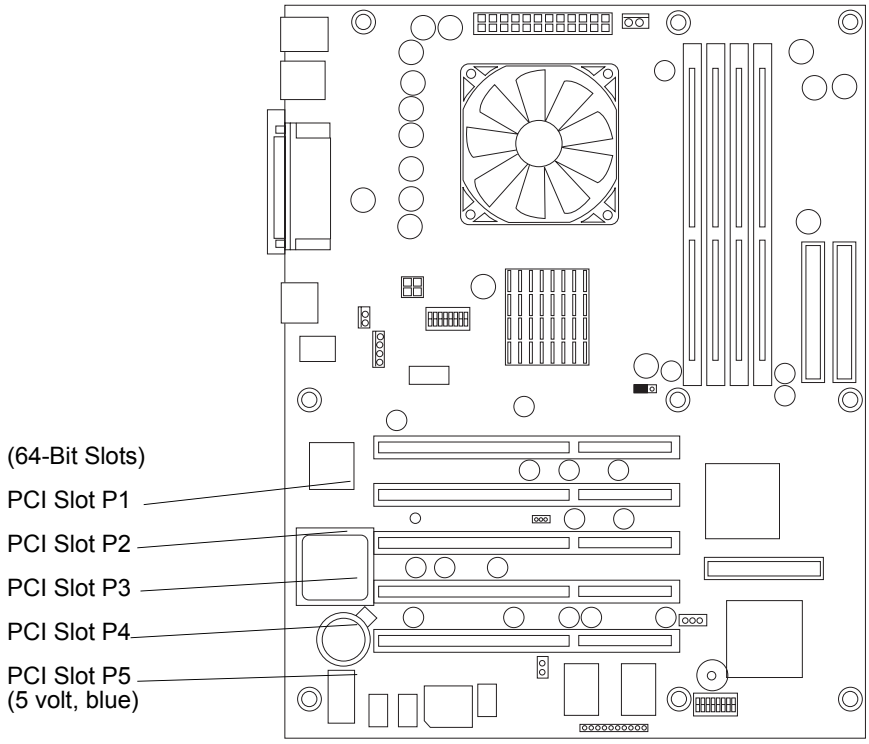


Figure 3-19. Accessory Board Slots

NOTE	Refer to the HP web site at http://www.hp.com/ for specific slot recommendations for a particular accessory board type.

7. Remove the slot cover latch:
   a. Lift up on tab of slot cover latch.
   b. Raise the slot cover latch up from the slot covers.
   c. Remove it from the chassis and keep it for reassembly. See *Figure 3-20* and *Figure 3-21*.

      You may need to lift the slot cover latch out of its retainer before lifting it out of the chassis.

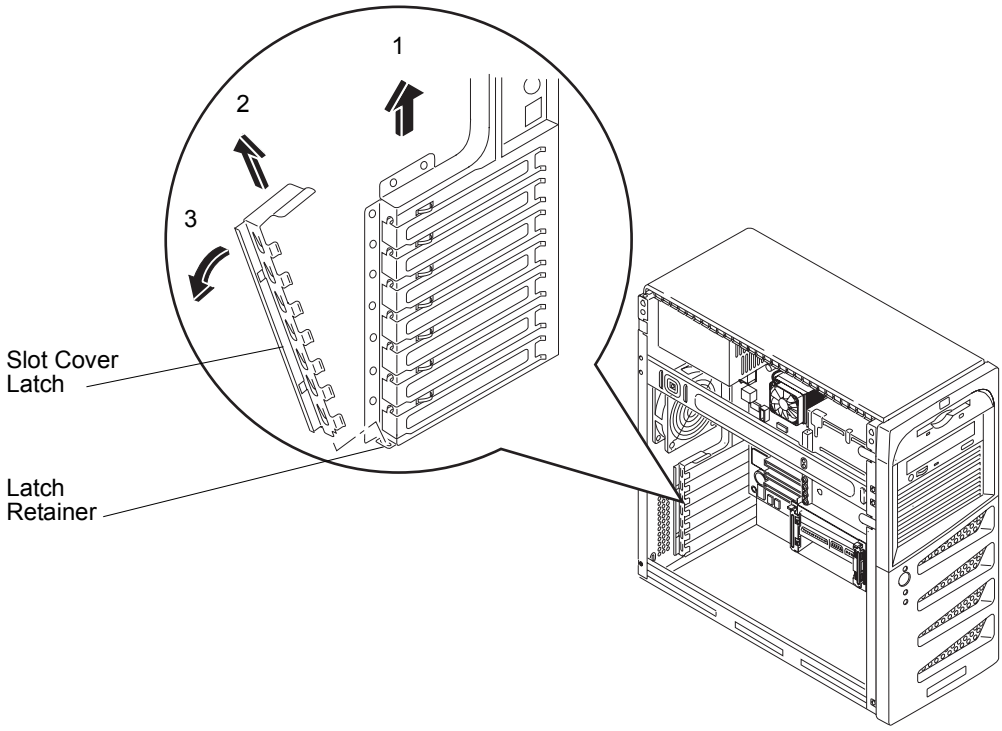


Figure 3-20. Removing the Slot Cover Latch

8. Move the top of the desired slot cover away from the chassis and then lift it up and out of the chassis. See *Figure 3-21*.

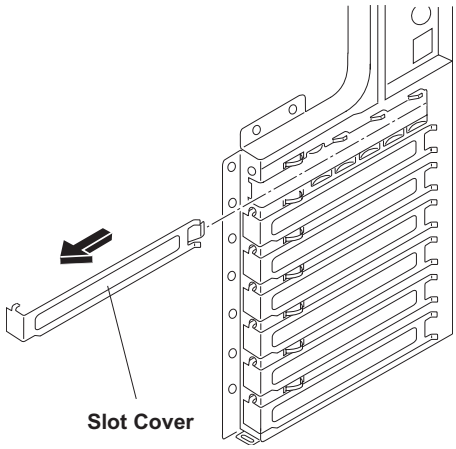


Figure 3-21. Removing the Slot Cover

NOTE	Ensure that you save the slot covers for use later to prevent EMI interference.

9. Align the card carefully, slide it into position, and press it firmly into the slot. See *Figure 3-22*.

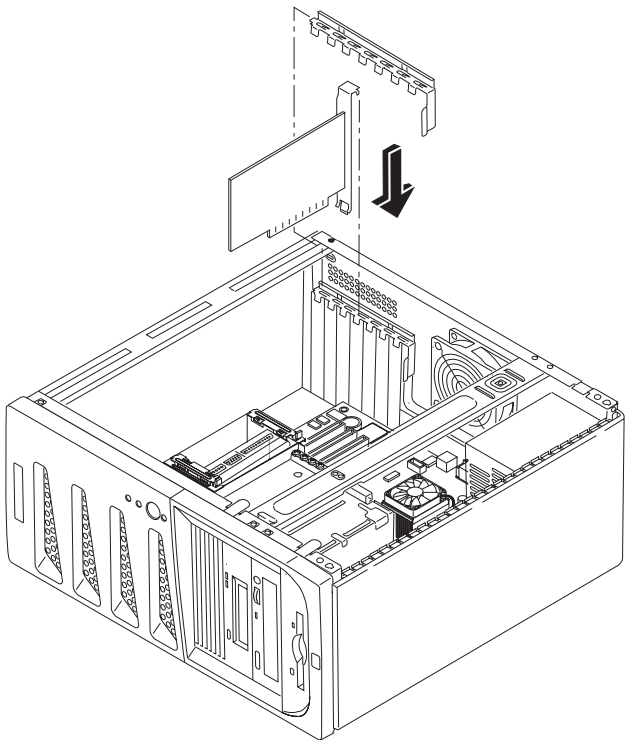


Figure 3-22. Inserting an Accessory Board

10. Replace the slot cover latch to secure the accessory board in the reverse order shown in *Figure 3-20*.

    The slot cover latch should snap in place.

NOTE	You may need a plastic extension to secure any full-length boards in PCI slots 1 through 5. See *Figure 3-23*.

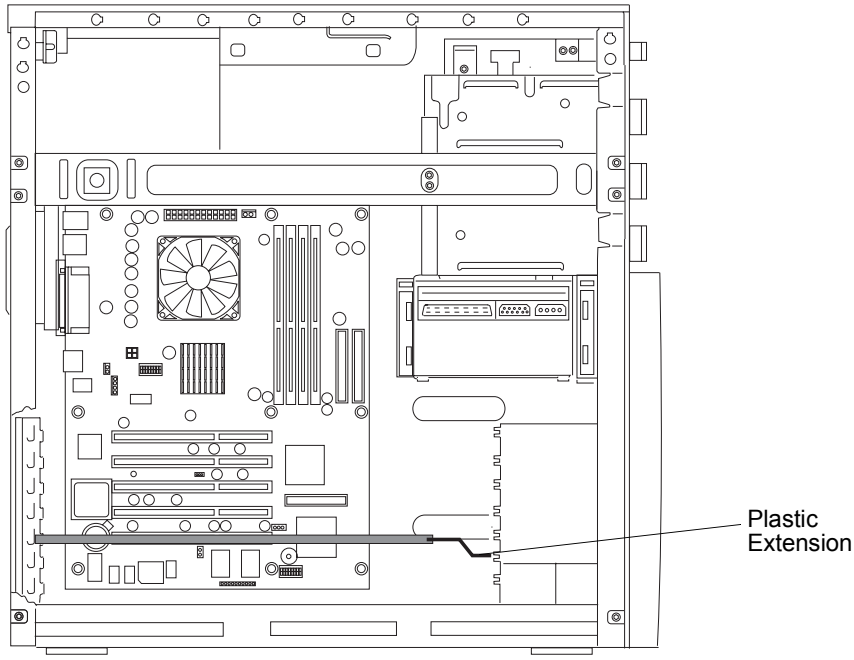


Figure 3-23. PCI Board Plastic Extension

11. Once the accessory board is installed, you may need to install software drivers.

    The drivers for the new board are either part of your existing system software or included on a flexible diskette or CD-ROM provided with the accessory board.

Removing Accessory Boards

Apply the same steps as the installation procedure in reverse. Replace the slot cover. See the preceding sections for details.

NOTE	Ensure that you use a slot cover to seal the unused board slot to prevent EMI interference. These slot covers make a better metal-to-metal contact than previous slot cover designs.

Connecting Peripheral Devices

This section contains instructions for connecting the peripheral control devices, including the UPS and monitor, to the hp server tc2120.

NOTE	The two USB connectors are reserved for a keyboard and a mouse.

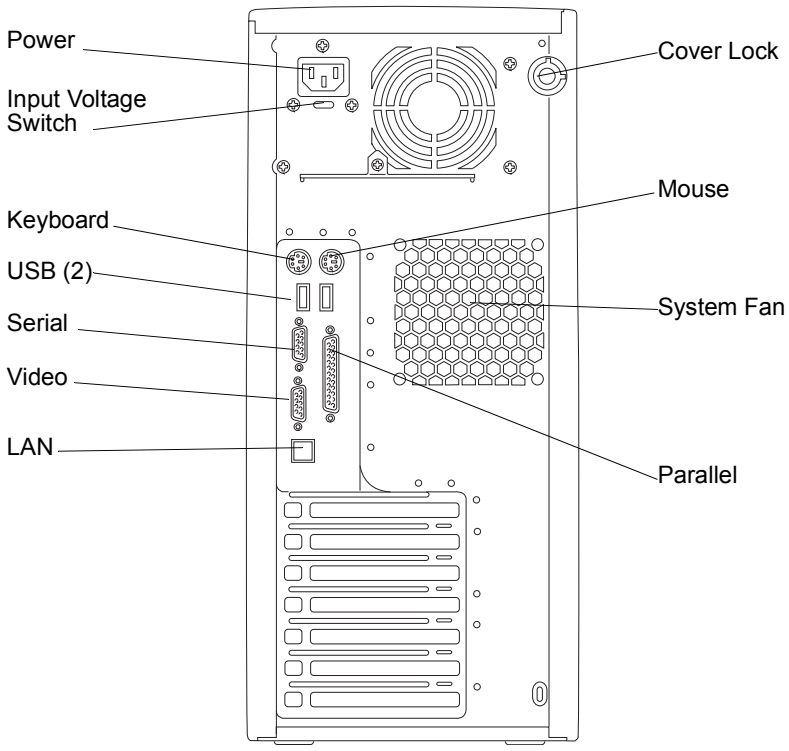


Figure 3-24. Rear Panel Ports

Monitor, Keyboard, Mouse, and LAN

1. Place the monitor, keyboard, and mouse near the hp server and connect these devices to the server using the connections provided on the rear of the chassis. See *Figure 3-24*.

   The connectors are color-coded for easy matching.

NOTE	If you have a console switch box, refer to the switch box's user guide for instructions on connecting the keyboard, mouse, and monitor.

CAUTION	The keyboard and mouse ports are both PS/2 ports, but are not interchangeable. If you plug the keyboard into the mouse port, or the mouse into the keyboard port, you will get an error message.

2. If a LAN cable is provided, you may connect it now, or wait until you have verified the server's operation.

CAUTION	To prevent possible damage to the hp server's power supply, set the input voltage selector to the correct input voltage.

3. Check the input voltage selector to ensure that you have the correct input voltage selected.

Uninterruptable Power Supply (UPS)

If you do not use a UPS with the server, you may experience an arching effect when you plug in the power cord to the AC power source. This is normal, due to the high inrush current of the power supply.

1. Place the UPS (Uninterruptable Power Supply) near the hp server to connect the two devices.
2. Connect the serial cable and power cord provided between the UPS and the hp server.

   Refer to the user guide included with the UPS for additional information.
3. If you have connected the serial cable and power cord between the two devices, turn on the UPS.

   The hp server tc2120 performs a diagnostic test when the power switch is turned on. If an error condition occurs, note any error code appearing on the display, then refer to *Chapter 6, Troubleshooting*.

Configuring the hp server tc2120

The following sections describe how to configure the hp server tc2120 with the help of the *hp tc2120 Startup CD-ROM*, (BIOS) Setup Utility, and SCSISelect Utility. The (BIOS) Setup Utility and SCSISelect Utility automatically detect most of the hardware devices you install, but you should verify that the server has properly recognized the options after you have installed all of the optional accessories.

Use the following resources to configure the server:

- *hp tc2120 Startup CD-ROM* – This CD-ROM allows you to access and copy the needed utilities and drivers to flexible diskettes, which can used to configure the server. Some NOS drivers are copied directly to the server from the Startup CD.
- NOS Drivers – The NOS drivers are copied from the Startup CD-ROM to diskettes. Refer to the instructions in the *hp server tc2120 NOS Installation Guide*.
- Diagnostics for Windows 2000 – This utility is installed from the Startup CD-ROM. For instructions, refer to the README.TXT file within the Diagnostics for Windows folder on the Startup CD-ROM. Diagnostics for Windows provides an easy-to-use hardware diagnostic for:
  - Server verification
  - Rapid troubleshooting
- (BIOS) Setup Utility – This firmware utility is used to configure server options such as:
  - BIOS settings
  - Setting the hp server date and time
  - Setting and clearing the hp server's passwords
  - Setting device boot priority
- SCSISelect Utility – This utility is used to:
  - Verify or modify SCSI controller settings
  - Low-level format the SCSI disks or verify the SCSI disk media, if necessary

  The SCSI configuration utility used for the hp server tc2120 is the Adaptec SCSISelect Utility.

hp 2120 Startup CD-ROM

The *hp tc2120 Startup CD-ROM* provides you with the latest NOS drivers, Diagnostics for Windows, BIOS Flash Utility, and a utility for creating diskettes.

- Run the *hp Startup CD-ROM* on any Windows PC with an HTML browser to obtain the required NOS drivers and the BIOS Flash Utility located on the CD-ROM.
- Refer to the *hp server tc2120 NOS Installation Guide,* when installing the NOS drivers on the server for more information about using the *hp Startup CD-ROM*.

  Refer to the topic *"NOS Installation"* on the next few pages, for more information.

Accessing the hp tc2120 Startup CD-ROM

To access the *hp tc2120 Startup CD-ROM*, use a Windows PC with an HTML browser tool such as Microsoft Internet Explorer 4.x, or Netscape Navigator version 4.x or greater. The CD-ROM should auto-start, but if it does not, start it by opening the Startup.htm file located at the root level of the Startup CD.

Contents of the hp tc2120 Startup CD-ROM

The *hp tc2120 Startup CD-ROM* contains the following drivers, utilities, and other resources:

- NOS Drivers (IDE, SCSI, SCSI Raid, IDE Raid, NIC, Tape Drive, Modem, Video) for all supported NOSs on the hp server tc2120 (IDE and SCSI models).
- Diagnostics for Windows 2000
- BIOS Flash Utility
- Pentium 4 and Celeron patch for Netware 5.1 and 5.1 SBS
- *hp server tc2120 Operations and Maintenance Guide*
- *hp server tc2120 Regulatory Guide*
- *Ultra3 SCSI HBA Installation and Configuration Guide*

NOS Installation

The instructions for manually installing your specific network operating system (NOS) and the respective NOS drivers are provided in the *hp server tc2120 NOS Installation Guide*. The *hp server tc2120 NOS Installation Guide* will help you when creating and copying the appropriate drivers (NOS, IDE, SCSI, NIC, and Video) onto the required diskettes. In some cases you will use the diskettes to load the appropriate drivers onto the server, or load the drivers directly from the *hp Startup CD-ROM* onto the server. Refer to the Welcome menu on the *hp tc2120 Startup CD-ROM*.

Diagnostics for Windows

The Diagnostics for Windows utility provides an easy-to-use hardware diagnostic for server verification, burn-in, and rapid troubleshooting. The utility is installed from the *hp tc2120 Startup CD-ROM*, and run under Microsoft Windows. For instructions on installation and use, refer to the README file within the Diagnostics for Windows folder on the *Startup CD-ROM*.

NOTE	HP recommends using Diagnostics for Windows to verify all server functions are operating correctly, after completing all the configuration steps. The Diagnostics for Windows utility generates a text file containing the hardware detected and the test results. This text file should be saved to a diskette for future reference or use by your support provider.

Documentation

The hp server tc2120 comes with the following documentation provided on the *Startup CD-ROM*:

- *hp server tc2120 Operations and Maintenance Guide*
- *hp server tc2120 Regulatory Guide*
- *Ultra3 SCSI HBA Installation and Configuration Guide*

BIOS Setup Utility

Use the BIOS Setup Utility to configure items in the BIOS using the following menus:

- Main
- Advanced
- Power
- Boot
- Server
- Exit

Accessing the Setup Utility

1. Turn on the monitor and the hp server. If the hp server is already turned on, save your data and exit all programs, then restart the server.
2. Press F10 while the startup-logo is displayed at the bottom of the screen.

   If you fail to press F10 in time and the startup process continues, you will need to restart the hp server so that you can press F10.

Viewing the Summary Configuration Screen

The Summary screen provides information about the current server configuration, such as the BIOS version, CPU speed, memory module size, and installed mass storage devices. You should check the server configuration when you first set it up and each time you install, remove, or upgrade accessories.

To check the configuration:

1. Turn on the monitor and the hp server. If the hp server is already turned on, save your data and exit all programs, then restart the server.

   The Summary Screen displays briefly. Press the Pause/Break key on the keyboard to continue displaying the Summary Screen until another key is pressed.

Menu Bar

The BIOS Setup utility provides a menu bar with several menu selections. The menu bar choices are as follows:

- Main - Use this menu option to set the system time, date, and keyboard features, configure IDE devices, set BIOS access and error conditions that prompt the server to power off.
  - o System Time – Sets the system time.
  - o System Date – Sets the system date.
  - o Legacy Diskette – Sets the floppy diskette type.
  - o Primary Master – Sets the IDE device to serve as the primary master.
  - o Primary Slave – Sets the IDE device to serve as the primary slave.

- Secondary Master – Sets the IDE device to serve as the secondary master.
- Secondary Slave – Sets the IDE device to serve as the secondary slave.
- Key Features – Sets the NumLock key on or off when server is powered-on, and sets the repeat rate for keyboard keys.
- Supervisor Password – The supervisor can access and change all settings in the Setup program.
- User Password– The user can only access and modify certain items in the Main menu.
- Power-on Password – If enabled, a password (User or Supervisor) is required to enter the Setup utility or complete the boot process.
- Halt On – Sets the error condition that will automatically pause the server.
- Installed Memory – Indicates the amount of memory installed in the server.

