Installing Peripherals

HP 9000 Series 800

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Overview

This manual is intended for System Administrators. It supplies all the information you will need to set up your device to communicate with the HP-UX operating system. It *does not* provide information on built-in devices. Refer to the *Owner's Guide* for the specific computer model you own for configuration information on built-in devices.

Peripheral installation on your S800 system comprises two parts:

- Connecting the device to the computer, and
- Configuring your HP-UX operating system to communicate with the device.

An overview of the procedure to connect the device to your system is given for each device. Use this procedure with the hardware installation documentation provided with your device.

Manual Organization

This manual is organized in the following way:

- Chapter 1 "Overview"
- Chapter 2 "Guidelines for Installing Devices"
- Chapters 3—7 Device specific chapters
- Chapter 8 "Setting Up Devices Using HP-UX Commands"
- Appendix A "Device Files and Minor Numbers"
- Index

How To Use This Manual

When you are adding a new peripheral to your system, use this book to help you in the following way:

■ If have not added a peripheral to your system before, refer to Chapter 2, "Guidelines for Installing Devices", for a high-level summary of the steps you will follow for most peripheral installations. Chapter 2 introduces you to **autoconfiguration**, a system capability that automates the task of configuring your system for a new peripheral. It also provides generic installation guidelines which apply to each type of device interface, such as the HP-IB interface, and gives important cabling information.

Interface information and the associated software components intended to support system communication with devices, are dependent upon which model of HP 9000 Series 800 computer you are administering. Chapter 2 provides a quick reference table of Series 800 models and their architecture types. For indepth information about architecture types, see Chapter 8, "Setting Up Devices Using HP-UX Commands". Finally, the System Administration Manager (SAM), a menu driven program that can help you install devices, is introduced in Chapter 2.

■ If you are already familiar with the material in Chapter 2, turn directly to the chapter devoted to the type of peripheral you are adding to your system. For example, if you are adding a LaserJet IIIsi printer, turn to Chapter 6, "Installing Printers" and find the section for the LaserJetIIIsi printer. These device specific chapters provide installation instructions and configuration information for the type of peripheral device you are installing.

■ If you want further information about system architecture types, device (special) files and commands supported by autoconfiguration, Chapter 8, "Setting Up Devices Using HP-UX Commands" is designed to provide this information. For the few devices not supported by either autoconfiguration or SAM, this chapter will give you all the information you need to set up a device using HP-UX commands.

■ Consult Appendix A for major and minor number information about specific devices.

Other References

The following documents will help you when installing and managing peripheral devices.

- The installation and user manuals that came with the device or interface card.
- *System Administration Tasks* manual, HP part number B3108-90005
- *HP-UX Reference Manual*, HP part number B2355-90033
- *How HP-UX Works: Concepts for the System Administrator*, HP part number B2355-90029

Note	The support status of peripheral devices listed in this document might have changed since this book was printed. For up-to-date support status on peripheral devices, contact your customer support engineer or HP sales and service representative.

2

Guidelines for Installing Devices

This chapter provides a generic procedure for peripheral installation and configuration and it describes the tools designed to help you perform these tasks. It presumes a knowledge of system architecture, device drivers and device files. For an understanding of these subjects, refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for information on these software and hardware components of peripheral communication.

The tools available to help you with peripheral installation are autoconfiguration, HP-UX commands and the System Administration Manager (SAM). This chapter also provides a quick reference table for HP 9000 Series 800 architecture types and basic guidelines for adding a peripheral.

Which Tool Should You Use

For a peripheral device to work with your system, the following things must be true:

- The device must be connected to your computer (and turned on).

- The appropriate device drivers must be part of your HP-UX kernel (operating system).

- The device drivers must be connected (bound).

- At least one device file (also known as a device "special" file) must exist for the device.

For most devices, the autoconfiguration mechanism discussed below will take care of binding the necessary device drivers (given that they are present in your HP-UX kernel) and creating the necessary device files "automatically" when you reboot your system after completing the hardware installation. You only need to determine that the drivers are part of your HP-UX kernel.

SAM, a menu-driven system administration manager, automates even further the process of adding devices. If you provide SAM with some basic information about the device you plan to install, SAM will check your currently running kernel configuration file for the necessary drivers, report back to you whether or not the drivers are in place, and add them and reconfigure the kernel if necessary. SAM will then use the autoconfiguration mechanism to create the necessary device files. For some devices, SAM will also automate other necessary steps. For example, when adding a terminal to your system, SAM will make an entry for the terminal just added in the `inittab` file. This step will have to be done manually if you do not use SAM.

You must use HP-UX commands to add new peripherals to the system in the following cases:

- The device is not supported by autoconfiguration, and
- SAM is not on your system or does not support adding the device.

What is Autoconfiguration?

Many, but not all, Hewlett-Packard disk drives, tape drives, printers, plotters and terminals are automatically configurable. This means that, if the device driver required by the peripheral is in your currently running kernel configuration file, and you follow the guidelines given in this book for installing the device, device (special) files are automatically created for the device when the system is rebooted. These device files are placed in the **/dev** directory.

If the device or I/O card you are adding requires one of the following drivers, device files will be automatically created during the reboot process. Note that each section on specific devices in this manual lists the necessary necessary device files for that device.

autox0	disc4	hpfl1	lpr0	mux0	scc1	tape2
disc1	hpib0	lan0	lpr1	mux0_16	scsi1	
disc2	hpib1	lan1	lpr2	mux2	scsi2	
disc3	hpfl0	lan3	lpr3	mux4	tape1	

Device files *are not* automatically created during the reboot process for devices requiring the following device drivers.

gpio0(1)	lanmux0	psi0	rti0
instr0	lantty0	pdn0	rti1

Devices requiring these drivers can be installed using the System Administration Manager (SAM), described later in this chapter, or the HP-UX commands method, described in Chapter 8, "Setting Up Devices Using HP-UX Commands".

Summary of Configuration Procedures

This section outlines a summary procedure for installing a device supported by autoconfiguration and a parallel procedure for installing a device that is not autoconfigurable. Specific information about each step is provided in the device specific chapters.

Note   These are *generic* procedures. The actual procedures for adding specific devices might vary slightly from these procedures. These specific procedures are in chapters three through seven. Find the section for the device you want to add and follow the procedures given there.

Table 2-1. Summary Peripheral Install Procedures

STEP 1: Determine what device driver(s) are required for this device and/or card.

STEP 2: Are these driver(s) supported by autoconfiguration?