- Advanced – Use this menu option to set hardware security options and configure memory caching, USB and integrated I/O ports, floppy disk access, and PCI slot interrupt.
  - CPU Speed – Indicates the CPU speed.
  - CPU Level 1 Cache – Enables or disables level one cache.
  - CPU Level 2 Cache – Enables or disables level two cache.
  - PS/2 Mouse Function Control – Set to Auto to automatically detect PS/2 mouse; set to Enable for other devices that require IRQs.
  - USB Legacy Support – Enables support for Legacy Universal Serial Bus.
  - Chip Configuration – Sets the video memory cache mode, and enables or disables each IDE channel.
  - I/O Device Configuration – Configures floppy disk access, serial and parallel ports, and direct memory access channel.
  - PCI Configuration – Configures the PCI slots for interrupt control, sets the PCI/VGA palette snoop feature, sets the PCI latency timer to optimize PCI card performance, enables or disables the USB interface, sets the primary VGA BIOS (onboard or PCI/VGA card), and enables loading a boot image from a boot server (Onboard LAN Boot ROM).
  - Hardware Protection – Controls access to various hardware components.
- Power – Use this menu to set the power-saving options (they are NOS dependant), and power-up options. This menu enables ACPI features only available with certain NOSs.
  - Power Management – Sets power saving options for the server.
  - Video Off Option – Set the on/off state of the video. “Always On” enables the video to remain on regardless of the power management state of the system. “Suspend->Off” enables the video to turn off to save power when the system is in the suspend state.
  - Video Off Method – Sets the video state when it is in the Off state.
  - HDD Power Down – Controls hard disk power management. “Disabled” means the hard disk is always in the On state. Selecting a time-out period causes the hard disk to power down if there is no activity during this period.
  - Suspend Mode – Sets the period of inactivity before the system goes into Suspend mode.
  - PWR Button < 4 Secs – Sets the mode of operation when the Power button is pressed for less than 4 seconds.

  - Power Up Control – Sets options controlling how the server is powered on. “AC PWR Loss Restart” restarts the server after an AC power loss. “Onboard LAN Power Up” enables server power on through the LAN; “Power Up on PCI Card” enables power on through onboard network or PCI modem; “Power Up by PS/2 Keyboard enables power on using the keyboard. “Automatic Power Up” sets the server to power on automatically at a specified date and time.

- Boot – Use this menu option to set the boot order of the mass storage devices and PCI cards.
  - Boot Device Priority – Sets the boot order of mass storage devices.
  - Plug & Play OS – Select “Yes” if your OS has plug-and-play capability.
  - Reset Configuration Data – Select “Yes” to clear the extended system configuration data. When you reboot, the system will rescan for plug-and-play devices.
  - MPS1.4 Support – Enables or disables support for multi processor specification.
  - Quick Power On Self Test – Select “Enable” to speed up the POST routine.
  - Boot Up Floppy Seek – Select “Enable” to search for a floppy disk during the POST process.
  - Post DIAG – Select “Enable” to detect and display errors during optional ROM initialization from VGA, NIC, and PCI plugin cards.
  - Quiet Boot – Select “Enable” to skip to the summary screen without showing BIOS POST information after booting.
  - Slot Configuration – Sets the boot priority for PCI card initialization.
- Server – Use this menu option to enable or disable the memory modules (DIMMs).
  - Remote Console – Enables or disables redirection of POST information to the serial port. Other systems may access this information by connecting to the port.
  - Side 0 of DIMM0 – Enables or disables side 0 of the DIMM in slot 0.
  - Side 1 of DIMM0 – Enables or disables side 1 of the DIMM in slot 0.
  - Side 0 of DIMM1 – Enables or disables side 0 of the DIMM in slot 1.
  - Side 1 of DIMM1 – Enables or disables side 1 of the DIMM in slot 1.
  - Side 0 of DIMM2 – Enables or disables side 0 of the DIMM in slot 2.
  - Side 1 of DIMM2 – Enables or disables side 1 of the DIMM in slot 2.
  - Side 0 of DIMM3 – Enables or disables side 0 of the DIMM in slot 3.
  - Side 1 of DIMM3 – Enables or disables side 1 of the DIMM in slot 3.
- Exit – Use Exit menu to save changes, discard changes, or load the setup defaults.

Using the Setup Screens

Online help explains the settings displayed on the Setup Utility screens. Instructions are also provided for navigating between the screens and entering or changing the setup data.

- Press the right-arrow and left-arrow keys to move between selections on the menu bar. The menu bar is present at the top of the main selections.
- Press the up-arrow and down-arrow keys to move between fields on each screen. The currently selected field will be highlighted.
- Certain fields ask you to choose from a list of entries. In such cases, press the plus (+) or minus (-) keys repeatedly to display each possible entry, or the Enter (or Return) key to choose from a pop-up menu.
- Small arrow pointers (->) precede some field names. This means the field is actually a submenu. To visit the submenu, select it with the arrow keys and press the Enter key. The submenu then appears.

- The Esc key is the exit key. If you press the Esc key on one of the top-level screens, the Exit menu appears. If you press Esc on a submenu, the previous screen appears. When you are making selections from a pop-up menu, use the Esc key to close the pop-up without making a selection.

Changing the System Date and Time

Follow these steps to change the hp server's date and time:

1. To reach the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
2. If necessary, use the left-arrow key to select Main from the menu bar at the top of the screen.

   Once in the Setup Utility, the menu bar appears at the top of the screen. The menu choices are Main, Advanced, Power, Boot, server, and Exit. The Main menu is the default menu and should be the highlighted selection at the left of the menu bar when the Setup Utility first opens.
3. If necessary, use the up-arrow key to move to the System Time field.

   The System Time field actually consists of three sub-fields enclosed in brackets [xx:xx:xx]: Hour to the left (24-hour clock), minutes in the middle, and seconds to the right.
4. Type in the value for Hour and press Enter to move to the minute field.
5. Type in the value for Minutes and press Enter to move to the second field.
6. Type in the value for Seconds and press Enter.

   The cursor moves back to the Hour sub-field.
7. Use the arrow key to move to the System Date field.

   Enter the dates in the System Date field in the same way you entered the time in the System Time field. The System Date field has three separate sub-fields for month, day, and year enclosed in brackets [xx/xx/xxxx].
8. Type in the value for Month and press Enter to move to the day field.
9. Then type in the value for Day and press Enter to move to the year field.
10. Type in the value for Year, using all four digits, and press Enter.

    The cursor moves back to the Month sub-field.
11. Use the right-arrow key to select the Exit menu.
12. Choose Exit & Save Changes from the list of exit options, then press Enter.

    A dialog box appears and asks you to confirm your decision.
13. Choose Yes and then press Enter.

    The hp server reboots and the date and time changes have been accepted.

Setting Boot Passwords

Use the Main menu in the BIOS Setup Utility to set passwords to control access to the hp server. There are three password options: Supervisor Password, User Password, and Power-on Password. The Supervisor Password allows you to access and change all settings in the Setup program; the User Password can only access and modify certain items in the Main menu. You must set the Supervisor password before setting the User password. When the Power-on Password option is enabled, a password (either Supervisor or User password) must be entered each time server is powered on.

To set a password:

1. Start the BIOS Setup Utility.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
2. Select Main from the menu bar at the top of the screen.

3. Select Supervisor Password or User Password.
4. Enter the password in the fields provided.
5. If you want to require a password to boot the server, select Power-on Password and then select Enable.
6. Press Esc or select Exit Menu, then select Exit & Save Changes to save your changes and exit the Setup program.

To remove the password:

1. Follow the steps to set a password (see the previous procedure).
2. Enter the existing password when prompted.
3. For the new password, leave the field blank and press Enter.
4. Press Enter again to confirm your choice.

Setting Hardware Security Options

The BIOS Setup Utility allows you to lock certain hardware components on the hp server so that they cannot be used. Components that can be locked include floppy disks, hard disks, CD-ROM, serial, parallel and USB ports.

To lock or unlock a hardware component:

1. Start the BIOS Setup Utility.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
2. Select Advanced from the menu bar at the top of the screen.
3. Select Hardware Protection from the submenu.
4. Select the hardware component and change its setting to lock (or unlock).
5. Use the right-arrow key to select the Exit menu.
6. Choose Exit & Save Changes from the list of exit options, then press Enter.

   A dialog box appears and asks you to confirm your decision.
7. Choose Yes and then press Enter.

SCSI Configuration Utility

The hp server uses the SCSISelect Utility to verify or modify the SCSI controller board settings for the devices connected to the active SCSI connector on the SCSI controller board. If you need to verify or modify SCSI controller settings, or if you need to low-level format SCSI disks or verify SCSI disk media, run the SCSISelect Utility.

NOTE	You typically would not need to use this utility unless you are an experienced administrator or have been requested to do so by a support provider.

During the boot process the BIOS searches for SCSI devices and a specific message appears if there are devices connected to the SCSI controller board, as shown below. The SCSI controller can provide the bus, device, and channel configurations when active on screen.

To access the SCSISelect Utility, refer to the following instructions.

1. Boot or reboot the hp server.

   If you are already in the boot process, you should see the following message appear.

```
<<<Press <Ctrl A> for SCSISelect™ Utility!>>>
```

2. Press Ctrl + A to enter the utility.

   The SCSISelect Utility appears on screen.

3. Use the arrow keys to move the cursor, press Enter to select an option, or press Esc to exit.
4. To change SCSI controller settings, select "Configure/View Host Adapter Settings."

   This menu allows you to configure the SCSI controller ID settings or other advance controller settings.

5. Select "SCSI Disk Utilities" to format a hard disk or change hard disk parameters.

CAUTION	Low-level formatting of a SCSI disk drive will destroy all of its data.

System Board Jumper/Dip Switch Settings

You need to change dip switch settings to clear the CMOS or passwords, perform a hardware flash or BIOS recovery, or when you upgrade from a 400 MHz to 533 MHz processor. The FSB jumper switch must also be moved when you upgrade to a higher speed processor. The following illustrations indicate switch locations and default settings.

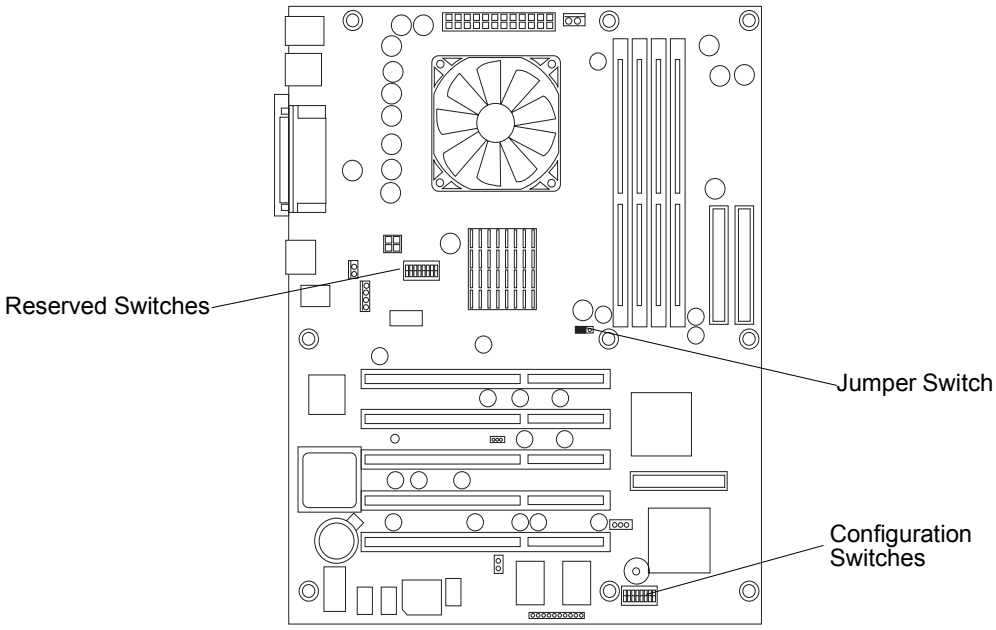
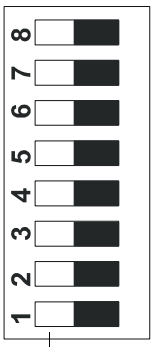


Figure 3-25. Location of Jumper and Dip Switches



Reserved (Do not change default setting)
Reserved (Do not change default setting)
Reserved (Do not change default setting)
Reserved (Do not change default setting)
Clear CMOS (Active when On. Default = Off)
Clear Password (Active when On. Default = Off)
Hardware Flash Protection (Enable flash protection when On. Default = Off)
BIOS Recovery (Active when On. Default = Off)

Figure 3-26. Configuration Switch Positions

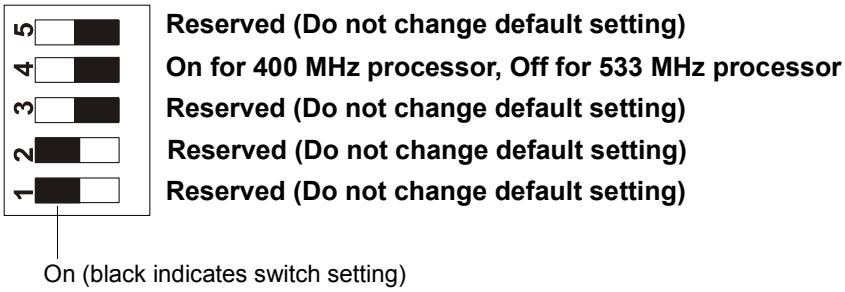


Figure 3-27. Reserved Switch Positions

Changing Jumper/Dip Switch Settings after Processor Upgrade

When you upgrade from a 400 MHz processor to a 533 MHz processor, after installing the new processor you must change a dip switch setting and move the jumper switch position (see *Figure 3-28*).

1. Remove the old processor (400 MHz) and replace it with the upgrade processor (533MHz). See *"Removing the Processor"* and *"Replacing the Processor"* in *Chapter 7, Replacing Parts*.
2. On the system board, locate the Reserved Switch set and move switch 4 to the Off position. See *Figure 3-25* and *Figure 3-27*.
3. Using your thumbnail, carefully lift and remove the jumper switch from its socket (see *Figure 3-28*).
4. Replace the jumper switch on pins one and two of the jumper switch socket (see *Figure 3-28*)

   The jumper switch must be on pins one and two for a 533 MHz processor (for a 400 MHz processor the jumper switch is on pins two and three).
5. Replace the heat sink and cooling fan. See *"Replacing the Heat Sink and Cooling Fan"* in *Chapter 7, Replacing Parts*.
6. Replace the left side cover.
7. Replace the external cables and power cord.
8. Power on the server as described in *Chapter 1, Controls and Indicators*.

   You may need to reboot the server for the BIOS to recognize the new processor.

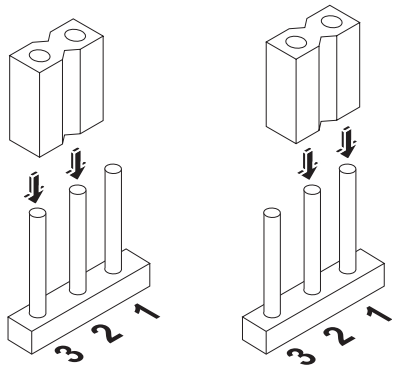


Figure 3-28. Moving the Jumper Switch

Wake On LAN (WOL) Support

The hp server tc2120 fully supports Wake On LAN (WOL). The WOL feature allows you to remotely power on the hp server when it is in sleep mode by sending it a wake-up packet. You can remotely upload data to the server or download data from it, and perform system maintenance tasks. WOL provides system administrators with increased flexibility and reduces operating costs by extending the capacity to perform tasks during off-peak hours.

4 Diagnostics

When the server boots, a series of tests are displayed on the screen. The number of tests displayed depends on the configuration of the server. The following are the types of errors you might get with the hp server.

- Built-in diagnostic error messages.
- BIOS and other error messages. These are errors detected by the system BIOS outside the built-in diagnostics or application errors.

To see the Power On Self-Tests (POST):

- The hp server must be functionally able to run the diagnostics.
- The video system must be functional.
- The keyboard must be functional.

NOTE	The BIOS ROM version number is displayed on the monitor screen during power-up.

WARNING	Always turn off the power and disconnect the power cord to the server before attempting to remove the cover and touch the internal components. Failing to do so can expose you to electric shock and damage the server's components. The power switch does NOT turn off standby power; you must disconnect the power cord to turn off standby power.

Power-On Self Test (POST)

The diagnostics (Power-On Self-Tests, or POST) run automatically each time the server is powered on. These diagnostics, which reside in the BIOS ROM, isolate server-related logic failures and indicate the board or component that needs to be replaced, as indicated by the error messages. Most server hardware failures will be accurately isolated by the diagnostics.

There are two types of error messages:

- **Power-on self-test (POST) messages** – These text messages display in normal video (white text on black background). If a text message error occurs during the POST, details of the error are displayed. Follow the instructions on the screen or refer to *Table 4-1* in this section for instructions.
- **Beep Codes** – These are a series of audible beeps, which occur during the boot process before the video display can initialize allowing the visual messages of the POST routines to appear. If you hear a series of audible beeps before the video appears on screen, refer to the beep codes listed in *Chapter 5, Error Messages*.

If no message appears (screen is blank), listen for the beep codes and refer to *Chapter 5, Error Messages* for more information. If no message appears but the server stops after POST, see *"Server Passes POST, but Does Not Function"* in *Chapter 6, Troubleshooting*. If an error message appears during POST, refer to *Table 4-1* in this chapter and follow the instructions provided. If the problem persists, refer to *Chapter 6, Troubleshooting* or call your HP Customer Support provider for assistance.

POST Error Messages

If you get a POST text error message in reverse video, details of the error are provided on the screen. Recommendations for troubleshooting are sometimes displayed along with the error message or by pressing Enter. Table 4-1 describes typical POST text errors and the corrective action you may take to remedy the problem.

NOTE HP recommends you correct the error before proceeding, even if the server appears to start successfully.

Table 4-1. POST Error Messages

Message	Corrective Action
Error!! Flash protection switch is On	This indicates that configuration switch 2 is currently set to On. If you want to update the BIOS, do the following: 1. Power down the server. 2. Set configuration switch 2 to the Off position. Refer to *"System Board Jumper/Dip Switch Settings"* in *Chapter 3*.
Keyboard error or no keyboard present	1. Verify the keyboard connector is firmly seated and connected to the proper connector. Refer to *"Connecting Peripheral Devices"* in *Chapter 3*. 2. Reboot the server. 3. If the error persists, replace the keyboard with a known good keyboard and repeat steps 1 and 2. 4. If the error persists, try using a USB keyboard.
Keyboard is locked out - Unlock the key	The BIOS detects that the keyboard is locked. 1. Try to identify which keyboard key is locked and unlock the key. Reboot the server. 2. Try replacing the keyboard with a known good keyboard. Reboot the server. 3. Try using a USB keyboard. Reboot the server.
Mouse error or no mouse present	1. Verify the mouse connector is firmly seated and connected to the proper connector. Refer to *"Connecting Peripheral Devices"* in *Chapter 3*. 2. Reboot the server. 3. If the error persists, replace the mouse with a known good mouse and repeat steps 1 and 2. 4. If the error persists, try using a USB mouse.
Your computer case has been opened	The BIOS reports that the chassis cover has been opened. This is a warning message. To avoid seeing this message again, do the following: 1. Make sure that the chassis cover is securely closed. 2. Reboot the system and press F10 during POST to enter the BIOS Setup. 3. When the "Message Confirmation" window appears, press Enter. 4. Press F6 to save and exit.
Message	**Corrective Action**

CMOS checksum error - Default loaded	• If this message displays after you have intentionally cleared the CMOS, it is simply a warning message to inform you that the CMOS has been loaded to default values. No action is required. • If this message appears when the server is powered up after being off for a period of time, it indicates the CMOS battery needs to be checked. See *"Battery"* in *Chapter 7*.
CMOS battery failed	1. Make sure the CMOS battery is seated correctly. 2. If error persists, replace the CMOS battery. See *"Battery"* in *Chapter 7*.
Password is cleared!...Please set switch #3 to off	• Power down the server and reset configuration switch 3 to Off. See *"Clearing the CMOS and Passwords"* later in this chapter.
CMOS is cleared... Please set switch 4 to off	• Power down the server and reset configuration switch 4 to Off. See *"Clearing the CMOS and Passwords"* later in this chapter.
Memory test fail	This message indicates that one or more of the DIMMs is bad. 1. Load the BIOS default CMOS configuration by pressing F10, then F5 and F6 during POST. 2. Make sure that all DIMMs are HP qualified. Refer to *"Memory Modules"* in *Chapter 3*. 3. Remove all DIMMs and re-insert them one at a time to determine which DIMM(s) failed. Replace the bad DIMM(s).
Primary master drive fails	BIOS detects the device installed in IDE primary master failed its test. • Replace the IDE device installed in the primary master drive.
Primary slave drive fails	BIOS detects the device installed in IDE primary slave failed its test. • Replace the IDE device installed in the primary slave drive.
Secondary master drive fails	BIOS detects the device installed in IDE secondary master failed its test. • Replace the IDE device installed in the secondary master drive.
Secondary slave drive fails	BIOS detects the device installed in IDE secondary slave failed its test. • Replace the IDE device installed in the secondary slave drive.
SMART failure predicted on primary master: xxxxxxxxx	BIOS predicts a future failure on xxxxxxxx (drive brand name and ID). 1. Press F1 to continue booting up the server. 2. Store all the data on the failing hard drive to another device. 3. Power off the server and replace the hard drive. Refer to *Chapter 7, Replacing Parts*.

System Configuration Updated	This is not an error. It indicates that the system configuration has been updated. This message normally appears when a new device has been added to the server. No corrective action needed.
Update DMI Information	This is not an error. It indicates that the Desktop Management Interface (DMI) information has been updated. No corrective action needed.
Warning! PCI device has failed to initialize (Bus: xx Dev: yy Fun: zz)	The BIOS has insufficient shadow RAM for PCI option ROM initialization. Contact your HP Customer Support provider.
Floppy disk(s) fail (80)	The BIOS is unable to reset the floppy subsystem. 1. Try using another known good floppy. 2. If the error persists, contact your HP Customer Support provider.
Floppy disk(s) fail (40)	Floppy type mismatch. 1. Make sure you are using the correct type of floppy disk. 2. If the problem persists, contact your HP Customer Support provider.

Clearing the CMOS and Passwords

You may need to clear the BIOS configuration (CMOS) if the configuration has been corrupted, or if incorrect settings made in the Setup Utility have caused error messages to be unreadable.

1. Power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

4. To clear the CMOS memory, set configuration switch 4 to the ON position.
   To clear passwords, set configuration switch 3 to the ON position.

   See *Figure 4-1* and *Figure 4-2*.

5. Replace the left side cover and reconnect only the power cord.

6. Power up the server.

   A message indicates that the configuration has been cleared.

7. Power down the server and disconnect the power cord.

8. Remove the left side cover.

9. Set the CMOS/Password switch to the OFF position to retain the configuration.

10. Replace the left side cover and reconnect the power cord and all data cables.

11. Power up the server.

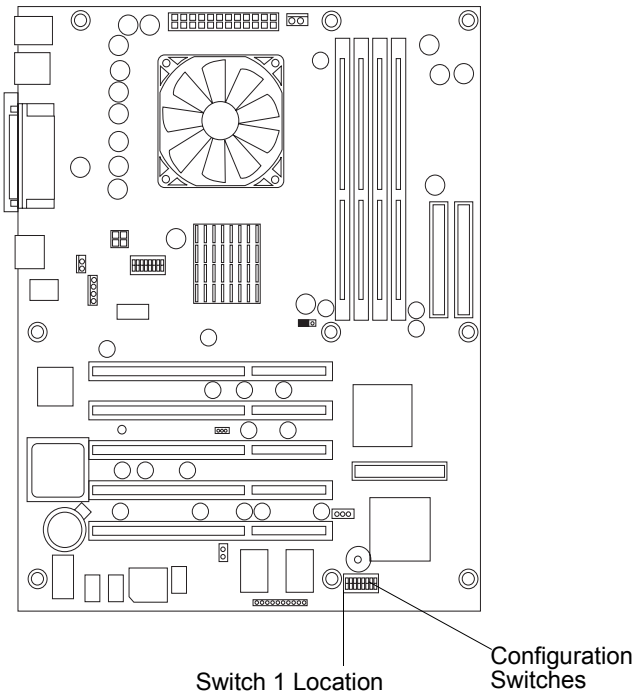


Figure 4-1. Location of Configuration Switches

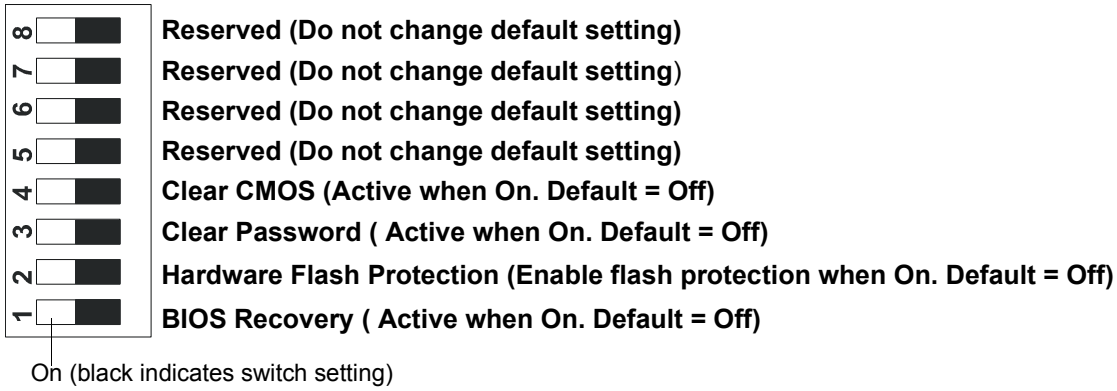


Figure 4-2. Configuration Switch Positions

hp server Diagnostics for Windows Utility

The purpose of hardware diagnostic software is to provide tools for checking hardware problems. By design, diagnostic software executes simple tests of each hardware component. Usually such tests confirm that hardware is not the source of server problems, allowing you to focus on other possible sources such as operating system configuration parameters, network connections, and application software configuration parameters.

If hardware problems are confirmed, the diagnostic software program can sometimes detect and diagnose the system or specific server component causing the problem. In addition, diagnostic tools can capture information that allows support personnel to quickly assess the condition of the server.

In order to be effective, diagnostic software tools must be used in the context of a wider troubleshooting procedure.

Diagnostics for Windows Features

Diagnostics for Windows is a set of diagnostic tests, including tests for system and processor components, memory and storage elements, ports, and input/output devices. The Diagnostics for Windows is supplied on the *hp tc2120 Startup CD-ROM*. To install Diagnostics for Windows, follow the instructions on the README file located in the Diagnostics for Windows folder on the *Startup CD-ROM*.

Diagnostics for Windows is run under Windows. When you start the utility, an Overview screen displays the current configuration of the hp server. Menus and tabs allow you to perform in-depth tests and access detailed hardware and software information by category (system, input devices, communication, and so on). Diagnostics for Windows does not use any tests that might write over and destroy user data.

Components tested with Diagnostics for Windows include:

- System board
- Memory modules
- Flexible disk drive (FDD)
- Parallel ports
- Video monitor
- Multimedia devices
- Processor
- Hard disk drives (HDD)
- Keyboard
- CD-ROM drives
- Communications devices

You can use Diagnostics for Windows to perform the following tasks:

- Display the current server configuration.
- Run a high-level Quick Test of basic hardware components.
- Run a Complete Test to thoroughly test basic components.
- Run a Custom Test to select specific test variations.
- Run tests in Interactive or Unattended mode.
- View, save, and print test results and the test error log.
- View, save, or print a summary of this sessions tests and results.
- Display and print information for specific hardware and software categories.

About Error Messages

A hexadecimal number designates each error message reported by Diagnostics for Windows. Sometimes the message includes a short note regarding the type of error and a list of one or more steps you may take in response. Most of these errors are encountered rarely, if ever. Error codes can be viewed in the Error tab within Diagnostics for Windows. For further assistance, contact the HP Customer Support Center nearest you.

5 Error Messages

This chapter describes the POST error and beep codes that may occur during the boot process or normal operation of the hp server tc2120.

WARNING	Always turn off the power and disconnect the power cord to the server before attempting to remove the cover and touch the internal components. Failing to do so can expose you to electric shock and damage the server's components. The power switch does NOT turn off standby power; you must disconnect the power cord to turn off standby power.

Power-On Self Test (POST) Error Messages

A POST error message displays if an error condition occurs during the boot process of the hp server tc2120, providing the video display and supporting circuitry are functioning. The following is an example of a POST error message:

```
'Floppy disk(s) fail (40)' -> Unable to reset floppy subsystem.
```

Some POST error messages include recommendations for troubleshooting or require that you press Enter to display recommendations. For a complete list of POST messages and corrective actions to take, see *"POST Error Messages"* in *Chapter 4*.

NOTE	Do not remove or replace parts until you have reviewed the troubleshooting checklist in *Chapter 6, Troubleshooting*.

Chassis Intrusion Error Message

If the server chassis has been opened, the following POST error message appears when you reboot the server. To remove the error message, you must reset the BIOS. For instructions, refer to *"BIOS Reset"* in *Chapter 6, Troubleshooting*.

```
'Your computer case has been opened...' -> BIOS reports computer case
has been opened.
```

Beep Codes

If the POST routines cannot display messages when an error occurs before the video display is initialized, the hp server emits a buzzing sound followed by a series of beeps. If you get a blank screen on boot, but hear beeps, count the beeps and refer to the table below to interpret their meaning. If you miss the beep code, power off the server and then power it on again and listen for the signal.

Number of Beeps	Meaning	Corrective Action
1 short beep	The video controller is functioning.	This is not an error. It simply indicates that the video is functioning. No action is required.
1 long beep (repeated)	DDR-SDRAM failed to initialize.	1. Verify that all DIMMS are HP qualified and correctly seated in the DIMM slots. See *"Memory Modules"* in *Chapter 3*. 2. Reboot the server. 3. If the problem persists, contact your HP Customer Support provider.
1 long beep followed by 3 short beeps	Video error.	1. Set configuration switch 4 to the On position to clear the CMOS. See *"Clearing the CMOS and Passwords"* in *Chapter 4*. 2. Reboot the server: • If the message "CMOS is cleared..." appears, the problem is fixed. Follow the onscreen instructions and reboot the server. • If no message appears, contact your HP Customer Support provider.
1 short beep (lower volume)	The system is going to S0 (On) in Advanced Power Management (APM) mode.	This is not an error. It indicates that the system is waking up. No action is required.
3 short beeps (lower volume)	The system is going to S1 (Standby) in Advanced Power Management (APM) mode.	This is not an error. It indicates that the system is entering standby mode. No action is required.

6 Troubleshooting

If you are having problems installing your hp server tc2120, there are a number of tools available for troubleshooting, including the information provided in this chapter.

- HP's web site at http:\\www.hp.com to access the most comprehensive support material:
  - Latest support news – Product and support information on hp servers.
  - Drivers and software downloads for hp servers.
  - HP Instant support – Fast, web-based support that is automated and provides quick diagnosis and resolution of most computing problems.
  - Step-by-step guides for your system troubleshooting.
  - Technical information – Data sheets, application notes, configuration guides, installation tips, product papers, reference material, and more.
  - Compatibility issues – HP Accessories, OS/NOS, HP and third-party parts compatibility information.
  - Manuals – Easy installation and configuration of your hp server.
  - Parts and service – Information on replacement parts, exploded views, and configuration.
  - Tape backup support – Support for HP's SureStore Tape Backup products.
  - hp server registration.
  - Training programs – HP STAR worldwide training and certification program.
  - Warranty and enhanced services – Your guide to warranty service for your systems.
  - Proactive notification – HP will e-mail your custom information when it is available.
  - Contacts – How to get help or provide feedback.
- The Startup CD-ROM provides a utility for troubleshooting purposes.
  - Diagnostics for Windows – An easy-to-use hardware diagnostic for server verification, burn-in, and rapid troubleshooting. Boot the HP Startup CD-ROM in the server and execute from the Startup CD-ROM. The Diagnostics for Windows utility will automatically launch when the Startup CD-ROM is booted.

The following sections contain general procedures to help you locate installation problems. If you need assistance, HP recommends contacting your reseller or going to the HP web site first at http:\\www.hp.com. Refer to the topics listed earlier regarding the HP web site. If you need immediate telephone support, contact the HP Customer Support Center nearest you:

- US/Canada phone support: 1-970-635-1000
- For all other countries, visit http:\\www.productfinder.support.hp.com/tps/CLC and click English to see an expanded list of countries.

WARNING	Before removing the server cover, always disconnect the power cord and unplug telephone cables. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects, such as tools or jewelry.

Preventive Maintenance Procedures

Refer to the following table for preventive maintenance procedures used for the hp server tc2120. Be sure to turn off power to the server when cleaning it.

Component	Time Frame	Maintenance Procedure
Keyboard	Regularly	Dust with damp, lint-free cloth.
Monitor screen	Regularly	Use “HP Video Screen Cleaning Solution” found in 92193M Master Clean Kit.
Mouse	Regularly	Refer to the mouse’s manual for mouse maintenance procedures.
Tape drive heads	Monthly	Use “Magnetic Head Cleaning Solution” found in the 92193M Master Clean Kit.
Cooling fans and grilles	6 Months	Check cooling fan operation and clean the air intake openings on the chassis by removing any dust, lint, and other obstructions to airflow.

CAUTION	Do NOT use petroleum-based cleaners (such as lighter fluid or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage the keyboard’s plastic surfaces).

HP recommends the periodic cleaning of tape heads, capstans, and guides on HP tape drive units and those products using high-density data cartridges and mini-data cartridges. These maintenance procedures prolong tape and head life and helps reduce read/write errors due to dust and oxide.

Troubleshooting Checklist

Begin with the procedures in this section as the first step in troubleshooting a problem with the server.

Server Does Not Power On

Follow these steps if the power/activity light does not light green after you press the power-on button.

NOTE	A system hang (Server does not complete boot process) could be due to an improperly installed heat sink on the processor. If the heat sink is not properly installed on the processor, the processor may overheat causing intermittent or unreliable operation leading to a possible system crash and permanent damage to the processor

1. Remove the AC power cord, wait 15 seconds, reconnect the power cord, and try again.
2. Verify all cables and power cords are firmly plugged into the respective receptacles.
3. Select the correct setting on the voltage switch located beside the power connector on the rear panel.

4. If the server is plugged into a switched multiple-outlet box, ensure the switch on the outlet box is turned on.
5. Plug a different electrical device (such as a printer) into the power outlet, and turn on the device to verify the outlet has power.
6. Verify that the voltage switch is set correctly:
   a. Reconnect the power cord.
   b. Power on the server.
7. If you hear a series of beeps when you power on the server, refer to *Chapter 5, Error Messages*.
8. Verify that the problem is not caused by an internal device connection:
   a. Disconnect the power cord.
   b. Remove the side panel.

      Refer to *Chapter 3, Installing and Configuring*.
   c. Verify the power supply is firmly connected to the system board connector.
   d. Verify the front panel power switch is connected to the system board.
   e. Verify the heat sink is correctly placed on the processor.

      Refer to *"Processor Problems"* later in this chapter.
   f. Remove the power connectors from all internal devices except the system board.
   g. Reconnect the power cord.
   h. Verify that the front panel green LED light is on. If it is off, call your HP Customer Support provider.
   i. If the front panel green LED light is on, reconnect the power connectors one by one to the internal devices in order to see which device or connection is defective.

      Ensure that you remove the power cord before you reconnect each internal device. After reconnecting the device, turn the power on again. If the green LED is still on, repeat this step with another device until you find the device that prevents the green LED from turning on. Call your HP Customer Support provider with this information and for further instructions.

Server Powers On, but Fails POST

Do one of the following:

- If the server fails POST and there is an error message or beep code, refer to *Chapter 5, Error Messages*.
- If the suggested solutions do not solve the problem, contact HP or your reseller.

Server Passes POST, but Does Not Function

If an error message appears, read the message and refer to *Chapter 5, Error Messages* for troubleshooting suggestions. If there is no error message, follow the steps in this section to troubleshoot the problem. If the problem persists, contact your HP Customer Support provider or your reseller.

If there is no error message, follow these steps:

1. *If you are an experienced user*, verify the server is configured correctly in the (BIOS) Setup Utility.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
2. If the server still does not work:
   a. Power off the server and remove all external peripherals, except the monitor and keyboard.
   b. Test the server for normal operation now.

c. If the server still does not work, go to Step 3.

3. If the server still does not work, turn off the monitor, the server, and all external devices, and check the internal hardware, as follows:

   a. Unplug the power cord and all telephone cables.

   b. Remove the server's left side cover.

   c. Verify all accessory boards are firmly seated in the respective slots.

   d. Ensure all disk drive power and data cables are securely and properly connected.

   e. Verify the mass storage configuration with the descriptions listed in *Chapter 3, Installing and Configuring*.

   f. Verify all the DIMMs are HP DIMMs.

   g. Replace the left side cover, and if necessary, use the lock to secure the cover on the server.

   h. Replace the power cord and all of the cables.

   i. Turn on the monitor.

   j. Turn on the server.

   k. Check for an error message or beep code.

4. Insert the *HP Startup CD-ROM* into the CD-ROM drive and reboot the server.

5. Run the Diagnostics for Windows utility from the Startup CD-ROM and verify the server's hardware integrity.

BIOS Recovery

Should you experience compatibility or stability issues with your server, HP recommends starting your troubleshooting by first updating your BIOS, which may fix your current problems. If the BIOS has become corrupted, it is possible to perform a BIOS reset, recovery, or update to correct the condition. A BIOS update/ recovery diskette is created when the most current BIOS to be used in flashing the BIOS into the server is downloaded from the HP web site: http:\\www.hp.com. To perform a reset, an update, or a BIOS recovery, perform one of the following procedures.

BIOS Reset

If you need to reset your BIOS settings to the factory defaults (the HP recommended values) due to possible corruptions, perform the following steps. The default values have been selected to optimize the hp server's performance.

1. Reboot the server in a normal manner and press F10 to enter the BIOS Setup Utility.
2. Press <F5> to load default values.

   It is recommended that you take note of the system setup before making any modifications to the BIOS.

3. Press F6 to save changes and exit the BIOS Setup Utility.

BIOS Update

Use this procedure if you need to update your server BIOS with the latest BIOS version. HP regularly posts a new version of the hp server tc2120 BIOS on the website to improve the server's performance.

1. Prepare a blank and formatted 3 ½" disk.
2. Insert this diskette to any Windows PC with HTML browser and a connection to the Internet.

3. Locate and download the latest hp server tc2120 BIOS to this diskette from HP's web site at:

   http://www.hp.com/

   This downloaded BIOS on the diskette becomes the BIOS update diskette.

4. Boot the server with the BIOS update diskette in the flexible disk drive.

   This action will automatically flash the BIOS from the diskette to the server.

5. Remove the BIOS update diskette and then reboot the server and press F10 when prompted to start the (BIOS) Setup Utility.

6. Make the changes you wish to make (such as system time, passwords, or boot device priority) to the (BIOS) Setup Utility and save the BIOS changes.

7. Label, date, and save this flexible diskette for use as a BIOS Recovery diskette.

NOTE	If you do not have convenient access to the Internet, you can create a BIOS Update/Recovery diskette from the *HP Startup CD-ROM*. Please note that the *Startup CD-ROM* may not provide the most recent BIOS. To create the BIOS Update/ Recovery diskette, run the *Startup CD-ROM* on any Windows PC with an HTML browser and follow the menu instructions.

BIOS Recovery

Use this procedure if the BIOS has become corrupted and you want to restore the BIOS with the BIOS update/ recovery diskette. Refer to the previous procedure, *"BIOS Update"* to create the BIOS update/recovery diskette.

1. Use the BIOS Update diskette you created in the previous procedure.
2. Power off the server.
3. Remove the power cord.
4. Remove the side cover.
5. Set switch 1 to the ON position.

   For information about switch positions, see *"System Board Jumper/Dip Switch Settings"* in *Chapter 3, Installing and Configuring*.

6. Insert the diskette into the flexible disk drive.
7. Reconnect the power cord and power on the server.

   The server boots from the diskette and then flashes the BIOS. The screen remains blank during this process. When the BIOS recovery is complete, a long beep is sounded.

8. Power off the server and remove the diskette from the drive.
9. Remove the power cord.
10. Set switch 1 on the configuration switch set to the OFF position. See *"System Board Jumper/Dip Switch Settings"* in *Chapter 3, Installing and Configuring*.
11. Replace the cover, reconnect the power cord, and then reboot the server.

Resetting a Lost Password

If you have forgotten the User password, the Supervisor can reset it for you. However, if the Supervisor password has been lost or forgotten you can only reset it by clearing the CMOS memory and all of the settings in the (BIOS) Setup Utility. For instructions, refer to *"Clearing the CMOS and Passwords"* in *Chapter 4, Diagnostics*.

NOTE	If you have forgotten the User Password or the Supervisor Password, your server will function normally, but you will not be able to access the configuration settings in the Setup Utility. If you have enabled the Password-on-Boot feature and have forgotten all the passwords (User and Supervisor) you will not be able to reboot the server successfully.

General Server Problems

"Operating system not found" message appears

1. Reboot the server.
2. If the message still appears, check that the device boot order is correct in the (BIOS) Setup program:

   To enter the (BIOS) Setup program, press F10 when the HP logo appears at startup, and then select Enter Setup.
3. Press F5 to reload the default Setup values.
4. Press F6 to save changes and exit the Setup program.

Server stops working (hangs)

If the server hangs before the end of POST completes, the problem is typically a hardware failure. If the server hangs after the POST completes, the problem is probably due to an incorrectly configured or corrupt driver, operating system, or application program, or a media (disk drive) error.

If the server stops working, try the following:

1. Review the Troubleshooting Checklist before you continue.
2. Verify that the most recent BIOS update is loaded. See *"BIOS Update"* earlier in this chapter.
3. Power down the server and unplug the power cords.
4. Wait 30 seconds and plug the power cords in and power on the server.
5. Verify that you have installed HP recommended memory.
   a. Power on the server.
   b. Press F10 when the HP logo appears at startup, and then select Summary.
   c. Check the information on RAM.
   d. Press Esc and select "Exit discarding changes."
6. If the failure persists, try removing any recently added memory or expansion cards.
7. If a problem has been found with a part, verify it is the problem (or the only problem) by reinstalling the part and replicating the error.
8. If the failure persists, call your HP Customer Support provider.

Power Problems

Symptom:

- A fan is not working.

Action:

1. Review the Troubleshooting Checklist before you continue.
2. Verify all cable connections:
   - o AC power cord from AC source outlet to server.
   - o DC power supply cable to system board.
   - o DC power supply cables to all mass storage devices, including the flexible disk drive.
   - o DC power supply cable to all fans (system, power supply, and processor heat sink).
3. If the fans (system, power supply, and processor heat sink) are not working, call your HP Customer Support provider.