IF YES	IF NO
STEP 3: Verify that the driver you need is included in the **uxgen** input file, usually the **S800** file. ■ Add it if it's not. ■ Edit out comment marks if necessary. If you have to make changes to the **S800** file, reconfigure the kernel by running **uxgen**. **STEP 4**: Shut-down, power off and unplug your computer. **STEP 5**: Install I/O card (if necessary). **STEP 6**: Connect the device to the I/O card. Set bus address, parity, and so on, if necessary. **STEP 7**: Plug in and power on the device. **STEP 8**: Plug in and power on the computer. The necessary device files are created and the Logical Unit number is assigned. **STEP 9**: Verify configuration using **ioscan**.	**STEP 3**: Verify that the driver you need is included in your **S800** file. ■ Add it if it is not. ■ Edit out comment marks if necessary. **STEP 4**: Add an I/O statement to the S800 file for the device you are installing. You will need to know which slot number you will connect the device to in order to determine the hardware path. **STEP 5**: Reconfigure the kernel by running **uxgen**. **STEP 6**: Shut down, power off and unplug your computer. **STEP 7**: Install I/O card (if necessary). **STEP 8**: Connect the device to the I/O card. Set bus address, parity, and so on, if necessary. **STEP 9**: Plug in and power on the device. **STEP 10**: Plug in and power on the computer. The necessary device files are created and the next available Logical Unit number is assigned. If you made an error entering the I/O statement the system will return an error message. You will have to go back to step 4 of this procedure. **STEP 11**: Verify configuration using **ioscan**.

2-4   Guidelines for Installing Devices

The System Administration Manager (SAM)

SAM is an acronym for System Administration Manager. It is a tool that allows you to perform many system administration tasks without having to know the specific HP-UX commands that are associated with the task.

You can use SAM to add peripherals. Read this section to learn how to use the SAM interface.

Starting SAM

To start SAM, type:

```
/usr/bin/sam
```

In a few moments, SAM's main window will appear. The appearance of this window depends on whether you are running SAM from an X Window System display server or from a text terminal.

Note	Navigation in the two interfaces is different. The X Window System interface makes use of the mouse pointing device, while the text-terminal interface uses special keys. Both types of interaction are described in this section.

Inside the window is a box containing a list of **functional areas**. The first of these is **highlighted**.

Using Control Buttons

In the window you will see **control buttons** with these labels:

```
Open
Exit
Options ...
Help
```

Activate these buttons to make SAM carry out different actions.

To activate a control button in the X Window System interface, use the mouse to place the cursor over it and press the left mouse button once.

To activate a control button in the text terminal interface, do one of the following:

- **Highlight** the button by pressing the (Tab) key one or more times. When a button is highlighted, that indicates that is ready for activation.

  Activate the highlighted control button by pressing (Spacebar) or (Return) on the keyboard.

- **Activate** a control button immediately by pressing a *mnemonic* key. For example, notice that the letter H on the (Help) control button is underlined. (On some terminals, it may be highlighted or displayed in an alternate color. Press the (H) key on the keyboard, and the (Help) control button will be highlighted and activated immediately.

Use the (Tab) key to return to "cycle through" all of the control buttons. To cycle through the control buttons in reverse order, hold down the (Shift) key while you press (Tab). Eventually you will return to the list of functional areas.

Using Softkeys in the Text-Terminal Interface

Note	This section does *not* apply to the X Window System interface. It applies *only* to the text-terminal interface.

Hewlett-Packard terminals (and some others) display eight **softkey labels** below the window area. The keyboard keys to which these labels correspond are in a row across the top of the terminal's keyboard, and they are usually labeled (f1) through (f8).

The labels may change when a new window appears. Table 2-2 lists the labels which you will see most often.

Note	VT-100 (and other ANSI-standard) terminals will not display these function-key labels. However, the keys (PF1) through (PF4) will provide the functions listed in Table 2-2.

Table 2-2 lists the keys or key combinations that give the equivalent result for these terminals.

Table 2-2. Function Keys for SAM's Text-Terminal Interface

Label	Meaning	Keys[1] HP or Wyse	Keys[1] VT-100 or ANSI
Help on Context	Get help in understanding an element displayed on the screen	(f1)	(Help) or (PF 2)
Alt	Type alternate character	(f2)	(PF 1)
Select	Highlight an item or open a menu	(f3) or (Spacebar)	(Spacebar)
Menubar on/off	Move cursor to menubar	(f4)	(PF 1), (Spacebar) or (PF 1), (=)
Open	Open the highlighted functional area or subarea	(f5)	(Return)
Previous Level	Return to the previous level of SAM	(f6)	(none)
Shell	"Escape" (temporarily) to a shell	(f7)	(none)
Exit	Exit the current window	(f8)	(none)
Exit SAM	Exit SAM entirely	(f8)	(none)

1 Keys are specified by the symbols which appear on their keycaps. The presence of a comma (",") between two keycaps means that the keys should be pressed in sequence.

Getting Help in SAM

SAM provides several different kinds of assistance. Table 2-3 describes the different kinds of help you can get from within SAM and how to request each kind of help.

Table 2-3. Help in SAM

Type of Help	What the Help covers	How to get it
Context Help	Information about elements within any window	Move the cursor to the element you want to know more about, then press the **Help on Context** softkey.
Functional Help	■ the current functional area ■ keyboard navigation within SAM ■ using the SAM help system ■ displaying the version of SAM you are currently running	Choose an item from the "Help" menu on the menubar. (For instructions on using the menubar, see "Using the Menubar".)
Box help	Information about the attributes and tasks presented in the message box or dialog box currently being displayed	Activate the (Help) button in the message/dialog box.

Exiting SAM

To exit SAM:

■ Activate any control button labeled (Exit SAM), or

■ On a text terminal, press the softkey labeled **Exit SAM**.

The main window (and any other windows that may be open) will close, and the shell prompt will return.

Entering a Functional Area

To use SAM you must first enter a **functional area**. A list of functional areas appears in the large box in the main window. Notice that one of the items is highlighted. This highlighted item is ready to be acted upon by SAM. If you want to enter a functional area other than the one that is highlighted, use the ▲ and ▼ arrow keys to highlight another area.

To enter the functional area:

■ If you are using the X Window System interface, move the mouse cursor over the (Open) control button to the right of the list and press the left mouse button once.

■ On a text terminal, press (Return).

SAM replaces the main window with one of the following:

■ A **subarea window** containing a list of particular work areas which apply the functional area. Highlight and activate one of these to enter the functional area.

   The presence of "->" at the end of the functional area name indicates that you will choose a functional area from a list in a subarea window.

■ A **functional area window**.

   Functional area list items that do *not* end in "->" lead directly to a functional area window.

The Object List

When the functional area window appears, it will contain a list within a large box. This is the **object list** of computer system elements (**objects**) you can control by using SAM. Different kinds of things can appear in an object list: files, peripheral devices, user accounts, and so forth.

If the box is empty, it means that there are no objects defined for that functional area. As you add objects to (or delete them from) the system, they will appear on (or disappear from) the object list of the appropriate functional areas.