   Typically, all fans run when power is turned on and all fans are off when the power is turned off.

Video/Monitor Problems

Symptoms:

- The monitor's power indicator LED is on, but the monitor is blank.
- The wrong size characters appear on the monitor.
- Colors are wrong or there are no colors on the monitor.

Action:

1. Verify the video and power cords are connected to the monitor.
2. Ensure there is adequate power:
   a. Verify the display power switch is turned on.
   b. Verify the display power cord is connected to an AC power outlet and the video cable connected to the server's video connector.
   c. Plug in a known working device to ensure there is power to the outlet or use the proper testing device to check the power outlet.
   d. Turn the monitor off and on, and if the monitor has an On/Off LED, see if it lights.
   e. Check if the problem persists.
3. If the problem persists, and if the power cord is detachable, try a known good power cord.
   a. Unplug the power cord and wait 30 seconds.
   b. Plug in the power cord and turn on the server.
   c. Wait a full 2 minutes.
   d. Verify the monitor starts displaying normally.
4. Check the contrast and brightness controls to ensure each is adjusted.
5. If the problem persists, remove the monitor connector and check for bent pins on the connector.

If you should find bent pins, slowly but carefully straighten each pin. If necessary, replace the cable.

6. Turn on the server and wait a full 2 minutes.
7. Verify the monitor starts displaying normally.
8. If the problem persists, check if the monitor is functioning:
   a. Turn off the monitor and the server.
   b. Disconnect the video cable from the video connector.
   c. Turn on the monitor.

      Monitor Notes:

      - When most VGA monitors are disconnected from the video connector, if the monitor is working, the screen is white.
      - When some monitors (such as HP high-resolution monitors) are disconnected from the video connector, the monitor may be working, although the screen is black.

   d. If a monitor tester is available, use it to check the display.
   e. If you suspect the monitor is faulty, replace it with a known good monitor.
   f. Verify the new monitor is operating properly and then reinstall the original monitor and duplicate the error.
9. Verify the monitor is working by plugging it into a known-good server or computer.
10. If you are using a video screen saver utility and the screen goes blank while using the keyboard, you may be using an application that turns off the screen even when you are using the keyboard.

    Refer to the manual provided with the screen saver utility.
11. If the monitor displays a badly scrambled image that looks to be the current screen image, then the monitor is not synchronizing correctly. Call your HP Customer Support provider.
12. If a message appears such as "INVALID CONFIGURATION," press F10 during the boot process and run the Setup Utility to confirm the server video configuration.

    Verify the other accessory boards do not use the same memory addresses as the embedded video connector. If the problem persists, call your HP Customer Support provider.

Configuration Problems

Symptom:

- An installed driver cannot find a PCI board.

Action:

Installing a PCI board that bridges two system PCI buses (certain adapter boards provide this feature) can cause previously installed PCI drivers not to recognize the respective adapter board(s).

To resolve the configuration problem, move the PCI board that has bridging capability to a PCI slot earlier in the boot order.

Symptom:

- The configuration cannot be saved and the battery loses power.

Action:

Refer to this section if the server frequently loses date and time that may be caused by the battery losing power.

1. Review the Troubleshooting Checklist before you continue.
2. If the server frequently loses the time and date, replace the battery. The battery is attached to the system board.
3. Set the new date and time, and reset the configuration parameters using the Setup Utility, if necessary.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
4. Turn off AC power to the server, then back on again and reboot to see if the date and time was saved.
5. If date and time are still requested, and the battery is good, perform the next procedure, below.

WARNING	There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn the old battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Symptom:

- The configuration information is frequently lost and the battery is good.

Action:

If the battery is good and you cannot save system configuration, do the following:

1. Review the Troubleshooting Checklist before you continue.

   BIOS configuration information is saved in the CMOS memory.
2. If you continue to lose configuration information and the battery is good, or you cannot save the BIOS information to CMOS memory:

   a. Check the battery socket terminals for corrosion or loose connections.

   b. If this does not correct the problem, then continue with the next step.

   c. Replace the system board.

Printer/Datacomm Problems

Symptom:

- A printer does not print or datacomm devices are not working.

Action:

If the printer does not work, or the datacomm devices are not working, do the following:

1. Review the Troubleshooting Checklist before you continue.
2. Verify the AC power cord is plugged into the power source and the printer.
3. Ensure the printer power switch is on and the AC outlet is working.
4. If the printer is plugged into a multiple-outlet box, make sure the switch on the outlet box is turned on, and the circuit breaker (if equipped) is not tripped.
5. Ensure the printer is on-line and available for printing.
6. Verify correct cables have been used, the cables are connected properly, and the cable pins are not bent.

Refer to the peripheral's manual.

7. Check the cable for continuity, or try a known good cable.
8. If the printer's parallel data cable (where applicable) was plugged in after the server was already powered on, power off the server and then power it on again.
9. Examine the printer for a paper jam.
10. Run the printer internal self-test (if it has one) to ensure the printer is functional.

    Refer to the printer's manual for instructions.
11. Verify that you have the correct printer driver installed.
12. Ensure you have selected the correct port setting when you configured the printer.

    The printer must be configured correctly for the server and for the application. You may need to change some switch settings on the printer.
13. Run the Setup Utility (press F10 during the boot process) and verify the I/O port status, ensuring you have not disabled the I/O port.
14. Ensure the server's printer port is working properly by running another peripheral from the same port.
15. If the printer still does not work, it may have a resource conflict with another board or accessory.
    a. Remove boards and accessories (except the boot disk drive) one at a time to isolate the conflict.
    b. Check the printer for proper operation after you remove each board or accessory.
16. If there is an error message or beep code, refer to *Chapter 5, Error Messages* and the printer's manual for help.
17. If the server and printer were working before you installed an accessory, remove the accessory and restart the server.
18. If the problem persists, replace the system board.

Keyboard and Mouse Problems

Symptoms:

- The keyboard does not work.
- A character is not displayed when a key is pressed.

Action:

1. Review the Troubleshooting Checklist before you continue.
2. Ensure the keyboard is not locked.
3. Check that the keyboard is clean and keys are not stuck.
4. Ensure the keyboard cable connections at the rear of the server and at the back of the keyboard are securely and correctly attached.
5. If a keyboard/monitor switchbox is used with this server, plug the keyboard directly into the keyboard port of the server and verify the problem.
6. If the problem persists, turn off the server and back on by using the power button.
7. Try replacing the keyboard with a known good keyboard.
8. Verify that you are using the latest BIOS for the hp server.

   Refer to *"BIOS Update"* earlier in this chapter.

9. Try using a USB keyboard.
10. If the problem persists, replace the system board.
11. Once a suspect part has been found, verify that it is the problem by reinstalling the part and duplicating the error.

Symptom:

- The mouse does not work or is intermittent.

Action:

The hp server automatically detects a mouse when one is installed. If the mouse or other input device is not working, perform the following:

1. Review the Troubleshooting Checklist before you continue.
2. Check that the mouse cable is properly and securely connected to the server.
3. If a keyboard/monitor switchbox is used with this server, plug the mouse directly into the keyboard port of the server. Verify the problem.
4. In (BIOS) Setup Utility, ensure mouse's port does not have a resource conflict.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
5. Ensure correct mouse driver has been installed onto the boot drive. Refer to the mouse installation manual or the operating system manual.
6. Replace the mouse with a known-good unit.
7. Try using a USB mouse.
8. If the problem persists, replace the system board.
9. Once a suspect part has been found, verify that it is the problem by reinstalling the part and duplicating the error.

Flexible Disk Drive Problems

Symptoms:

- There are lost clusters.
- There are read/write errors.
- The server will not start from a diskette.

Action:

1. Review the Troubleshooting Checklist and read about Boot Device Priority before you continue.
2. Try booting from a good known flexible disk.
3. Press F8 and select "Boot from A drive."
4. If you cannot format or write to a flexible disk:
   - o Ensure diskette is not write-protected.
   - o Start the (BIOS) Setup Utility (press F10 during the boot process) and ensure that the flexible disk drive is properly configured and you have access privileges.
5. Verify all internal drive cables are securely attached and functional.
6. Inspect the cables and reseat the connectors at both ends.

7. If the cables are securely attached, and the drive still does not work, replace the cables with known good cables, one at a time.
8. If the problem persists, and/or there is an error code, replace the faulty part (the drive, the system board, etc.)
9. If the problem persists, check for environmental problems that could damage disk media and disk drive heads.

   Environmental problems result from:

   - Radiated Interference: Sources include communications and radar installations (such as at an airport), radio/TV broadcast transmitters, and hand-held receivers.
   - Airborne Contaminants: Sources include dust, smoke, and ashes. Steam from duplication equipment may result in intermittent disk errors.

CD-ROM Problems

Symptom:

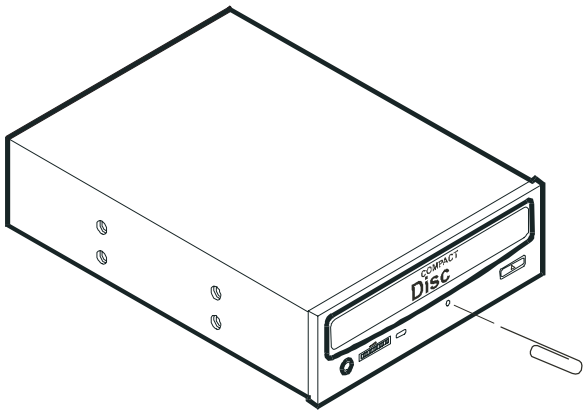
- The CD-ROM drawer will not open.

Action:

If the CD-ROM drawer fails to open when you press the Eject Button or with software commands, do the following:

1. Turn off all power to the server.

   To open the drawer, insert a pointed object, such as a paper clip, into the emergency eject hole and push in about 1.75 inches (40 mm).



2. Remove the disk and close the drawer.
3. After you remove the disk, start the server and try to open the drawer again with the Eject Button or software commands.
4. If the drawer still will not open, replace the CD-ROM drive with a working unit.

Symptom:

- The CD-ROM drive is not working properly.

Action:

The CD-ROM drive provided with this hp server (SCSI or IDE models) is IDE CD-ROM. If the CD-ROM drive does not work, do the following:

1. Review the basic IDE installation guidelines to ensure a proper configuration.
2. In addition, check the following:
   - o Verify correct drivers are installed.
   - o Verify there is a CD-ROM disk in the CD-ROM drive.
   - o Verify all internal drive cables are securely attached and functional.
3. Try installing a known good CD-ROM disk.
4. Verify that the Local Bus IDE Adapter item is correctly configured in the Setup program:
   - o Power up the server and press F10 at startup.
   - o Select Enter Setup, and go to the Advanced menu.
   - o Check that "Both" is selected in the Local Bus IDE Adapter field.
5. If the problem persists, check for environmental problems that could damage disk media and disk drive heads.

   Environmental problems result from:
   - o Radiated Interference: Sources include communications and radar installations, radio/TV broadcast transmitters, and hand-held receivers.
   - o Airborne Contaminants: Sources include dust, smoke, and ashes. Steam from duplication equipment may result in intermittent disk errors.

Symptom:

- The server will not boot from the CD-ROM.

Action:

Use the (BIOS) Setup Utility to ensure the CD-ROM drive is bootable:

1. Place a known, bootable CD-ROM in the drive.
2. Review the Troubleshooting Checklist and Boot Device Priority.
3. Reboot the server and run the (BIOS) Setup Utility (press F10 during the boot process).
4. Select the Boot menu and the Boot Device Priority submenu.
5. If necessary, move the CD-ROM up the boot list.

   This ensures the CD-ROM will boot before any of the hard disk drives (IDE or SCSI).
6. Save and exit the Setup Utility.

SCSI Problems

Symptom:

- The SCSI BIOS has trouble loading.

Action:

1. Review the Troubleshooting Checklist before you continue.
2. If you installed more than one SCSI controller, verify the BIOS of all other SCSI controllers are disabled except for the SCSI boot controller.

This lets the SCSI BIOS for the boot controller board load, preventing conflicts from the other SCSI controllers. If necessary, remove the other SCSI controller boards, except the SCSI boot controller board, until you resolve the current problem.

3. Reboot the server and run the (BIOS) Setup Utility (press F10 during the boot process).
4. Select the Boot menu and the Boot Device Priority submenu. Make sure that the SCSI hard drive is not disabled.
5. Determine what the boot order is for this server model. See *"Mass Storage"* in *Chapter 3, Installing and Configuring*.
6. Verify the SCSI controller board is in the right place in the boot order.
7. Verify the SCSI boot drive (address ID = 0) is in the right place in the boot order.

Symptom:

- The SCSI devices stop working.

Action:

1. Review the Troubleshooting Checklist and Mass Storage Guidelines before you continue.
2. Run the Diagnostics for Windows utility and:
   a. Verify the SCSI IDs and any relevant switch settings are correct.
   b. Verify the problem is the SCSI bus, by looking for specific information.
3. If an accessory board was added recently, check for a resource conflict between the new board and an existing accessory board.
4. Also, if you have changed the options on an existing board, there may be a resource conflict:
   a. Remove the new board and restart the server.
   b. If this corrects the problem, the board is either defective or it is trying to use a system resource used by the SCSI controller board.
   c. Check if the board is using memory, I/O addresses, or interrupt lines that are also used by the SCSI controller board.
5. Check for any recent changes or upgrades to the software.

   For example, has anyone moved, removed, or changed the configuration files or drivers? Refer to the software documentation for more information.
6. If you suspect hardware failure and there are no system error messages or beep codes, check each component associated with the failure.

   Equipment failure is probably the most unlikely reason for a SCSI devices failure.

IDE Problems

Symptom:

- The IDE devices stop working.

Action:

1. Review the Troubleshooting Checklist and Mass Storage Guidelines before you continue.
2. Reboot the server and run the (BIOS) Setup Utility (press F10 during the boot process).
3. Select the Boot menu and Boot Device Priority submenu. Make sure the device is not disabled.

4. Run the Diagnostics for Windows utility and:
   a. Verify the IDE IDs and any relevant switch settings are correct.
   b. Verify the problem is the IDE bus, by looking for specific information.
5. If an accessory board was added recently, check for a resource conflict between the new board and an existing accessory boards.
6. Also, if you have changed the options on an existing board, there may be a resource conflict:
   a. Remove the new board and restart the Server.
   b. If this corrects the problem, the board is either defective or it is trying to use a system resource used by the IDE controller board.
   c. Check if the board is using memory, I/O addresses, or interrupt lines that are also used by the IDE controller board.
7. Check for any recent changes or upgrades to the software.

   For example, has anyone moved, removed, or changed the configuration files or drivers? Refer to the software documentation for more information.
8. If you suspect hardware failure and there are no system error messages or beep codes, check each component associated with the failure.

   Equipment failure is probably the most unlikely reason for a IDE devices failure.

Processor Problems

Symptoms:

- The server is overheating.

Action:

Processor problems in the hp server tc2120 are typically problems of overheating due to incorrect installation of the heat sink-cooling fan on the processor or a damaged thermal patch.

1. Verify that the jumper switch is set properly for the processor. See *"Changing Jumper/Dip Switch Settings after Processor Upgrade"* in *Chapter 3, Installing and Configuring*.
2. Remove and reseat the heat sink-cooling fan.
3. Check the condition of the existing thermal patch on the bottom of the heat sink. If it is damaged, replace the heat sink-cooling fan.
4. Verify the cooling fan is connected to its power connector properly and there is voltage to the fan.
5. Remove and reseat the processor, ensuring the ZIF lever is completely down.
6. Replace each of the following components (one at a time) with a known good component, and retest the server:
   - Heat sink-cooling fan (with a good thermal patch)
   - Processor

CAUTION	Do not push on the processor components; push only on the edge. Pushing on the device may damage it.

7. If the fault persists, replace the system board.

Memory Problems

The memory modules used for this server are PC2100 DDR 266 MHz ECC DIMMs.

NOTE	If the POST (displayed at power-on time) indicates a defective memory module, replace it.

Action:

1. Review the Troubleshooting Checklist before you continue.
2. If memory problems are being experienced, power the server off and on. This performs a "cold" restart, rather than a "warm" restart (as it does when you press Ctrl+Alt+Del).
3. Reseat the memory modules.
4. Run the Diagnostics for Windows utility memory test.
5. To check that the modules are installed and configured correctly:
   a. Run the (BIOS) Setup Utility (press F10 during the boot process) and check the configuration.
   b. Install one known good DIMM. If you still receive an error, replace the system board.
   c. If the error goes away, add another DIMM and reboot again.
   d. Continue this process until you have installed all DIMMs or you experience a failure.
   e. Replace the defective DIMM.
6. Once a suspect part has been found, verify the cause of the problem by reinstalling the part and attempting to duplicate the error. Also install it in another memory socket to confirm whether or not the socket is defective.

Embedded Network Interface Card Problems

See the appropriate Network Interface Card documentation.

Symptom:

- The NIC adapter cannot connect to the network.

Action:

1. Check power to the server.
2. Ensure the proper drivers are installed.
3. Check the LAN cable connection on the device and the server.
4. Check the LAN status and activity LEDS are on. See *"Standard LAN Connector"* in *Chapter 2, External Connectors*.
5. If the LAN status light is off, replace the system board.
6. If the problem persists, contact your system administrator or HP Customer Support provider.

Network Interface Card (Installed) Problems

See the appropriate Network Interface Card documentation.

Symptom:

- The NIC adapter cannot connect to the network.

Action:

1. Ensure the cabling is installed properly.
2. If you're directly connecting two servers (with no hub or other device), use a "crossover" cable.

   Most hub and switch connections require a straight-through cable; but consult the documentation.
3. Verify there are no resource conflicts between the NIC and any other accessories in the server.
4. Check the (BIOS) Setup Utility for resource conflicts.

   To start the (BIOS) Setup Utility, boot or reboot the system and press F10 when prompted.
5. Check the LEDs on the adapter at the back of the server to see if any show activity.

   No lit LEDs probably indicate a bad network cable, hub connection, or other network error.
6. Ensure you're using the latest and most correct drivers.
7. Verify the drivers are intended for this NIC adapter.
8. Ensure the port on the switch or hub (or other device) has the same duplex setting as the adapter.
9. If you configured the adapter for full duplex, make sure the switch port is also configured for full duplex.

   Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.
10. Test the adapter as directed in the installation tasks for each operating system.
11. Also check the "README" files on the support disk provided by the NIC adapter vendor.

Installation Problems

To troubleshoot an installation problem, you need to determine if the problem is hardware or software related.

1. Verify all cables and boards are securely plugged into the appropriate connectors or slots.
2. Ensure the server is configured properly.

   Most installation problems are the result of incorrect BIOS and SCSI configurations of the server.

   a. Verify that the system BIOS is the latest. See *"BIOS Update"* earlier in this chapter.

   b. Verify the SCSI BIOS configuration. See *"SCSI Problems"* earlier in this chapter.

   c. If the network is not functioning, consult your network operating system manual and its requirements.

To determine if the problem is a hardware error, follow these steps:

1. If necessary, log users off the network and back up the server.

2. Power down the server and disconnect the power cord from the AC power source.

WARNING	Before removing the left side cover, always unplug telephone cables and disconnect the power cord. Unplug telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

3. Remove the server's left side cover.
4. Simplify the hp server configuration to the minimum required:

   The minimum configuration would include a monitor, one flexible disk drive, one CD-ROM drive, one hard disk drive, keyboard, mouse, and embedded NIC.

5. Boot the server.

   - If the server does not operate properly, consult the troubleshooting steps in *"Server Does Not Power On"* in this chapter.
   - If you get an error message or beep code, refer to *Chapter 5, Error Messages*.
   - If there is no error messages or beep code, refer to *"Server Passes POST, but Does Not Function"* earlier in this chapter.

6. Re-install the third-party options, one at a time, checking the server after each installation (repeat steps 2 through 5).

   This allows you to locate the defective option and replace it if necessary. After adding all options, if the problem persists, call your HP Customer Service provider.

7 Replacing Parts

This chapter describes the removal and replacement procedures for the user serviceable components in the hp server tc2120.

NOTE	The hp server tc2120 is highly customer serviceable. All major parts are easily accessible and replaceable.

Safety Information

Follow the procedures listed below to ensure safe handling of components and to prevent harm to both you and the server:

- Use an anti-static wrist strap and a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (HP 9300-1155).
- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards.
- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials.

WARNING	Hazardous voltages are present inside the server. Always remove AC power from the processor and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.