To modify an object, first select it:

- In the X Window System interface, move the mouse cursor over the line that describes the object and press the left mouse button once to highlight it.

- On a text terminal, move the cursor to the line, using the (▲) and (▼) keys, and press (Spacebar) to highlight it.

Then choose an operation from the menubar "Actions" list, described in the next section.

Using the Menubar

In each functional area window there is a **menubar** near the top of the screen. It contains the titles "List", "View", "Options", "Actions," and (at the far right of the screen) "Help."

To move the cursor to the menubar:

- If you are using the X Window System interface, place the mouse cursor over the title in the menu item.

- On a text terminal:

  □ Press (f4) (the **Menubar On/Off** softkey) on HP or Wyse terminals

  □ Press (PF 1), then (Spacebar) on VT100 or ANSI terminals.

Menus

The menubar always contains the same five menus. Table 2-4 lists the kinds of items you can expect to see within each menu.

Table 2-4. Menus and Menu Items

Menu	Types of Menu Items
List	■ Alternate views of the functional area (chosen by means of **radio buttons**). See "Radio Buttons". ■ `Exit`
View	Menu items for changing the content and appearance of the object list: ■ Arranging columns ■ Filtering to display only certain objects ■ Sorting objects to change the order of the list ■ Saving a particular "view" for future use
Options	Special actions (like refreshing the display) that apply to the entire window.
Actions	Menu items for adding, modifying, or deleting objects.
Help	Assistance for using SAM.

Opening a Menu

To see the menu items within a particular menu:

■ If you are using the X Window System interface, place the mouse cursor over the menu. Press down and hold the left mouse button.

■ On a text terminal, make sure that the cursor is on the menubar, then do one of the following:

    □ Use the ⓐ and ⓑ keys to highlight the menu you wish to see, then press ⌊Spacebar⌋, or

    □ Type the mnemonic (the underlined character) for the menu.

Choosing a Menu Item

To **choose** a menu item:

■ If you are using the X Window System interface, drag the mouse cursor through the menu until it highlights the desired item. Then release the mouse button.

■ On a text terminal, do either of the following:

  □ **Highlight** the menu item of your choice by using the (▲) and (▼) keys. The highlight moves in response. When a menu item is highlighted, that indicates that is ready for choosing. Notice that if you press either of the arrow keys many times, the highlight "cycles through" the menu over and over again.

  Choose the highlighted menu item by pressing the (Spacebar) on the keyboard.

  □ If the menu item contains an underlined character, you can **choose** it immediately by pressing a *mnemonic* key. For example, the last item in every "List" menu is **Exit**. The "E" on the **Exit** menu item is underlined. (On some terminals, it may be highlighted or displayed in an alternate color.) Press the (E) key on the keyboard, and the **Exit** menu item will be highlighted and activated immediately.

Using Buttons and Checkboxes

There are several features in SAM that have a special appearance and which exhibit special behavior.

Menu Buttons

Some screen buttons present a range of settings from which you must choose. These **menu buttons** differ in appearance from ordinary buttons by the presence of "->" after the button label. Menu buttons look like this in the text-terminal interface:

[*label* ->]

To "open" a menu button:

- In the X Window System interface, move the mouse cursor over it and hold down the left mouse button.

- On a text terminal, highlight the button and press (Spacebar).

When "opened", a menu button expands into a small menu. To select one of the menu items:

- In the X Window System interface, drag the cursor to highlight the item you wish, them release the mouse button.

- On a text terminal, press the (▲) and (▼) keys to move the highlight to your choice, then press (Spacebar).

The choice will be displayed on the menu button.

Radio Buttons

Within the "List" menu, you may find two or more views of a functional area. Access to these alternate views is controlled by a **radio button** which may be turned "on" or "off". Radio buttons differ in appearance from ordinary buttons by the presence of a diamond shape to the left of the button label. On a text terminal, a radio button looks like this when it is turned "on":

    `<*>` *view_name*

On a text terminal, a radio button looks like this when it is turned "off":

    `< >` *view_name*

In the X Window System interface, the diamond shape appears "down" when the button is on and "up" when the button is off.

To turn a radio button on or off:

- In the X Window System interface, place the mouse cursor over the diamond shape and press the left mouse button.

- On a text terminal, highlight the radio button with the ▲ or ▼ arrow keys and press (Spacebar). The screen will change to another functional area.

Radio buttons are *mutually exclusive*: within a "List" menu, only one button at a time may be turned on.

Checkboxes

A **checkbox** is an object which can be turned "on" or "off." Checkboxes differ in appearance from ordinary buttons by the presence of a square shape to the left of the button label. On a text terminal, a checkbox looks like this when it is turned "on":

[x] *label*

On a text terminal, a checkbox looks like this when it is turned "off":

[ ] *label*

In the X Window System interface, the square shape appears "down" when the button is on and "up" when the button is off.

To turn a checkbox "on" or "off":

- In the X Window System interface, place the mouse cursor over the square shape and press the left mouse button.

- On a text terminal, use the (Tab) to move the highlight over the checkbox, then press (Spacebar). If it was "on," the x in the checkbox disappears. If it was "off," an x appears in the checkbox.

Checkboxes are *not* mutually exclusive. You may turn "on" or "off" as many as you need.

Navigating with Keys and Key Combinations
in the Text-Terminal Interface

Note	This section does *not* apply to the X Window System interface. It applies *only* to the text-terminal interface.

You must use particular keys and combinations of keys to navigate and perform particular tasks in SAM. Table 2-5 lists the special meanings of the keys you must use to navigate within the windows in SAM's text-terminal interface.

Table 2-5. Meanings of Selected Keys

Action	Keys[1]	
	HP or Wyse	**VT-100 or ANSI**
Move the cursor one space to the right	▶	▶
Move the cursor one space to the left	◀	◀
Move the cursor up one line	▲	▲
Move the cursor down one line	▼	▼
Move the cursor to the next field	Tab	Tab
Move the cursor to the menubar	f4	PF 3

1 Keys are specified by the symbols which appear on their keycaps. The presence of a comma (",") between two keycaps means that the keys should be pressed in sequence. The presence of a hyphen ("-") between two keycaps indicates that the keys should be pressed simultaneously.