Service Tools Required

Service of this product may require one or more of the following tools

- Electrically Conductive Field Service Grounding Kit (P/N 9300-1155)
- CE Peripheral Exerciser Disk Kit (45935-63210)
- Datacomm Test Hood, 9-pin (24540-60010)
- Datacomm Test Hood, 25-pin parallel (24540-60011)
- 1/4 inch Flat Blade Screwdriver
- T-15 Torx® Screwdriver

Mass Storage Devices

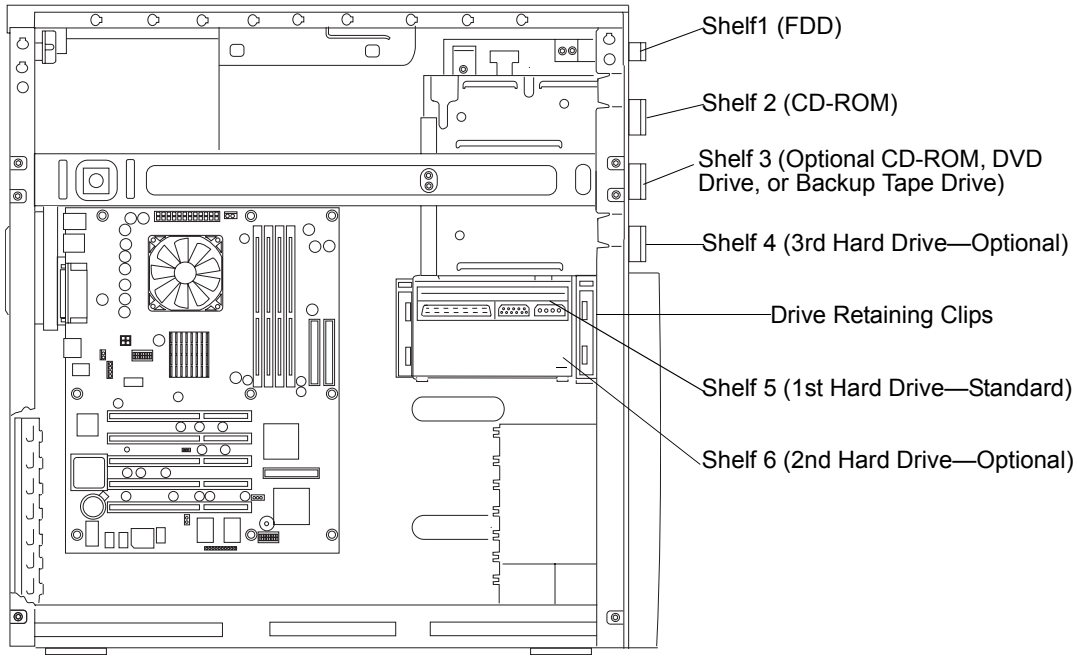


Figure 7-1. Mass Storage Device Locations

Removing the Flexible Disk Drive

1. If the server is operating, power down the server, and if necessary, back up mass storage devices.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.
4. Remove the upper bezel.
5. At the rear of the flexible disk drive (FDD), carefully disconnect the power and data cables.
6. Remove the flexible disk drive:

   a. Press in on both release tabs to release the FDD assembly.

   b. Pull the FDD assembly out of the chassis.

c. Remove the two screws from the side of the FDD assembly.

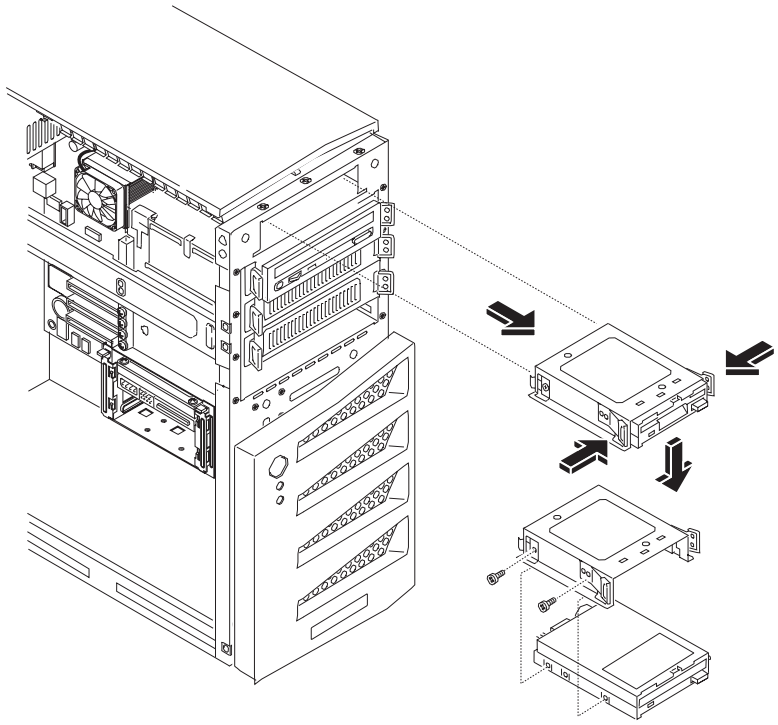


Figure 7-2. Removing the Flexible Disk Drive (FDD)

d. Remove the flexible disk drive from the tray.

7. Place the flexible disk drive in an anti-static bag.

Replacing the Flexible Disk Drive

1. If not already mounted, insert the new drive in the tray (pin side first), and then replace the side screws.
2. With the cable connectors toward the rear of the chassis, slide the FDD assembly all the way into the chassis, until the FDD assembly snaps into place.

   The flexible disk drive is only mounted in the top shelf (shelf 1).
3. At the rear of the flexible disk drive, carefully connect the power and data cable.
4. Replace the upper bezel.
5. Replace the left side cover.
6. Replace the external cables and power cord.
7. Power on the server as described in *Chapter 1, Controls and Indicators*.

Removing the CD-ROM

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.
2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

   Refer to *"Opening and Closing the hp server"* in *Chapter 3*.

4. Remove the upper bezel.

   Refer to *"Opening and Closing the hp server"* in *Chapter 3*.

5. At the rear of the CD-ROM, carefully disconnect the power and data cables.

6. Remove the CD-ROM:

   Press in on both release tabs to release the CD-ROM tray assembly.

   Pull the CD-ROM assembly out of the chassis.

   Remove the four screws (two on each side) from the CD-ROM tray.

7. Place the CD-ROM in an anti-static bag.

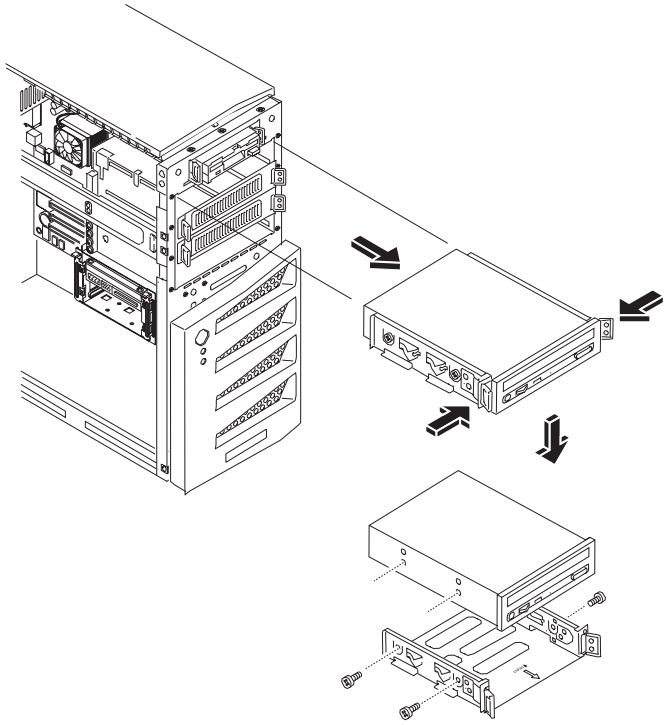


Figure 7-3. Removing the CD-ROM

Replacing the CD-ROM

1. Remove the CD-ROM from the shipping container.
2. Set the jumper on the back of the CD-ROM to "CS" (Cable Select). Refer to the CD-ROM documentation for detailed instructions.
3. If not already mounted, place the CD-ROM into the CD-ROM tray and secure it using the four screws.
4. Guide the CD-ROM tray into the chassis opening, with the cable connectors of the CD-ROM toward the rear of the chassis.

   The first CD-ROM must be mounted in the second shelf.

5. Push the CD-ROM tray all the way into the chassis until the CD-ROM tray snaps into place.

   The two release tabs should click when in place.

6. At the rear of the CD-ROM, carefully connect the power and data cables.

   The IDE CD-ROM uses one connector on the cable from the IDE-2 connector, leaving one connector for an optional third hard drive in shelf 4 or an optional IDE device in shelf 3.

7. Replace the upper bezel.
8. Replace the left side cover.
9. Replace the external cables and power cord.
10. Power on the server as described in *Chapter 1, Controls and Indicators*.

Removing a Backup Tape Drive

This procedure is used to remove the optional HP DAT 24i backup drive mounted in the third shelf.

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.
4. At the rear of the backup tape drive tray, carefully disconnect the power and data cables.
5. Remove the backup tape drive tray by:

   a. Pressing in on both release tabs to release the backup tape drive tray.

   b. Pull the backup tape drive tray out of the chassis.

   c. Remove the four screws (two from each side) securing the tray to the backup tape drive.

6. Place the backup tape drive tray in an anti-static bag.

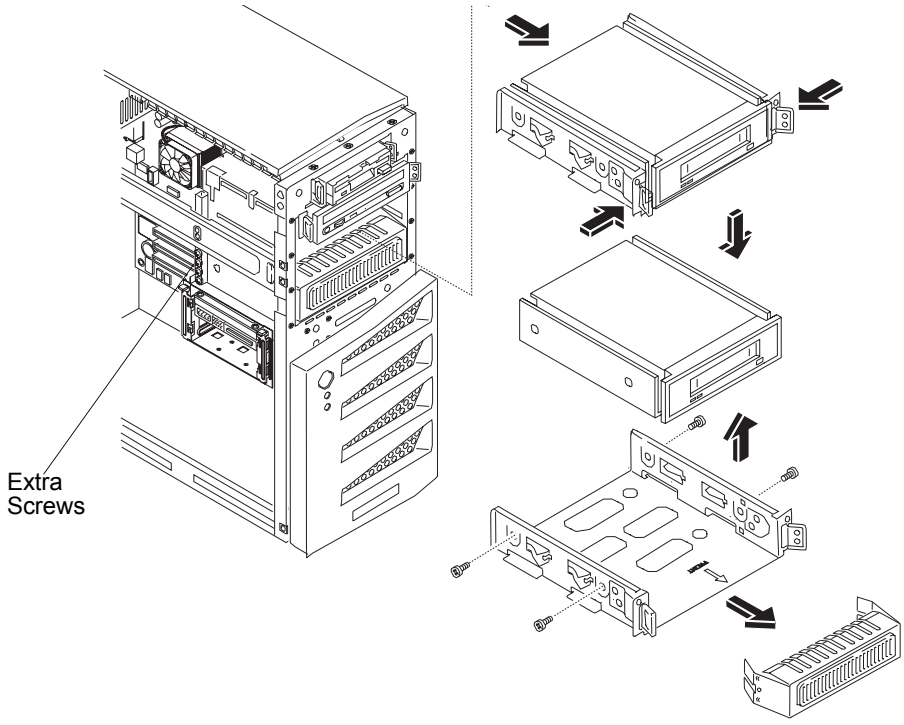


Figure 7-4. Removing the Backup Tape Drive

Replacing a Backup Tape Drive

This procedure is used to replace the optional HP backup tape drive mounted in the third shelf. In SCSI models, the optional HP backup tape drive may slow down access time for the Ultra-160 SCSI hard drives. If this is the case, HP recommends adding another single channel SCSI controller to control the slower backup tape drive.

1. Remove the HP backup tape drive from the shipping container.
2. Make any settings required by the HP backup tape drive documentation.

   The SCSI backup tape drive should not be terminated, but if it is remove the termination jumper. The default SCSI address for HP backup tape drive is normally set to ID address = 3.
3. Attach the backup tape drive to third mounting tray using the four screws on the sides of the tray.

   The optional HP SureStore DAT 24i backup tape drive normally comes with 5¼ inch mounting brackets installed on the tape drive. If not, follow the instructions provided with the tape drive to connect the 5¼ inch mounting brackets to the tape drive, before installing the tape drive into the third drive tray.
4. Guide the backup tape drive tray into the chassis opening, with the cable connectors toward the rear of the chassis.
5. At the rear of the backup tape drive tray, carefully connect the power and data cables.

   The optional HP backup tape drive comes with a 50-to-68-pin adapter to connect to a 68-pin SCSI cable used for connection of backup tape drive.
6. Replace the upper bezel.
7. Replace the left side cover.
8. Replace the external cables and power cord.
9. Power on the server as described in *Chapter 1, Controls and Indicators*.

Removing a Hard Disk Drive (Tray Mounted)

This procedure is used to remove the third hard disk drive (HDD) mounted in the fourth shelf.

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.
2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.
3. Remove the left side cover.
4. At the rear of the HDD tray, carefully disconnect the power and data cables.
5. Remove the hard disk drive (HDD):
   a. Press in on both release tabs to release the HDD tray
   b. Pull the HDD tray out of the chassis.
   c. Remove the four screws, from below the HDD tray.

6. Place the HDD in an anti-static bag.

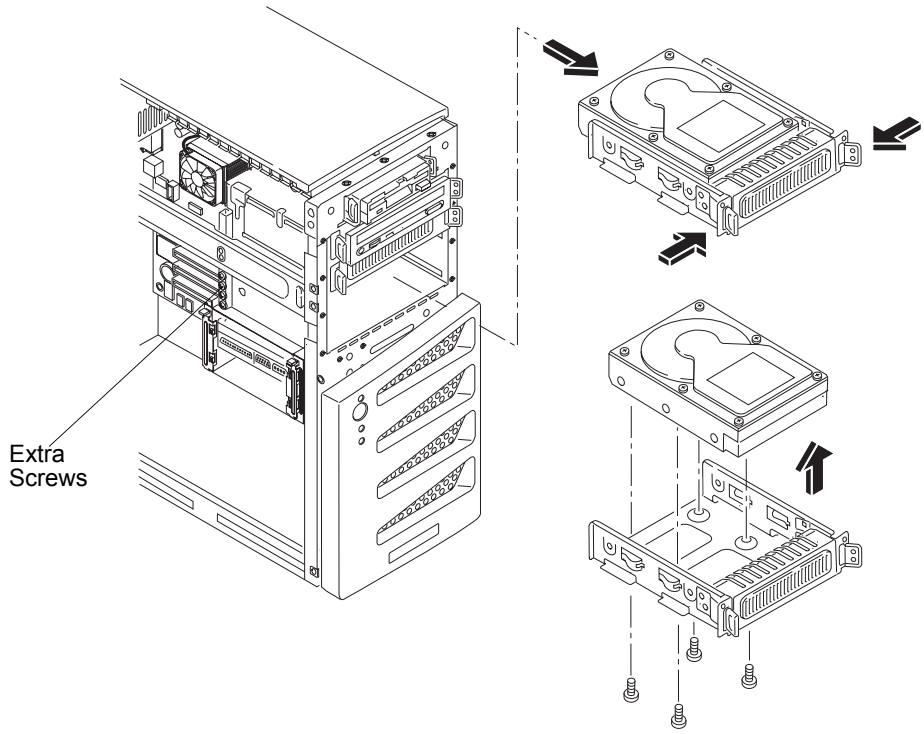


Figure 7-5. Removing Hard Disk Drive (HDD) and Tray

Replacing a Hard Disk Drive (Tray Mounted)

Follow these steps to replace the third hard disk drive (HDD) mounted in the fourth shelf. The second and third drive trays are identical, but the forth drive tray is reserved for a hard drive (IDE or SCSI). The fourth drive tray provides four raised mounting posts to mount hard drives without the use of any mounting brackets.

1. Remove the hard disk drive from the shipping container.
2. Set the jumper on the back of the drive to "CS" (Cable Select). Refer to the hard disk drive documentation for detailed instructions.
3. Attach the third HDD to mounting tray using the four screws at the bottom of the tray.

CAUTION	All mounting screws used with the hard disk drive must be #6-32 and not exceed ¼-inch in length. Longer screws may cause internal damage to the mass storage device. Damage caused by incorrect mounting screws is not covered by the HP warranty.

4. Guide the HDD tray into the chassis opening, with the cable connectors toward the rear of the chassis.
5. At the rear of the HDD, carefully connect the power and data cables.

   For IDE models, the third HDD is connected to the cable for IDE-2.

   For SCSI models, the SCSI cable has five connectors and one termination. There should be a connector available for the third HDD.

6. Replace the upper bezel.

NOTE	If this is the initial installation of a hard disk drive in this location, it is necessary to remove the bezel drive cover from the upper front bezel.

7. Replace the left side cover.
8. Replace the external cables and power cord.
9. Power on the server as described in *Chapter 1, Controls and Indicators*.

Removing a Hard Disk Drive (Drive Cage Mounted)

The replacement of the mass storage cage mounted drives is the same for IDE or SCSI devices. The first hard disk drive (IDE or SCSI) is always mounted in the top (shelf 5) of the hard disk drive cage. The second hard disk drive should be mounted just below it (shelf 6).

CAUTION	Install and remove connectors carefully, and avoid displacing any pins.

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.
2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.
3. Remove the left side cover.
4. Disconnect the data and power connectors from the drive.
5. Press and release the retaining clips at the side of the drive cage.

6. Slide the drive out of the drive cage.

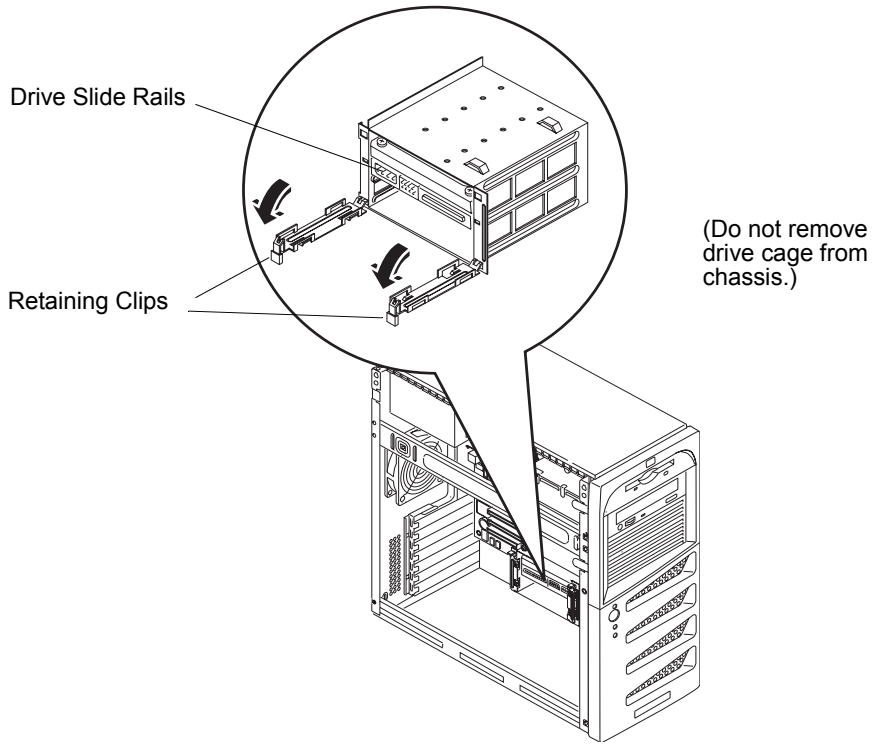


Figure 7-6. Releasing the Retaining Clips

7. Remove the four screws to remove the rails from the drive.
8. Place the removed drive in an anti-static bag for protection.

Replacing a Hard Disk Drive (Drive Cage Mounted)

NOTE	If the hard disk drive (HDD) you are planning to install already has a mounting tray attached, you must remove it before you can install the drive into the drive cage.

1. Set the jumper on the back of the drive to “CS” (Cable Select). Refer to the hard disk drive documentation for detailed instructions.
2. Align and screw the rails to the new drive.

   Use the shoulder screws located above the drive cage.

3. Slide the HDD into the drive cage opening.

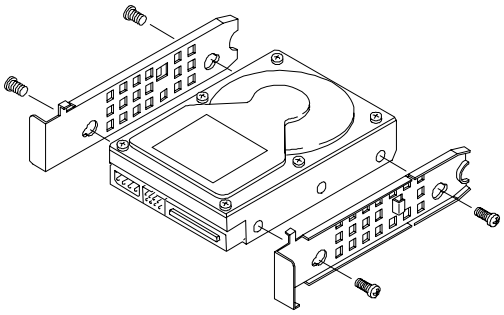


Figure 7-7. Attaching the Rails

4. Connect the power and data cables to the disk drive.

   For the IDE model, use the two connectors on the primary cable (IDE-1) to connect the IDE drives. The secondary cable (IDE-2) is intended for the IDE CD-ROM and an optional IDE device (shelf 3) or third drive (shelf 4).

   For the SCSI model, use the SCSI cable, which has 5 connectors and a termination on the end of the cable. Typically, the SCSI cable is already folded, allowing you to use the available connectors on the SCSI cable nearest the drive cage.

5. Replace the left side cover.
6. Replace the external cables and power cord.
7. Power on the server as described in *Chapter 1, Controls and Indicators*.
8. Verify the new configuration by checking the HP Summary screen. To access the HP Summary Screen, press F10 when the HP logo appears during startup.

DIMMs

NOTE	Use only memory modules provided for your hp server model. Install only 128 MB, 256 MB, 512 MB, or 1 GB buffered ECC DDR DIMM modules. To ensure that you have the correct DIMMS, refer to http://www.hp.com.

Removing DIMMs

Use this procedure to upgrade DIMMs or replace a defective DIMM.

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

WARNING	The power supply will continue to provide standby current to the hp server until the power cord is disconnected from the AC power source.