Table 2-5. Meanings of Selected Keys (continued)

Action	Keys[1]	
	HP or Wyse	**VT-100 or ANSI**
Scroll a list up one page	(Shift)-(▲)	(none)
Scroll a list down one page	(Shift)-(▼)	(none)
Scroll a list up one line	(f2), (▲)	(PF1), (▲)
Scroll a list down one line	(f2), (▼)	(PF1), (▼)
Scroll a list left one page	(Prev)	(none)
Scroll a list right one page	(Next)	(none)
Scroll a list left one character	(f2), (◀)	(none)
Scroll a list right one character	(f2), (▶)	(none)
Highlight one item	(f3) or (Spacebar)	(Spacebar)
Highlight all items in a list	(f2), (/)	(PF 1), (/)
Highlight a range of items	1. (f2), (f3) on first item 2. Move cursor 3. (f2), (f3) on last item	1. (PF 1), (.) on first item 2. Move cursor 3. (PF 1), (.) on last item or 1. (Find) on first item 2. Move cursor 3. (Find) on last item
Dehighlight one item	(f3) or (Spacebar)	(Spacebar)
Dehighlight all items in a list	(f2), (\)	(PF 1), (\)
Open a menu on the menubar by using a **mnemonic** (first letter of menu)	(f2), *mnemonic* key	(PF 1), *mnemonic* key
Close a menu	(f4) or (Spacebar)	(PF 3) or (Spacebar)

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HP 9000 Series 800 Architecture Types

When you are adding peripherals on an HP9000 Series 800 computer, you need to know which architecture type your computer is, either CIO or HP-PB.

Table 2-6. HP 9000 Series 800 Architecture Types

Architecture Type	Model Numbers
HP-PB	807, 808, 815, 817, 822, 827, 832, 837, 842, 847, 852, 857, 867S, 877S, 887S, 890S, 897S
CIO	825, 834, 835, 840, 845, 850, 855, 860, 865, 870S/xxx

For more detailed information on the differences between CIO and HP-PB computers, see Chapter 8, "Setting Up Devices Using HP-UX Commands".

Device Interfaces

Devices are connected to your system using a variety of interface types. Some devices require an HP-IB interface, some SCSI, some RS232 and some HP-FL. The sections that follow outline information you need to work with these devices.

HP-IB Guidelines

Devices using an HP-IB interface can be connected directly to an interface adapter on the back of your computer, or they can be connected to other HP-IB devices in a daisy-chained arrangement.

If the HP-IB interface on your computer already has one or more devices connected to it, you can connect the cable from your new peripheral device to the last device on the chain as in Figure 2-1. A close-up of the piggy-backed HP-IB connectors on the last device on the chain is provided in Figure 2-2.
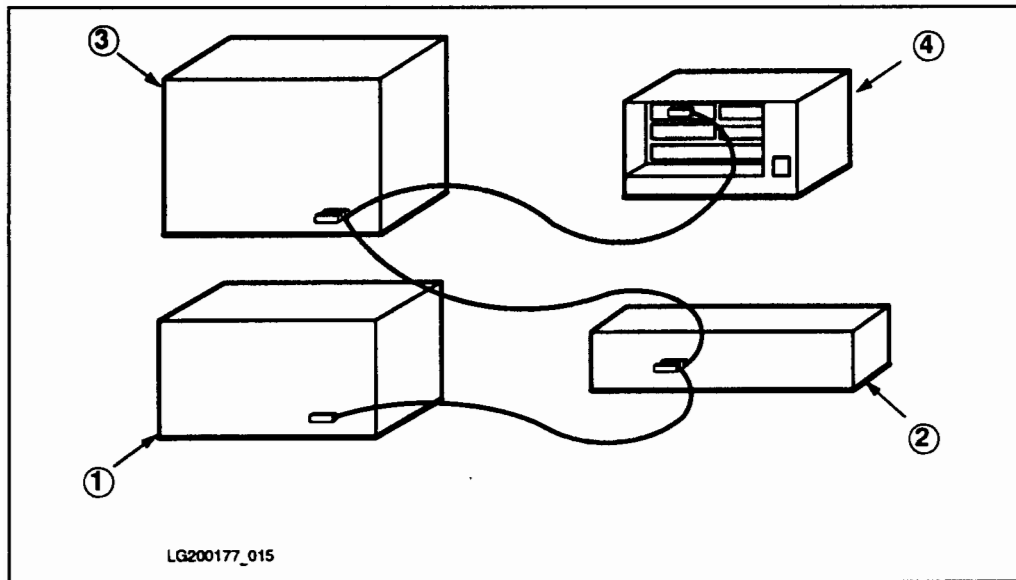
Figure 2-1. Daisy-Chained HP-IB Devices

①   Computer system.

②   First peripheral device.

③   Second peripheral device.

④   Last peripheral device in chain.
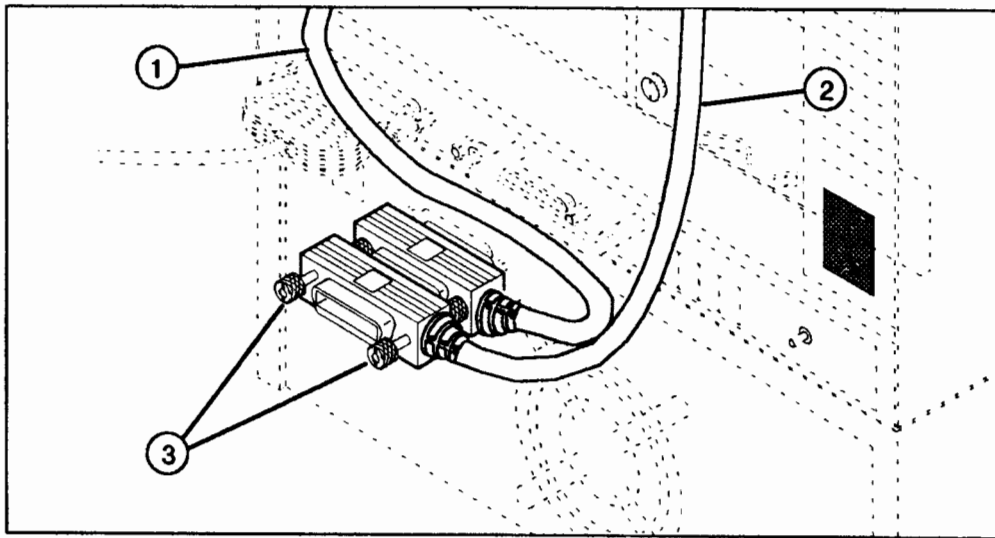
LG200177_006

Figure 2-2. Piggy-Backed HP-IB Connectors

①   Cable to the interface or previous device.

②   Cable to the new peripheral device.

③   Thumb screws to be tightened.

If the device you are connecting requires an HP-IB interface, follow these guidelines:

- DO NOT connect or disconnect an HP-IB device while the system is running, or turn power on or off to an HP-IB device while connected to a powered-up system. This could result in bad data on the HP-IB bus.

- If you need to change the bus address switch settings on an HP-IB device, you must perform the task in the following sequence:

  1. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.
  2. TURN OFF the computer and unplug the power cord.
  3. Turn off the device.
  4. Change the switch settings on the device.
  5. Turn on the device.
  6. Turn on your system.

- The system printer *must not* be on the same interface as the system root device. This is not a supported configuration. Place the system printer on a low-speed, HP-IB interface, separate from the system root device. A bus address of 1 is typical.

- The system printer should be on a low-speed HP-IB interface, separate from the system root device. A bus address of 1 is typical.

- An HP 7971 9-track tape must be placed on a low speed HP-IB interface. A bus address of 3 is typical.

- An HP 7974 or 7978 9-track tape drive should be placed on a high-speed HP-IB interface, if possible. A bus address of 3 is typical.

- Avoid putting flexible disk drives, cartridge tape drives, or 9-track tape drives on the same interface as the root device.

- Plotters and the HP 9111 graphics tablet should be placed on separate low-speed HP-IB interfaces when possible. Typical bus addresses are 5 and 6 for plotters and graphics tablets, respectively.

- When only standard speed devices are used, the total HP-IB cabling on a standard speed interface is limited to two meters per device or 20 meters total, whichever is less.

- When only high speed devices are used, the total HP-IB cabling on a high speed interface is limited to one meter per device or 10 meters total, whichever is less.

- The recommended configuration for HP-IB cabling is a single run of multi-drop (daisy-chained) segments, and not a star configuration.

- The HP 37204A or HP 37201A HP-IB extenders can be used to exceed the total cable limit on standard speed HP-IB connections.

HP-IB Cables

If you need to replace you HP-IB cable for any reason, consult the following list of available HP-IB cables and their lengths:

- HP 10833A 1.0 meter HP-IB cable
- HP 10833B 2.0 meter HP-IB cable
- HP 10833C 4.0 meter HP-IB cable
- HP 10833D 0.5 meter HP-IB cable

SCSI Device Guidelines

A device using the Small Computer System Interface (SCSI) bus can
be connected directly to your computer or to another SCSI device in a
daisy-chained arrangement.
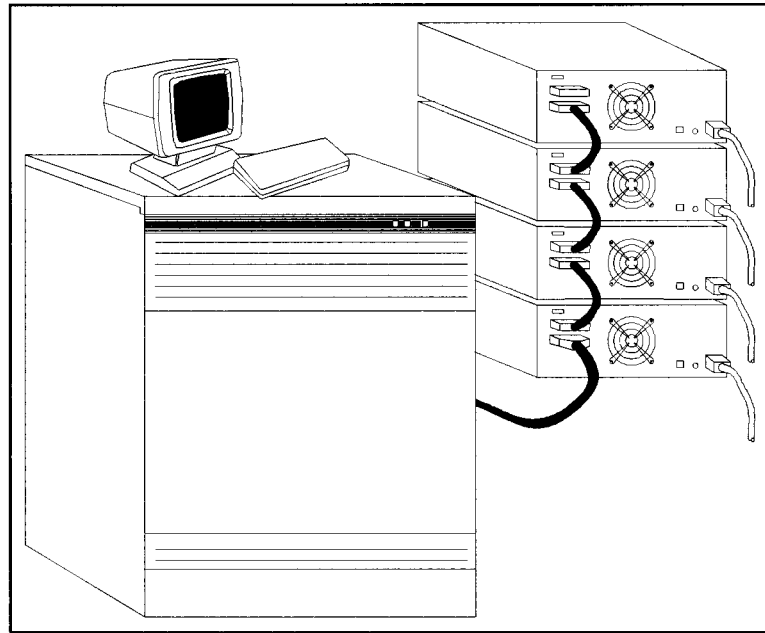
Figure 2-3. SCSI Bus Example

If the SCSI interface on your computer already has a device connected to it,
you can connect the cable from your new peripheral device to the last device
on the chain as in Figure 2-4.
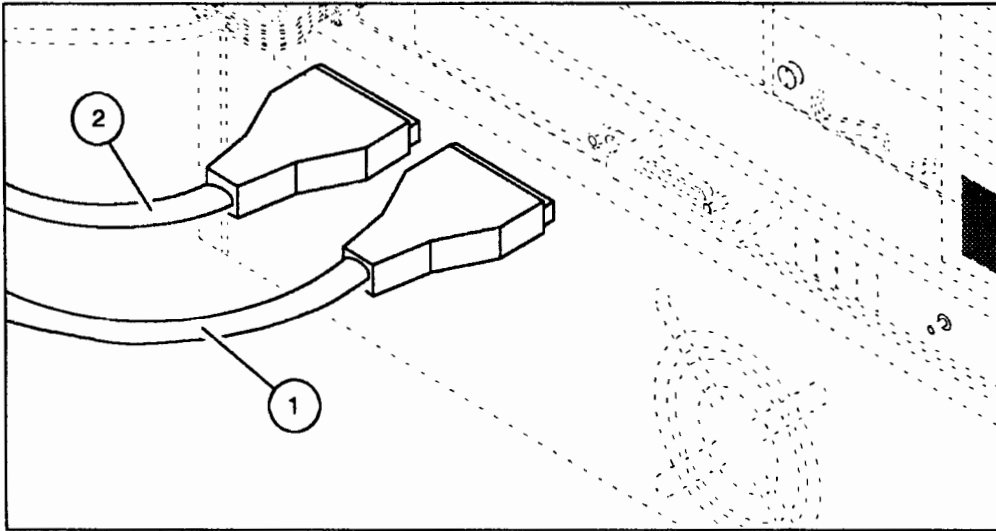
Figure 2-4. SCSI Connectors

①   Cable to the interface or previous device.

②   Cable to the new peripheral device.

Follow the guidelines listed here when you are connecting a device to a SCSI interface:

■ The last SCSI device in the chain, even if it is the only one, *must have* a terminator installed to its second connector. This terminator provides matching impedance on the bus circuits. Without the terminator, the bus will not work.

■ Make sure there are no unterminated cables (that is, make sure all cables are attached to a device at both ends).

Caution   Only the two ends of a SCSI bus should be terminated. Excessive or improper termination might overload the SCSI port's termination power ("TERMPWR") circuitry. This could result in blowing the TERMPWR fuse on the adapter, or damaging transceivers on any attached device (including the adapter).

Refer to device manuals to ensure they operate properly on the SCSI bus.

■ Use of non-Hewlett-Packard peripherals is at user's risk, and it is not supported by Hewlett-Packard's standard support process.

■ Because SCSI cable impedance and construction can have a significant effect on signal quality, only HP cables are recommended.

■ *Do not* connect or disconnect any SCSI device while the system is running, or turn power on or off to any SCSI device while it is connected to a powered-up system. Doing so could result in data corruption or a system panic, which in turn could lead to corruption of the file system.

■ Keep all devices powered on during and after system boot-up.

■ *Do not* add or remove SCSI devices while the system is powered on.