4. Lay the server on its side (components showing).
5. Select the desired DIMM and open the retaining latches completely.

   This forces the DIMM up in the slot and makes it easier to remove.
6. Lift the DIMM completely away from the slot.
7. Place the DIMM in its anti-static container.
8. Repeat Steps 5-7 for as many DIMMs as you need to remove.

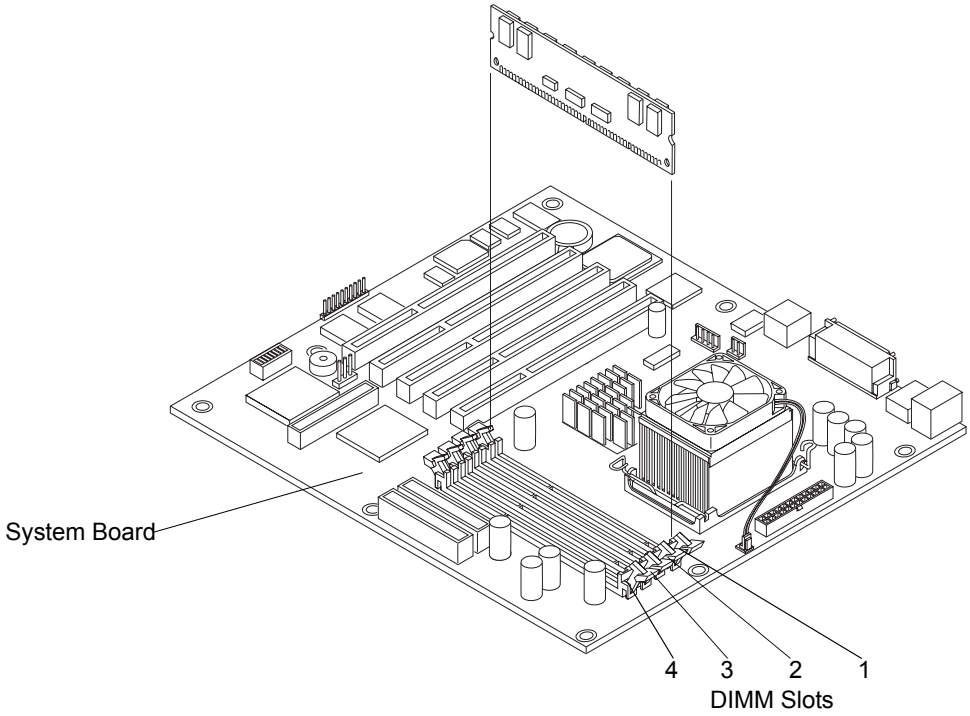


Figure 7-8. Removing DIMMs from System Board

Replacing DIMMs

1. Choose a DIMM slot for the desired DIMM.

   While the four system board slots can accept different size DIMM in any configuration, HP recommends installing the smallest capacity DIMM in slot 4 and progressively larger capacity modules in slots 3, 2 and 1.
2. Spread the two retaining latches on the slot outward.

CAUTION	Use only HP DIMMs, which are 184-pin, 3.3V, PC2100 (266 MHz), buffered ECC DDR DIMMs. The EDO DIMMs and PC 100 SDRAM DIMMs from earlier hp server models will fit into the DIMM slots in the hp server tc2120, but the EDO DIMMs and PC 100 SDRAM will not function properly. HP's warranty does not apply to non-HP parts.

3. Remove a DIMM from its protective container, handling the module by its edges.

   If necessary, lay it on an anti-static surface until you are ready to install it.

4. Align the notches on the DIMM with the keys on the slot.

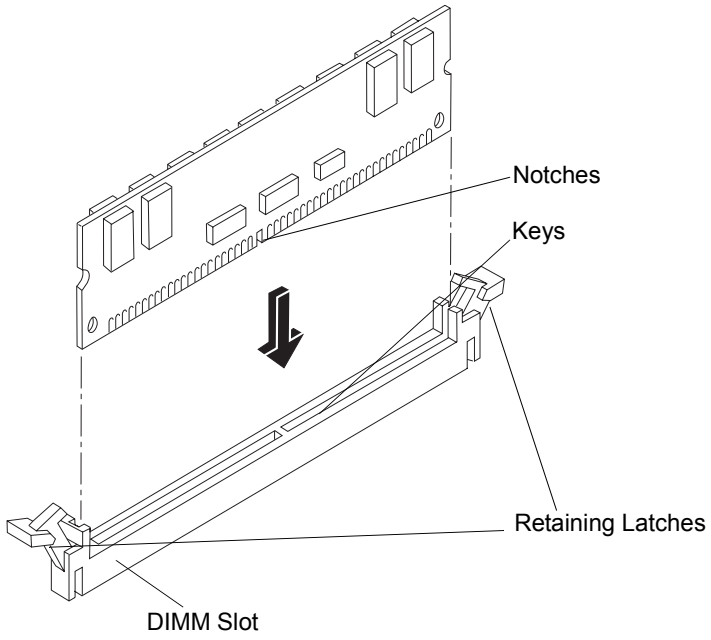


Figure 7-9. DIMM to Slot Alignment

5. Holding the DIMM at 90 degrees to the system board, press the DIMM fully into the slot until the retaining latches close.

   If the latches do not close, the DIMM is not inserted correctly.

6. Repeat Steps 1-5, to install all of the remaining DIMMs for your memory configuration.
7. Replace the left side cover.
8. Replace the external cables and power cord.
9. Power on the server, as described in *Chapter 1, Controls and Indicators*.

   If the DIMMs are not seated properly you may get a blank screen.

NOTE	Most DIMMs are dimensionally identical, so, if you have two or more DIMMs installed, you may verify all DIMMs are seated by sliding a straight edge (a pen, for example) across the top edges and verify it remains in continuous contact with all of the DIMMs.

Processor

Use the procedures in this section to remove and replace the heat sink-cooling fan and the processor.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

Removing the Heat Sink and Cooling Fan

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

WARNING	The power supply will continue to provide standby current to the hp server until the power cord is disconnected from the AC power source.

4. Lay the server on its side (components showing).
5. Disconnect the cooling fan power cable from the connector on the system board.
6. Open the heat sink release latches by pressing down on the latches and unhooking them from the heat sink bracket. Then, remove the heat sink by lifting it. See *Figure 7-10*.

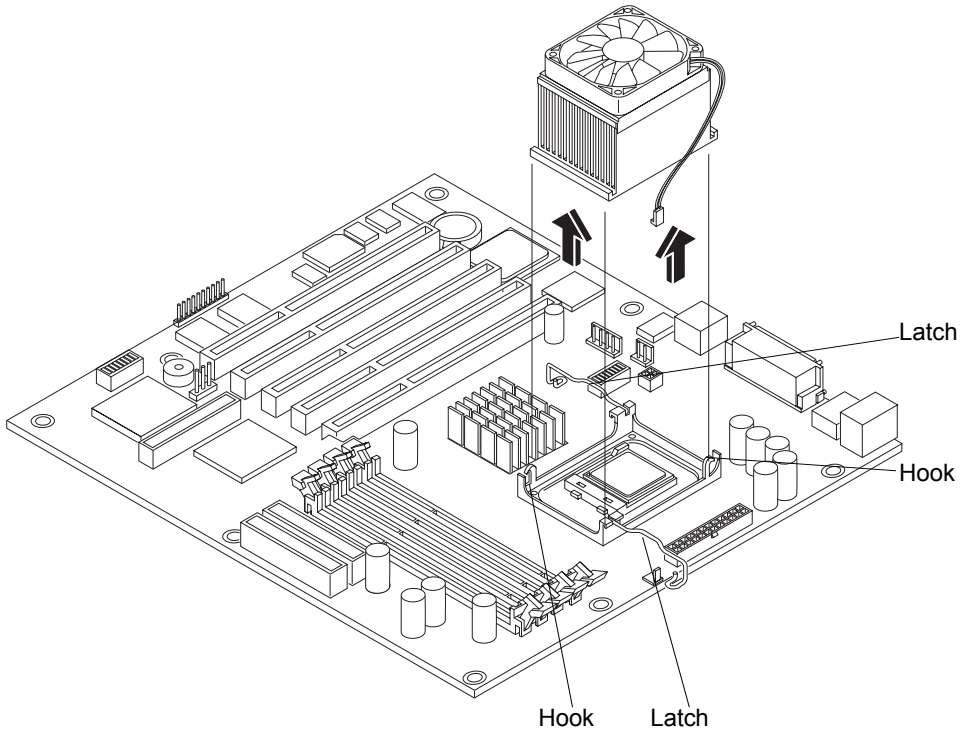


Figure 7-10. Removing Heat Sink and Cooling Fan

Removing the Processor

1. If you have not removed the heat sink-cooling fan assembly, do so now before continuing.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

2. Open the ZIF lever completely to allow removal of the processor.

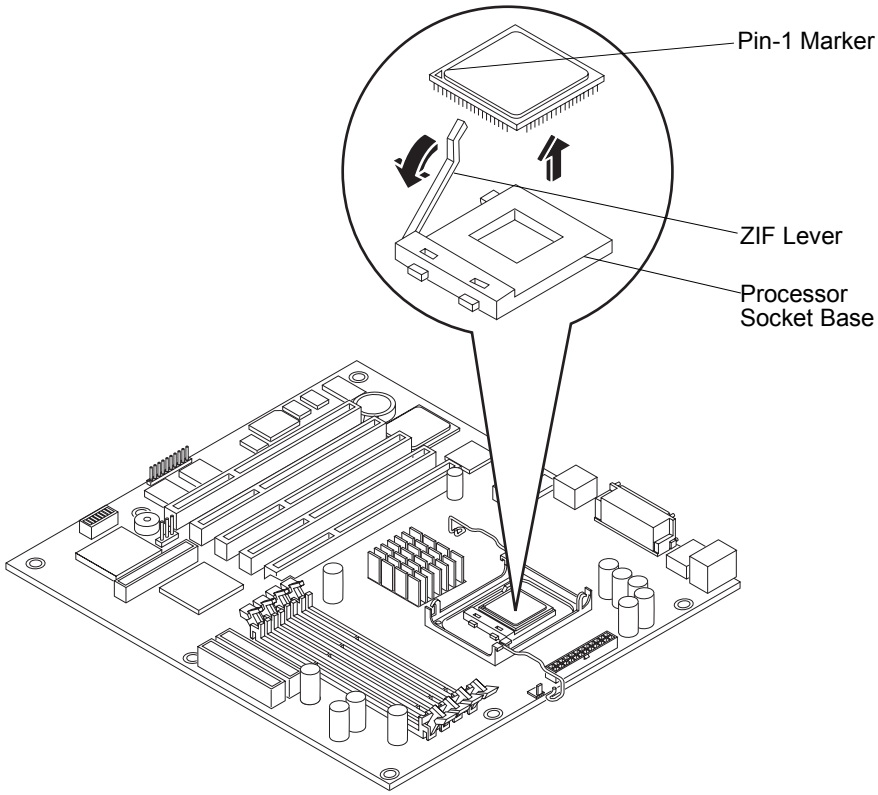


Figure 7-11. Removing the Processor

3. Grasp the processor by its edges and lift it out of the processor socket.
4. Place the processor on a static-dissipating work surface or into an anti-static bag.

Replacing the Processor

1. Locate the pin-1 marker on the processor before installing the processor.

NOTE	If you are upgrading the processor to a faster processor with a different front side bus (FSB) speed than the previous processor, the system board will not automatically detect a need for a faster FSB speed. See *"Changing Jumper/Dip Switch Settings after Processor Upgrade"* in *Chapter 3*.

2. Open the ZIF (Zero Insertion Force) lever to allow access to the processor socket.

   Pull the ZIF lever up and away from the ZIF socket and then raise it to a full 90° to the system board.

3. Align the processor over the empty processor socket.

   The socket has a mark for pin-1 that should match the mark for pin-1 on the processor near the end of the ZIF lever.

CAUTION	Ensure you align pin-1 of the processor with pin-1 of the processor socket or pin damage will occur.

4. Insert the processor into the socket and close the ZIF lever to fully seat the processor.

   You should hear the ZIF lever click when it closes properly.

5. Change the jumper and dip switch settings. Refer to *"Changing Jumper/Dip Switch Settings after Processor Upgrade"* in *Chapter 3*.

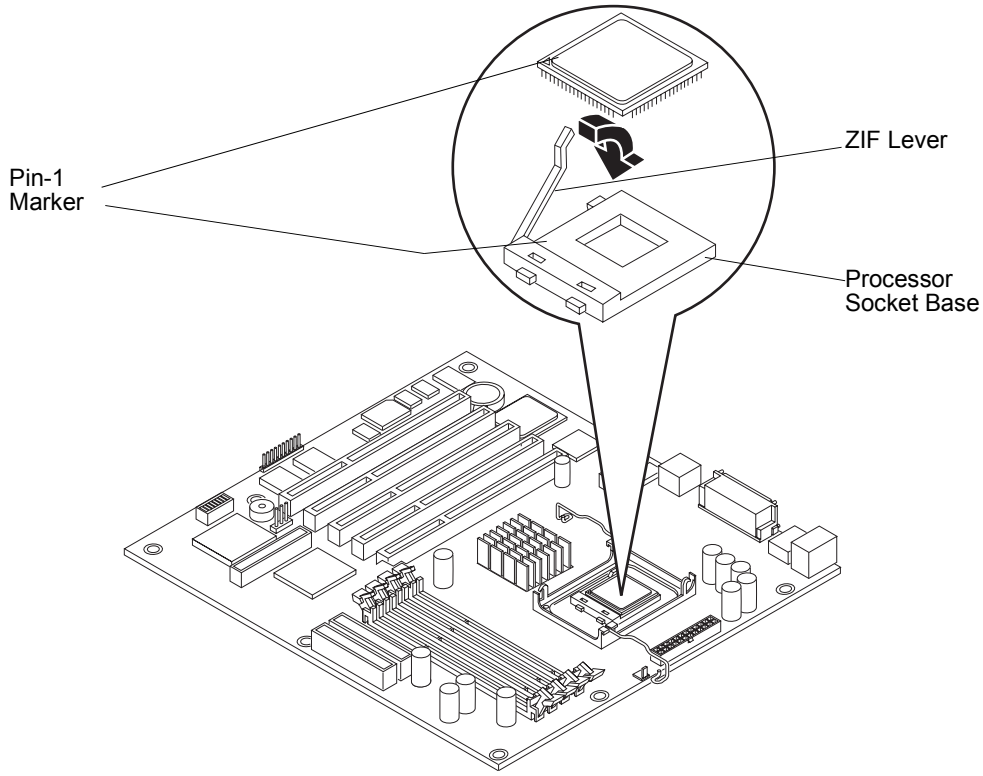


Figure 7-12. Replacing the Processor

Replacing the Heat Sink and Cooling Fan

Once the processor is installed, the heat sink-cooling fan must be installed on top of the processor. The thermal interface material on the bottom of the heat sink provides thermal bonding between the heat sink and processor.

CAUTION	To prevent overheating or a possible system crash, use only the heat sink-cooling fan assembly specified for the hp server tc2120.

1. Remove the heat sink-fan assembly from the shipping container and ensure you do not touch the thermal patch on the bottom of the heat sink.
2. Verify the thermal patch is not damaged (missing thermal material from the patch).
3. If the thermal patch is damaged, you will need to replace the heat sink with another one (the thermal patch itself is not replaceable).
4. Hold the heat sink in place and close the latches to secure the heat sink to the bracket. Make sure the latches engage the hooks on the heat sink bracket. See *Figure 7-13*.

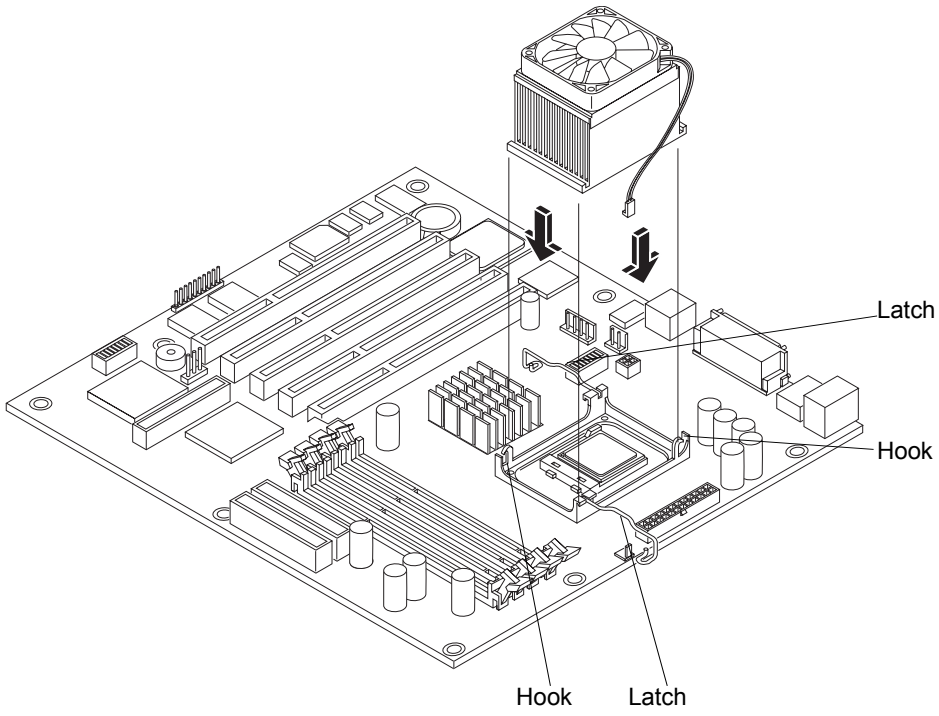


Figure 7-13. Replacing Heat Sink-Cooling Fan on the Processor

CAUTION	To avoid thermal overheating ensure that both latches are firmly fastened, providing good contact between the heat sink and processor.

5. Connect the cooling fan power cable to the fan connector on the system board.

CAUTION	Failure to connect the cooling fan to its power connector may cause the server to shut down with no messages displayed and possibly damage the processor.

6. Replace the left side cover.
7. Replace the external cables and power cord.
8. Power on the server as described in *Chapter 1, Controls and Indicators*.

   You may have to reboot the server so the BIOS will recognize the new processor.

Accessory Boards

The system board in the hp server tc2120 provides five PCI slots (P1 through P5), 64-bits at 33 MHz bus speed. Four of the slots support 3.3 volt cards; the fifth (blue) slot supports a +5 volt card. The SCSI model requires slot 1 for the SCSI controller board. For a list of tested PCI boards, check for compatibility in the Hardware Tested Products list for the hp server tc2120 under the Technical Support topic for the specific NOS used in the server at HP's web site: http://www.hp.com.

Removing Accessory Boards

To remove an accessory board, refer to the following procedure:

1. If the server is operating, power off the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.

WARNING	The power supply will continue to provide standby current to the hp server tc2120 until the power cord is disconnected from the AC power source.

CAUTION	Wear a wrist strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin.

4. Lay the server on its side with the system board facing up (component side up).
5. Remove any cables attached to the accessory board.

   If necessary, label each one to expedite re-assembly of a replacement board.

6. Remove the slot cover latch by:

   a. Lift up on the tab of slot cover latch.

   a. Raise the slot cover latch up from the slot covers.

   a. Remove it from the chassis and keep it for reassembly.

You may need to lift the slot cover latch out of its retainer before lifting it out of the chassis.

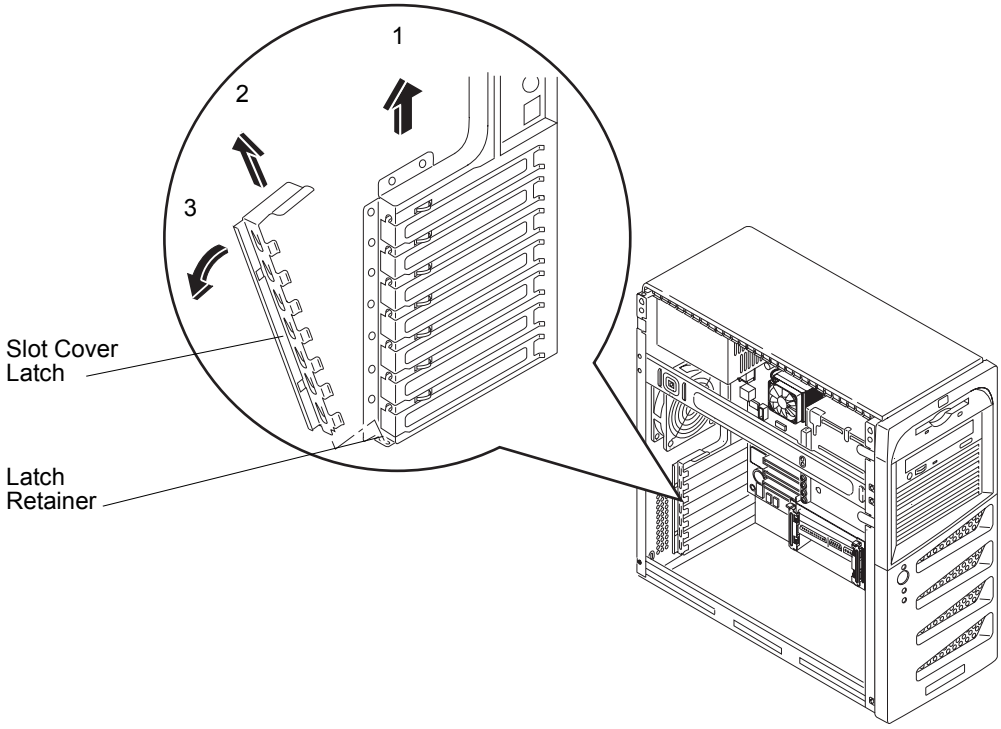


Figure 7-14. Removing Slot Cover Latch

7. Lift the accessory board up and away from the slot.
8. Place the accessory board and any cables in an anti-static container.

Replacing Accessory Boards

1. Read the documentation included with the accessory board and follow any special instructions.
2. If you are installing the accessory board into a new PCI slot, continue with Step 3.

   If the accessory board is a replacement for a defective board, skip to Step 5.
3. Remove the slot cover latch by:

   a. Lifting up on the tab of slot cover latch with your finger.

   b. Raise the slot cover latch up away from the slot covers.

   c. Remove it from the chassis and keep it for reassembly later.

   You may need to lift the slot cover latch out of its retainer before lifting it out of the chassis to remove the slot cover latch.
4. Select the desired accessory slot cover, slide the top of the slot cover away from the chassis, and then lift it up and out of the chassis as shown in the following illustration.
5. Slide the accessory board into the desired PCI slot and then press down to seat the board.

6. Ensure the accessory board is seated properly in the PCI slot.

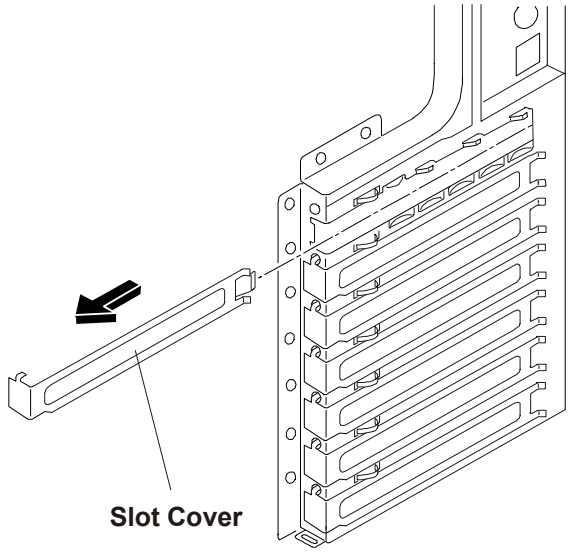


Figure 7-15. Removing the Slot Cover

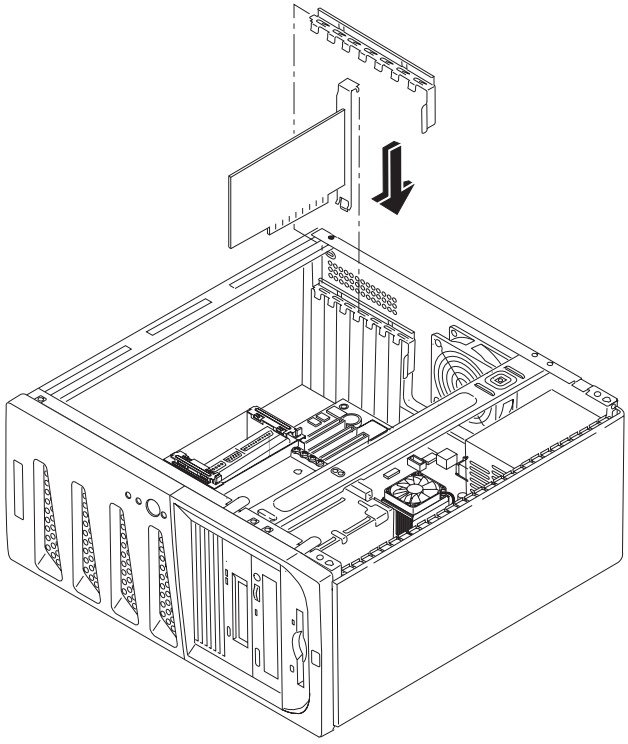


Figure 7-16. Inserting an Accessory Board

7. Replace the slot cover latch to ensure the accessory board is held in place.
8. Replace the left side cover.
9. Replace the external cables and power cord.
10. Power on the server as described in *Chapter 1, Controls and Indicators*.

Once the accessory board is installed, you may need to install or update software drivers. The drivers for the new board are either part of your existing server software or provided on a flexible diskette (or CD-ROM) included with the accessory board.

Power Supply

Removing the Power Supply

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.
4. Disconnect the power cables from the system board connector and all the mass storage devices.
5. Remove the power supply:
   a. Remove the four outside screws securing the power supply.

      You may need a flat blade screwdriver to remove the four screws.

   b. Remove the screw securing the power supply on the inside of the server.

WARNING	To prevent the power supply from falling, support the power supply with your hands when you disconnect the screw securing the power supply on the inside the chassis. The power supply is heavy and could hurt you or damage components on the system board.

c. Slide the power supply out of the chassis while you support it with your hands.

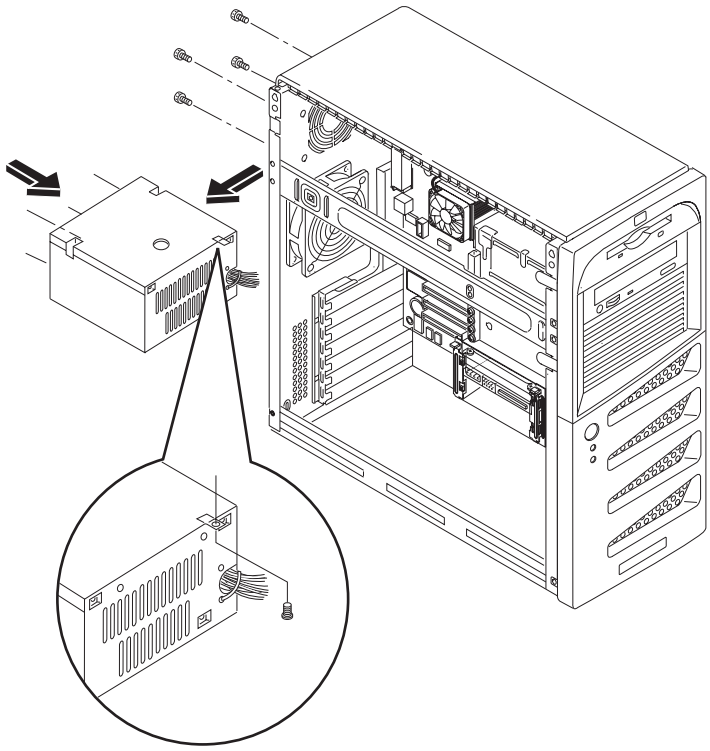


Figure 7-17. Removing the Power Supply

Replacing the Power Supply

1. Insert the new power supply and replace the screw securing it on the inside of the chassis.
2. Replace the remaining screws securing the power supply.
3. Reconnect all internal power supply connectors.
4. Replace the left side cover.
5. Replace the external cables and power cord.
6. Select the correct voltage setting for your country.
7. Power on the server as described in *Chapter 1, Controls and Indicators*.

Battery

Removing the Battery

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.
2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Remove the cover.

WARNING	The power supply will continue to provide standby current to the hp server until the power cord is disconnected from the AC power source.

4. Lay the server on its side (components showing) for better access to the battery, especially when it is released from the socket.
5. If necessary, remove any accessory boards or SCSI cables that prevent access to the battery socket.
6. Insert a small flat-blade screwdriver or similar tool between the battery and spring latch. See *Figure 7-18*.
7. Push the spring latch away from the battery to release it, and remove the battery.

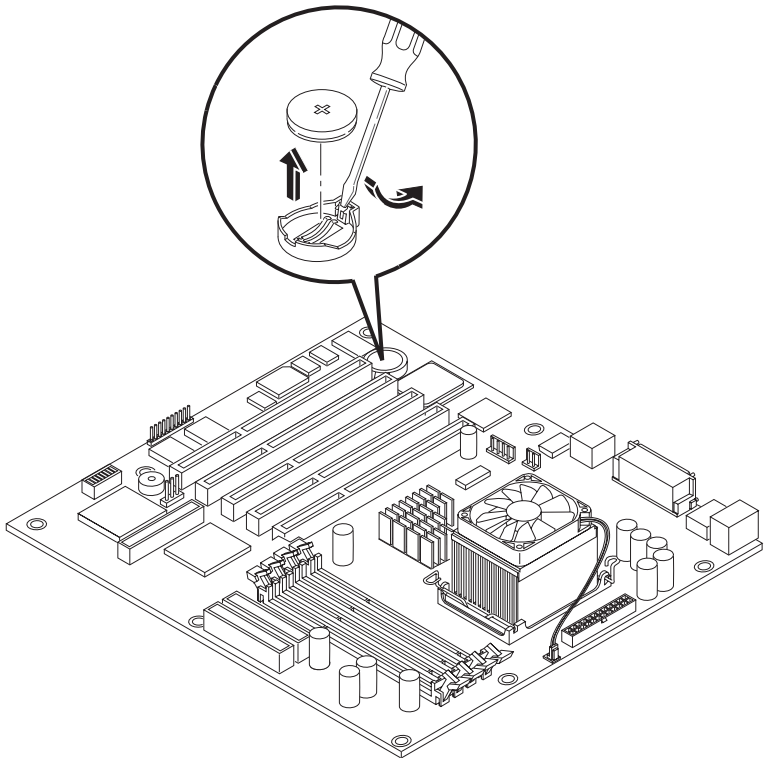


Figure 7-18. Removing the Battery

Replacing the Battery

1. Insert the new battery with the positive sign (+) facing out, and ensure that it is seated completely.

   Ensure the retaining latch is in place, and holds the battery firmly.
2. If necessary, replace any accessory boards or SCSI cables removed to allow access to the battery socket.
3. Replace the left side cover.
4. Replace the external cables and power cord.
5. Power on the server as described in *Chapter 1, Controls and Indicators*.
6. Press F10 during the boot process to enter the (BIOS) Setup Utility and change the BIOS settings.

Chassis Fan

Removing the Chassis Fan

The chassis fan is mounted at the rear of the chassis.

WARNING	Before removing the cover(s), always disconnect the power cords and unplug telephone cables. Disconnect the power cords to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects, such as tools or jewelry. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. The power switch does not turn off any standby power. Disconnect the power cord to stop or turn off standby power.

Follow these instructions to remove the chassis fan:

1. If the server is operating, power off the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables connected to the server.

   If necessary, label each one to expedite re-assembly.

3. Disconnect the chassis fan's power connector from the system board.

   Note the orientation of the fan's power cable.

4. Remove the fan by placing a sharp flat object (screwdriver or knife) under the edge of the mounting snap rivet.

5. Lift the snap rivet away from the surface of the rear chassis.

6. Remove the snap rivet housing from the rear of the chassis.

CAUTION	To prevent damage from the fan if it falls, support the fan when you release the last snap rivet and the snap rivet housing. The fan could fall onto the system board or an accessory board causing damage, if not supported when released.

7. Repeat Steps 3-6 for the three remaining snap rivets.

   Ensure you catch the fan when you remove the last snap rivet housing.

8. Lift the fan out and away from the chassis.

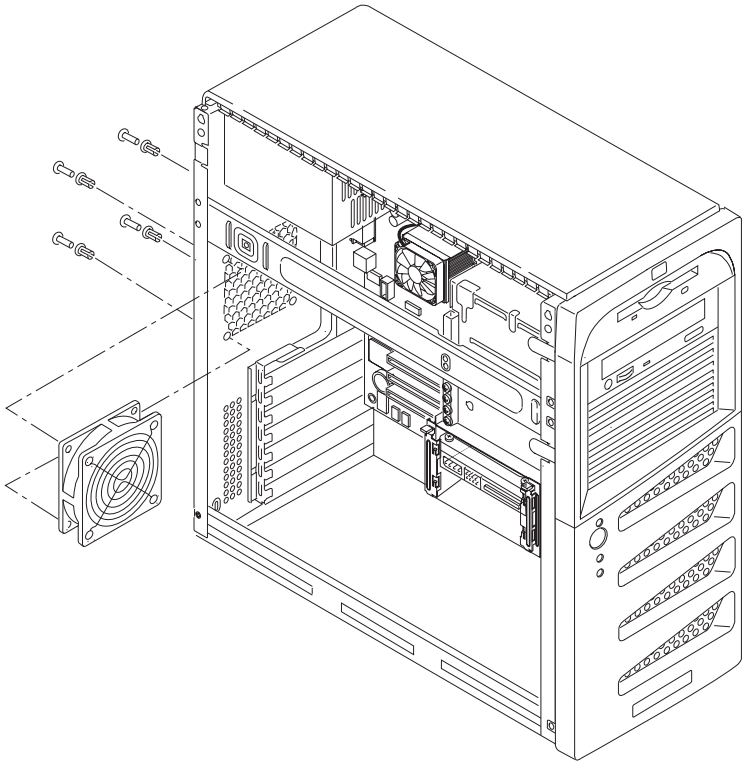


Figure 7-19. Removing the Chassis Fan

Replacing the Chassis Fan

1. Remove the replacement chassis fan from the shipping container.
2. With the power connector oriented toward the rear of the chassis and the system board, guide the chassis fan into the chassis fan opening.
3. Attach the chassis fan by placing the first snap rivet housing into the chassis and then pushing the snap rivet into the housing.
4. Repeat Step 3 for the three-remaining snap rivet housings and snap rivets.
5. Connect the chassis fan's power connector.
6. If necessary, replace any accessory boards removed to allow clear access to the fan.
7. Replace the left side cover.
8. Replace the external cables and power cord.
9. Power on the server as described in *Chapter 1, Controls and Indicators*.
10. Verify the chassis fan is operating correctly.

System Board

Removing the System Board

1. If the server is operating, power down the server.

   Refer to *Chapter 1, Controls and Indicators* for instructions.

2. Disconnect the power cord and any external cables.

   If necessary, label each one to expedite re-assembly.

3. Remove the left side cover.
4. Lay the server on its side (components showing).
5. Remove any accessory boards mounted on the system board.
6. Disconnect all cables connected to the system board.

   If necessary, label each one to expedite re-assembly.

7. Remove DIMMs, heat sink-cooling fan and the processor, placing the components on an anti-static pad.
8. Remove all the screws securing the system board to the chassis.
9. Remove the old system board by carefully disengaging the rear connectors and then carefully lifting it out and away from the chassis.
10. Place the system board on an anti-static pad and record all jumper connections.
11. Place the system board in an anti-static container.

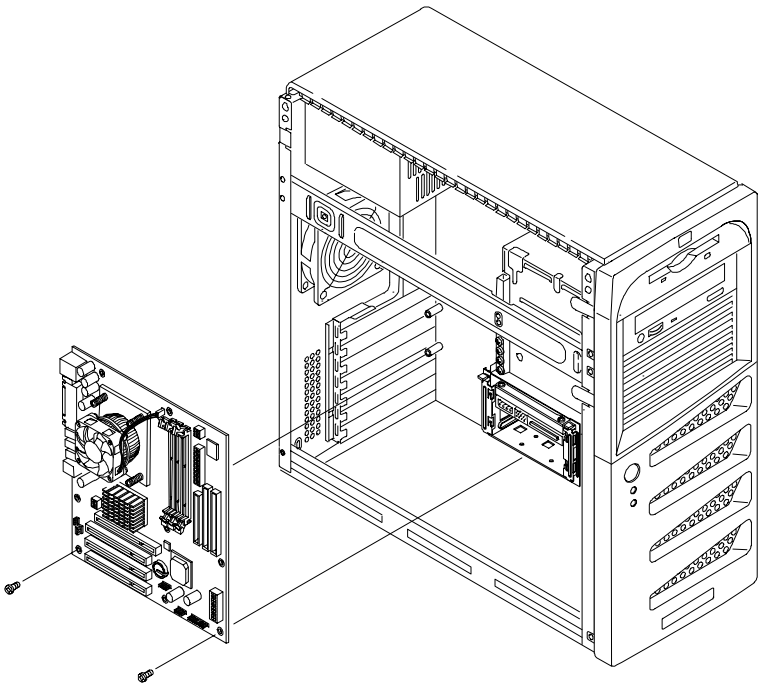


Figure 7-20. Removing and Replacing the System Board

Replacing the System Board

1. Remove the replacement system board and any cables from the anti-static shipping container.
2. Place the system board on an anti-static pad and set all jumper connections as recorded during the system board removal.
3. Insert the new system board, lining up the rear connectors carefully.
4. Install all the screws into the system board to secure it to the chassis.
5. Replace all cables that were disconnected during the previous removal.
6. Replace the DIMMs, processor and heat sink-cooling fan and accessory boards.
7. Replace the left side cover.
8. Return the server to the upright position.
9. Connect the power cord and any external cables to the server.
10. Power on the server as described in *Chapter 1, Controls and Indicators*.
11. Enter the (BIOS) Setup Utility and set the BIOS configuration.
12. Reboot the server and verify the server is operating correctly.