2

- If you need to change the bus ID on a SCSI device, perform the task in the following sequence:

  1. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery backup.
  2. TURN OFF the computer and unplug the power cord.
  3. Turn off the device.
  4. Change the bus ID on the device.
  5. Turn on the device.

     Power on all SCSI peripherals and make sure they have time to complete their selftest before powering on the SPU (System Processor Unit).
  6. Turn on your system.

- All devices on a SCSI bus must have the same parity-checking capability. If any device on the SCSI bus does not generate parity, then all devices on the bus, including the adapter, must not check parity. (Although parity-checking is selectable, the adapter always generates parity.)

Note   If there is a SCSI device that cannot match the parity-checking capability of other devices, then an additional SCSI bus will be required.

- Up to eight devices (including the SCSI device adapter) can be connected to a SCSI bus. Assign each device a unique bus address, from 0 to 6. DO NOT use address 7: it is reserved for the SCSI device adapter. The bus address determines the device's priority on the bus. Seven is the highest priority and zero is the lowest priority.

■ Do not exceed the maximum number of devices supported. Although a SCSI bus can support up to eight devices (which includes the device adapter), the number of devices might be limited by your particular system.

■ Ensure that the total cable length (including external and internal cables) does not exceed six meters. The length of the SCSI bus should be kept as short as possible. However, do not use cables less than 0.5 meters in length. Refer to the documentation that came with your device for internal cable lengths.

Calculating SCSI Cable Length Example

Table 2-7 demonstrates how to calculate SCSI bus cable lengths for a typical installation. The SCSI 0.5 meter cable (HP 92222A) used in the example is available through your HP Sales and Support Office. Other lengths are also available.

Table 2-7. Example of SCSI Cable Length Calculation

Starting Point Device	Cable to Next Device		Internal Cable	Cumulative Cable Length
SCSI host adapter	5062-3383	1.0m	0.1m	1.1m
HP device #1	HP 92222A	0.5m	0.2m	1.8m
HP device #2	HP 92222A	0.5m	0.4m	2.7m
HP device #3	HP 92222A	0.5m	0.3m	3.5m
HP device #4	none		0.4m	3.9m
Total		2.5m	1.4m	3.9m

■ Check whether your device contains internal SCSI bus terminators, or requires special terminators. Any device that supplies termination power should be enabled to do so. If at least two devices supply termination power, locate them at each end of the SCSI bus. Refer to your device manuals for instructions on how to prevent excessive or improper SCSI bus termination.

■ All devices must be connected to a common (single point) system reference ground. The system ground must be isolated from other electrical devices such as copying machines, arc welders and air conditioners. Cables supplied by HP have correct grounding.

Datacommunications and Terminal Controller (DTC)

A Datacommunications and Terminal Controller (DTC) is a modular and flexible LAN-based controller which provides asynchronous connectivity support for local and remote terminals and printers. Devices connected to DTCs and the DTCs themselves are configured by one of two DTC manager products. Refer to the documentation that came with these products for information on configuring DTCs and the devices connected to them.

There are two kinds of DTCs:

- HP 2345A is a DTC 48 with six slots and up to eight ports per slot. Refer to the *HP 2345A Datacommunications and Terminal Controller Installation and Service Manual*, part number 02345-90021 for installation instructions.

- HP 2340A is a DTC 16 with two available slots and up to eight ports per slot. Refer to the *HP 2340A Datacommunications and Terminal Controller Installation and Service Manual*, part number 02340-90001 for installation instructions.

Configuration and management of DTCs is done with a separate product. The HP J2120A HP OpenView DTC Manager/UX runs on an HP 9000 Series 800 host and manages DTCs for local systems. The HP D2355A HP OpenView DTC Manager runs on a dedicated PC and manages DTCs for access to multiple HP 9000 systems.

RS-232-C Cabling Guidelines

Terminology and Background

The type of connect that a device (SPU or peripheral) provides is usually one of, or a variant of:

DCE   Data Communications Equipment

DTE   Data Terminal Equipment

DQE   Nominally wired DCE, but with DTE hidden on pins unused by EIA.

Historically, DCEs were modems, and DTEs were whatever "terminated" the data path, typically an actual terminal at one end, and the computer at the other. A pair of DCEs were always assumed to be in the link, and they used something other than RS-232 to communicate with each other. The generalized circuit was:

```
Computer[DTE]---{ DCE~~phone lines~~DCE }---[DTE] terminal
```

The connectors and pin-outs at the DCE ("-{" above) are specified. The cable termination at the DTE itself is not, and in the early days, the cable was hard-wired right into the device (typically an ASR-33 TTY).

When the EIA created RS-232, it failed to adequately describe the case of direct computer-peripheral connection. This is the now-common configuration of DTEs connecting directly to other DTEs, with no DCEs in sight. This might be what you are trying to do. Today's devices, and their serial connectors, often do not clearly fall under DTE or DCE, and they provide an assortment of connector genders, styles and pin counts.

Although nominally a 25-pin connection, HP systems typically provide a maximum of nine pins, sometimes seven, and all that is really required for a device-device direct connection is three pins.

Despite this potential confusion, the terms DTE and DCE still have their uses. For our purposes, when normalized to 25 pins:

DCE:
  Transmits on pin 3
  Receives on pin 2
  Monitors pins 4 (RTS), 20 (DTR), if present
  Asserts pins 5 (CTS), 6 (DSR), 8 (CD), 22 (RI), if present

DTE:
  Transmits on pin 2
  Receives on pin 3
  Asserts pins 4 (RTS), 20 (DTR), if present
  Monitors pins 5 (CTS), 6 (DSR), 8 (CD), 22 (RI), if present

DQE: Wired for DCE-25F, but convertable to DTE-25M with 92219Q cable.

Pin 7 is signal ground for both DCE and DTE.

Pin Counts

When there are fewer than 25 pins (especially 9-pin), the actual pin numbers vary. The type of connector implied by the counts listed in this guide are:

50	Amp "blue ribbon" D-style
25	DB-25 subminiature D-style
9	DB-9 subminiature D-style
4	USOC RJ-11C (same as on contemporary consumer telephones)

Connector Gender

Actual DCEs, such as modems, are still usually 25-pin female. No particular connector gender is common to DTEs. The abbreviations used in this guide are:

M	Male
F	Female

The following table is intended to be a quick-reference to the selection of RS-232 cables for connecting serial devices directly to an HP 9000 Series 800 system. It does not cover RS-422.

Table 2-8. RS-232-C Interconnections

Host Type	Device Type	Cable Suggested
DTE-4F	DCE-25F	Not recommended for actual DCEs. Use 92219T + 17255=D otherwise.
DTE-4F	DTE-25F	92219T
DTE-4F	DTE-25M	92219T plus 92224F adaptor
DTE-9F	DCE-25F	92221M, or 98561-61604 plus 40242M
DTE-9F	DTE-25F	92221P, or 98561-61604 plus 40242G
DTE-9F	DTE-25M	98561-61604 plus 40242C
DTE-9M	DCE-25F	24542M, or 98574-61606 plus 92221M, or 98574-61606 + 98561-61604 + 40242M
DTE-9M	DTE-25F	24542G, or 98574-61606 plus 92221P, or 98574-61606 + 98561-61604 + 40242G
DTE-9M	DTE-25M	24542H, or 98574-61606 + 98561-61604 + 40242C
DCE-25F	DCE-25F	40242G
DCE-25F	DTE-25F	40242M, or 92224M adaptor, if cables present
DCE-25F	DTE-25M	40242C, or simply directly interconnect, if cables present
DQE-25F	DCE-25F	92219Q
DTE-25F	DCE-25F	40242M, or 92224M adaptor, if cables present
DTE-25F	DTE-25F	40242G
DTE-25F	DTE-25M	17255D
DTE-50F	DCE-25F	5061-4215
DTE-50F	DTE-25F	5061-4216 plus 92224M
DTE-50F	DTE-25M	5061-4216

HP-FL Guidelines

Devices using an HP-FL interface can be connected directly to an HP-FL
interface on the back of your computer, or they can be connected to other
HP-FL devices in a daisy-chained arrangement. Figure 2-5 shows a typical
HP-FL installation connecting six HP-FL disk drives to the computer.
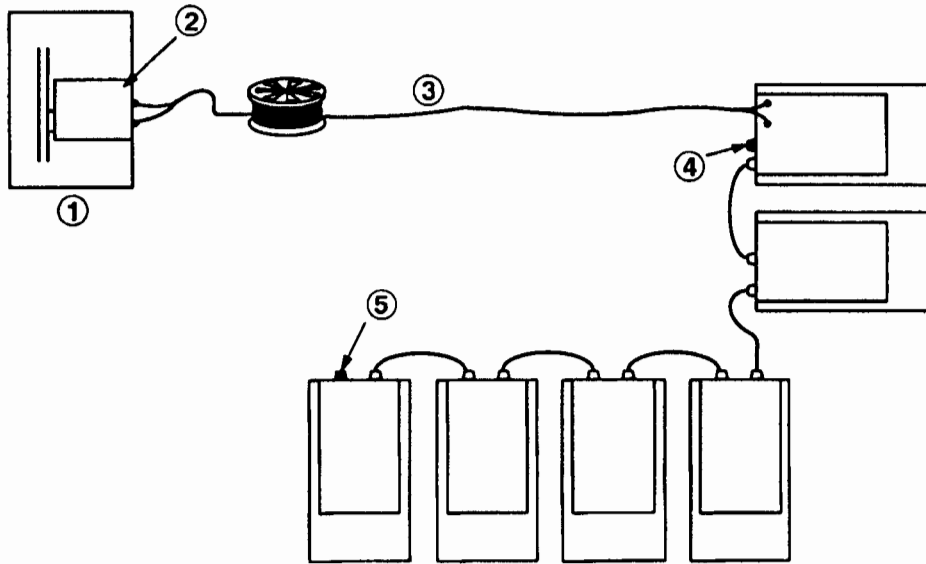
LG200177_019

Figure 2-5. A Typical HP-FL Installation

①   HP-PB computer

②   HP-FL interface card

③   Fiber-optic cable

④ and ⑤   Peripheral Bus (PBus) terminators

In Figure 2-5, the HP 28615A HP-FL card and fiber-optic cable connect
the computer to the first drive. The remaining drives are daisy-chained on
a peripheral bus (PBus) using PBus cables. Note that the PBus must be
terminated on each end.

The following device adapters are available for connecting HP-FL devices to your Series 800 system:

HP 28615A   This adapter is supported on HP-PB systems. It provides a direct connection from your HP-FL device to your computer. However, on HP-PB systems running DataPair/800, this interface is not supported. You must use the HP A1749A device adapter described below.

HP A1749A   This HP-PB PBA-FL device adapter is installed on a HP-PB-type system and simulates a CIO-type backplane, allowing for the connection of fiber-optic devices. The direct connection made possible by the HP 28615A Fiber-Optic Link adapter is preferred. However, you must use the HP A1749A HP-PB PBA-FL device adapter if you are using DataPair/800 on your system. The HP models 807S, 817S, and 837 do not support the A1749A FL adapter.

Note   The CIO bus address is hardwired to address zero (0). For example, if the card is in HP-PB slot 11 and a disk is at address three (3), the notation 44.0.3 would be used for accessing the disk.

HP 27111A   This adapter is supported on CIO systems. It provides a direct connection from your HP-FL device to your computer.

HP-FL Cables and Accessories

If you need to replace any of the HP-FL hardware supplies, consult the following list:

- HP 1005-0078 30-meter fiber-optic cable with 905-type SMA connectors.
- HP 5061-3151 PBus terminators (2 per package).
- HP 5061-3174 PBus cable.

Note	Other cable lengths must be ordered separately. Order HFBR-AWSxxx, where xxx is the cable length in increments of one meter from 001 up to a maximum of 500 meters. Consult HP for the latest ordering information.

Caution	To protect the fiber-optic cable, use guidelines supplied by the cable manufacturer. In general, do not bend, twist, or lay objects on the cable. Ensure that the cable is protected from foot traffic and sharp objects. Ensure that the cable is not stressed or damaged both during and after installation.

Installing Interface Cards

Introduction

Installation of an interface card by itself does not require any special configuration of your system. You do not need to create device files specifically for interface cards and device adapters. However, the peripherals connected to the interface cards and adapters will require device files. Refer to Table A-1 in Appendix A, "Device Files and Minor Numbers" for a list of device drivers and the associated supported devices and interface types.

This chapter contains installation guidelines for the following interface cards:

- HP 27147A CIO Small Computer System Interface (SCSI) Host Adapter

- HP 28615A HP-PB Fiber-Optic Link Adapter Card

- HP 28651A HP-PB General Purpose Input/Output (GPIO) Device Adapter

- HP 28655A HP-PB Small Computer System Interface (SCSI)/Parallel Adapter

Specific information about installation for the following interface cards (device adapters) is *not* documented in this manual. Refer to the documentation shipped with the interface card for hardware installation procedures.