8 Parts Identification

Exploded View – Covers and Bezels

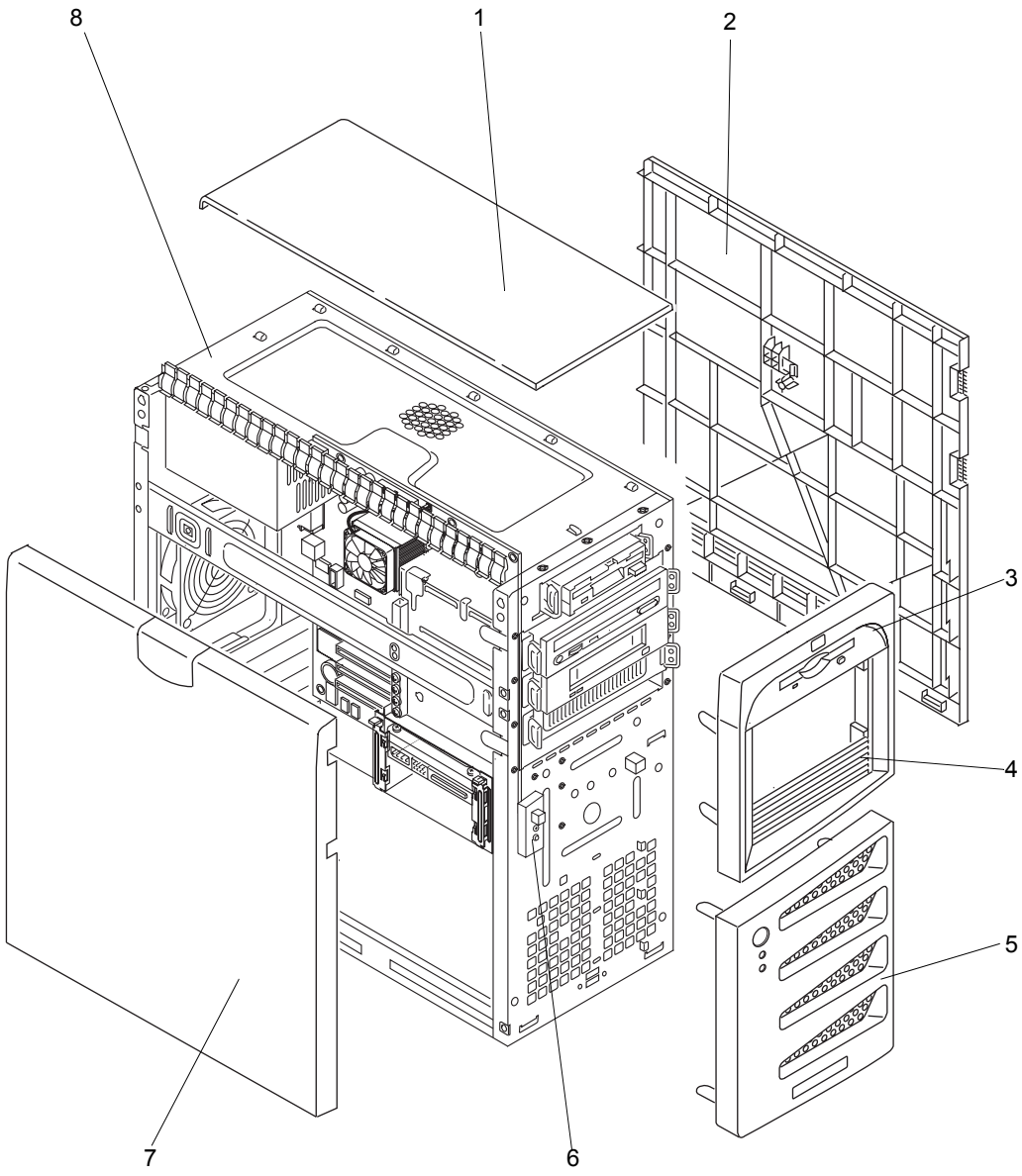


Figure 8-1. Covers and Bezels

Exploded View – Mass Storage Devices

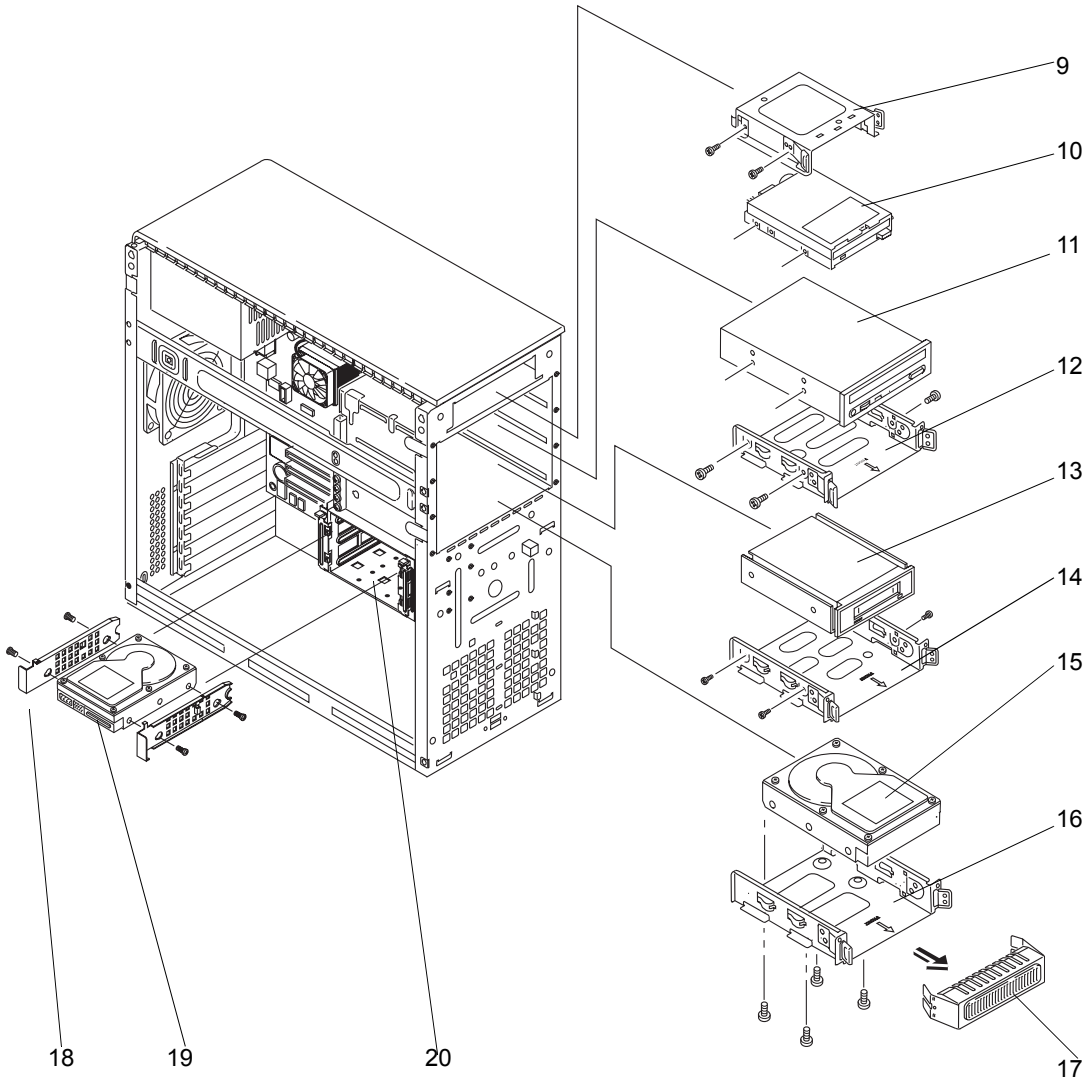


Figure 8-2. Mass Storage Devices

Exploded View – Chassis Fan, Power Supply, and System Board

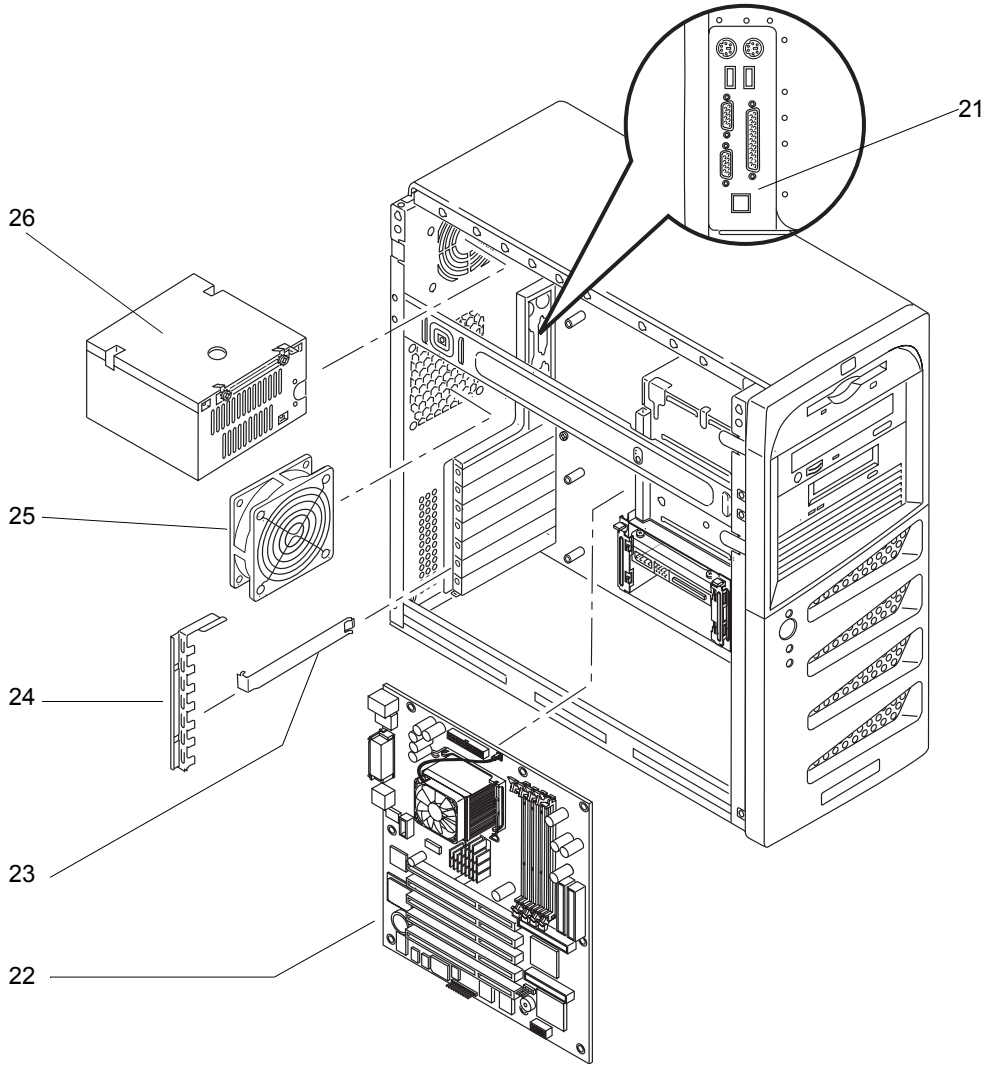


Figure 8-3. Chassis Fan, Power Supply, and System Board

Exploded View – System Board Components

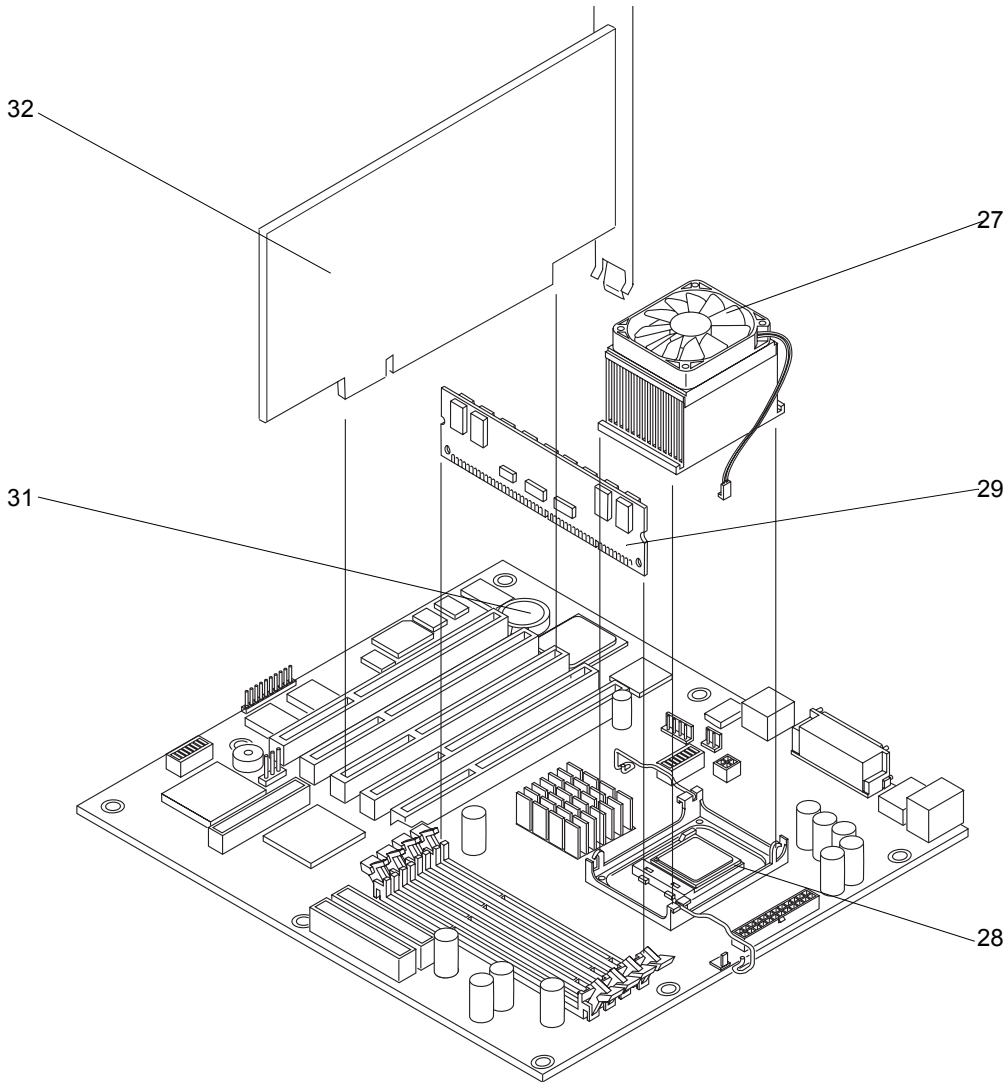


Figure 8-4. System Board Components

Replaceable Parts List

The items in this list and the corresponding item numbers in the respective Exploded Views apply to both models of the hp server, except where noted.

NOTE The part numbers listed below were available at the time of publication. Part numbers may change after publication. Order parts by the number listed below; HP's parts price list database will generally contain a reference to the revised part number. If a system board needs to be replaced, remove processor modules, DIMMs, or adapter boards and transfer these to the new board. Ensure all jumper and switch settings on the old board are transferred to the new board.

Item No.	Description	Spare Part Number
1	Top Cover	311181-001
2	Right Side Cover (not removable)	311181-001
3	Upper Front Bezel	311172-001
4	Filler Panel (5¼") with vents	311172-001
5	Lower Front Bezel with Power Button	311186-001
6	Control Cable Kit (with Power Switch)	311177-001
7	Left Side Cover	311171-001
8	Chassis	Not available
9	FDD (Flexible disk drive) tray	311173-001
10	Flexible disk drive 3 1/2 inch	233409-001
11a	CD-ROM Drive 48x IDE	288894-001
11b	DVD Drive 16x/40x	
12/14	CD-ROM Tray	311168-001
13	Tape Drive, SureStore, DAT24I (Optional)	
14/12	Backup Tape Drive Tray	311173-001
15a	Hard Disk Drive 40 GB, 7200 RPM (IDE model)	232008-001
15b	Hard Disk Drive 80 GB, 7200 RPM (IDE model)	287685-001
15c	Hard Disk Drive 36 GB, 10K RPM (SCSI model)	177987-001
16	5 1/4 inch Tray for 3rd HDD	311173-001
17	Spacer/shield (RFI)	Not available
18	Drive Rails	
19a	Hard Disk Drive 40 GB, 7200 RPM (IDE model)	232008-001
19b	Hard Disk Drive 80 GB, 7200 RPM (IDE model)	287685-001

19c	Hard Disk Drive 36 GB, 10K RPM (SCSI model)	177987-001
20	Drive Cage and Rails	311176-001
21	I/O Panel, Rear	Not available
22/30	System Board	311185-001
23	Slot Cover	311184-001
24	Slot Cover Latch	311184-001
25	Chassis Fan	311175-001
26	Power Supply, 250 W	311178-001
27	CPU heat sink/fan assembly	294988-001
28a	Northwood Pentium 4, 2.4 GHz processor	311183-001
28b	Celeron, 1.8 GHz processor	311182-001
29a	DIMM, 128 MB	301681-001
29b	DIMM, 256 MB	300699-001
29c	DIMM, 512 MB	300700-001
29d	DIMM, 1GB	300701-001
31	Battery	234556-001
32	SCSI Controller Board (SCSI Model only)	311734-001
*	Keylock assembly	311180-001
*	Chassis Intruder Switch	311179-001
*	Mouse	334684-005
**	HP Startup CD-ROM	
*	Hardware Kit (Screws, Slot Cover)	311184-001
*	Return Kit (Shipping box for return of hp server)	311732-001

* This part is not on an exploded view

**This Part Number is revised with each new release

Cables and Part Numbers

Description	Spare Part Number
Country Kit (Documentation, Power Cords)	311733-001
IDE Cable kit (Floppy, CD-ROM, HDD)	311174-001
Internal SCSI Cable w/five connectors and termination at end of cable	
SCSI LED Cable	

Keyboards

Language	Spare Part Number	Language	Spare Part Number
US	313352-001	Danish	313352-081
Arabic/French	313352-171	French Canadian	313352-121
Portuguese	313352-131	German	313352-041
Belgian/Flemish	313352-181	Spanish	313352-071
Italian	313352-061	Spanish Latin America	313352-161
Polish	313352-241	French	313352-051
Hungarian	313352-211	Norwegian	313352-091
Turkish	313352-141	Swiss	313352-111
Greek	313352-151	Swedish	313352-101
Taiwan	313352-AB1	UK	3133352-031
Japan	313352-291	Czech	313352-221
Thai	313352-281	Russian	313352-251
Chinese	313352-AA1	Slovak	313352-231
Korean	313352-AD1		

Power Cords

Country	Kit Number	Spare Part Number	Country	Kit Number	Spare Part Number
China	286496-001	252657-AA1	Japan	139867-004	292657-191
Argentina	401328-001	158878-201	Australia	100661-001	285811-001
Italy	109197-008	198292-061			

9 Specifications

This appendix provides the operating conditions (environmental requirements), hardware specifications, physical requirements, power requirements, and video resolutions of the hp server tc2120. The system board layout and its connectors are also provided. See *Figure 9-1*.

The specifications listed may vary if you install a mass storage device in your server that has more stringent environmental limits. Ensure the operating environment for your server is suitable for all of the mass storage devices being used.

Environmental

Temperature

Operating	5° to 35° C (41° to 95° F) at 10,000 ft
Non-operating	-40° to + 65° C (-40° to + 149 F°)

Humidity

Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing

Altitude

Operating	-30 to 3,045 m (~ 10,000 ft)
Non-operating	-30 to 12,180 m (~ 40,000 ft)

Thermal Output

Maximum Operating	1108 BTU/hr

Acoustic Emissions

Operating	LpA: <38 dBA

Weight and Dimensions

Weight	Basic configuration approx. 14.9 kg. (33 lbs) - excludes keyboard and monitor. Fully loaded approx. 22.5 kg. (50 lbs) - excludes keyboard and monitor.
Height	476mm (18.7 inches)
Width	205mm (8.08 inches)
Depth	467mm (18.3 inches)

Power Supply Specifications

Parameter	Characteristics
Input Type	Manual voltage selection
Input - Maximum Range	100 to 127 VAC @ 50/60 Hz 200 to 240 VAC @ 50/60 Hz
Operating Current	100 to 127 VAC @ 7.0 A 200 to 240 VAC @ 3.5 A
Inrush Current	90 A (cold) 120 A (warm)
Operating Power	250 W Continuous

Hardware Specifications

Specification	Characteristics
Processors	The hp server tc2120 supports the following processors: • Northwood Pentium 4 processors 2.4 GHz and above with 533 MHz FSB and 512KB L2 cache memory • Celeron processors 1.8GHz and above with 400MHz FSB and 128KB L2 cache memory
Chipset	ServerWorks Grand Champion SL chip set with 33 MHz PCI and 133 MHz FSB speed support
Memory	Supports up to four ECC DDR DIMMS for a maximum total of 4.0 GB. Supported DIMM type and sizes: 128MB, 256MB, 512MB, or 1GB buffered, 184-pin, 3.3 volts, 72 bits wide, ECC single-bit correcting, multi-bit detecting.
Video	Embedded ATI Rage XL (8MB SDRAM)
SCSI	SCSI model only; single channel Ultra-160 SCSI cable (3 internal connectors), Ultra 160 SCSI LED cable
IDE	Embedded Enhanced-IDE 33/66/100 dual-channel controller
PCI Bus	Five full-length 64-bit PCI slots at 33MHz. Four slots support 3.3 volt cards and 1 slot (blue connector) supports a +5 volt card.
LAN	Embedded 10/100/1000 Broadcom 5702 LOM connection

I/O	One Serial port; one bi-directional parallel port with ECP/EPP high-speed support; PS/2 style mouse and keyboard connectors; two USB ports - supports USB printers, external modems, and mouse and keyboard, but NOS dependant; one video port; one LAN port
CD-ROM	Bundled CD-ROM drive; IDE interface; 48x speed or faster. Supports 16x40x max IDE DVD-ROM drive
DVD-ROM	Supports 60x40x max IDE DVD-ROM drive

System Board Layout

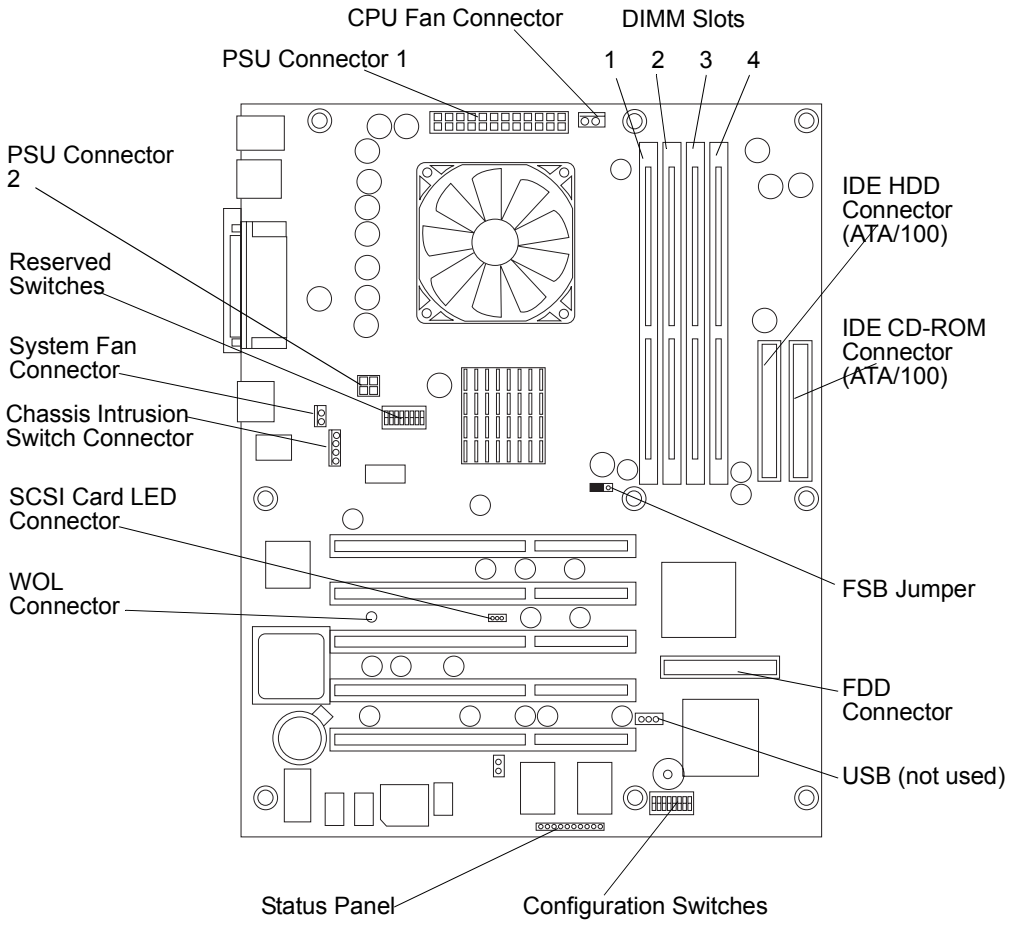


Figure 9-1. System Board Components/Connectors

Index