- HP 27110B CIO HP-IB Device Adapter

- HP 27111A CIO Fiber-Optic Link (HP-FL) Device Adapter

- HP 27114B CIO Parallel Asynchronous FIFO Interface (AFI)

- HP 28650A HP-PB HP-IB Device Adapter

- HP 36967A HP-PB/CIO Local Area Network (LAN) Link Adapter

- HP 40299A/B HP-PB Asynchronous Eight Port Multiplexer Interface

- HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface

- HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface

- HP A1749A HP-PB Fiber-Optic Link (PBA-FL) Precision Bus Device Adapter

Note

□ The HP A1749A Fiber-Optic Link adapter is installed on a HP-PB-type system and simulates a CIO-type backplane, allowing for the connection of fiber-optic devices. The direct connection made possible by the HP 28615A Fiber-Optic Link adapter is preferred. However, you must use the HP A1749A adapter if you are using DataPair/800 on your system. The HP models 807S, 817S, and 837 do not support the A1749A adapter.

□ The CIO bus address is hardwired to address zero (0). For example, if the card is in HP-PB slot 11 and a disk is at address three (3), the notation 44.0.3 would be used for accessing the disk.

- HP J2092A HP-PB Asynchronous (RS-232) 16-Channel Multiplexer with DDP (Data Distribution Panel)

- HP J2093A HP-PB Asynchronous (RS-422) 16-Channel Multiplexer with DDP (Data Distribution Panel)

- HP J2094A HP-PB Asynchronous 16-Channel Multiplexer with ADP (Active Distribution Panel)

HP 28651A General Purpose Input/Output (GPIO) Device Adapter

The HP 28651A product is a General Purpose Input/Output device adapter, also referred to as a **GPIO card**, for HP 9000 computers that have HP Precision Bus (HP-PB) backplanes. The GPIO card is a medium speed, parallel data transfer device. It provides half-duplex communication between an HP 9000 computer and a peripheral device or another computer.

This card is used for a variety of application-dependent connections, also known as **black box** connections. To implement such functionality, refer to the *HP 28651A HP-PB GPIO Adapter Designer's Guide* (HP 28651-90002).

You can connect peripheral devices, such as disks, tapes, printers, or other computers with their own GPIO cards. Figure 3-1 illustrates a typical GPIO card system connection.
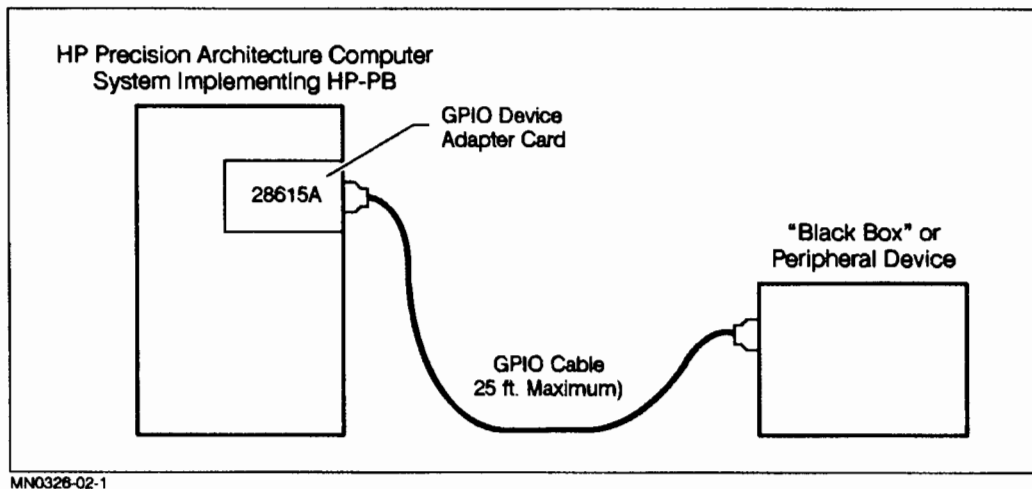
MN0326-02-1

Figure 3-1. GPIO Card System Connection

Before Installing This Device

Before you install this interface card:

- Have the installation documentation that came with the card handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installation of interface cards (device adapters) requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the *wall*(1M) command to do this.

- Unpack the GPIO card and record the card's part number and date code for future reference. If you ever need to replace your card, the part number, serial number, and date code must be available.

Note	*Save the shipping carton and packing material.* If you are going to store this product, do so in its original shipping container, or one of equivalent quality and size. Use anti-static containers for storing cards. The storage area should be clean, dry, and free of corrosive elements. Be sure to not drop or crush the card. An example of the card identification numbers is provided below.
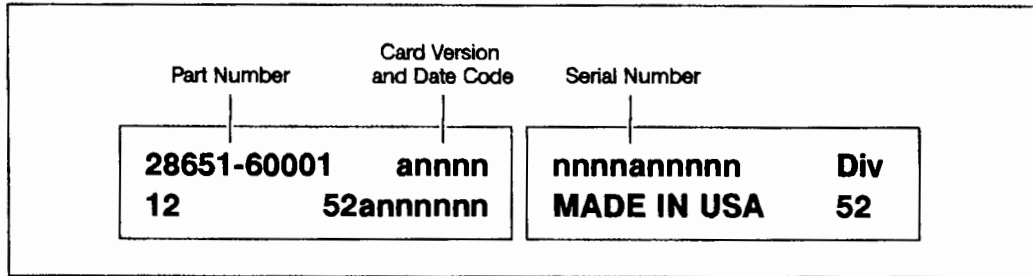
MN0326-02-2

Figure 3-2. Generalized Identification Stickers

□ The HP 28651-60001 is the part number of this card.
□ The 5-digit alphanumeric string ("annnn" in the example) is the version and date code of the card.
□ The alphanumeric string on the second sticker ("nnnnannnn") is the serial number.
□ The other numbers identify production information.

■ This card is a single-high (3U) card. If you need to convert a double-high (6U) slot on the back of your computer into two single-high slots, a slot divider, HP part number 5062-3336, is required. The GPIO card does not come with a slot divider. Slot dividers are normally furnished or pre-installed with the computer. Contact your nearest HP Sales and Support Office.

What You're Going To Do

Caution	The GPIO card is susceptible to damage by electrostatic discharge. Degraded performance or loss of operation can result. When handling the card, use a grounding wrist strap. Handle the card only by its edges, faceplate (bulkhead) or extractor levers.

The device driver for the HP 28651A HP-PB General Purpose Input/Output (GPIO) Device Adapter is gpio1. The gpio1 device driver *is not* supported by autoconfiguration. If you are installing a device on this interface at this time, and the gpio1 device driver is not already in your currently running kernel configuration file, you will have to add the driver to your kernel file. The following instructions for installing this card will step you through the procedures needed to install the card and add the driver to your system if necessary.

Table 3-1 lists the major number and device driver for the HP 28651A HP-PB General Purpose Input/Output (GPIO) Device Adapter.

Table 3-1.
HP 28651A HP-PB GPIO Device Adapter
HP-UX Setup Information

Driver Required for HP-PB	gpio1
Character-mode major number for HP-PB	58
Minor number format	See Appendix A

Installing the GPIO Card

1. *Verify that the* gpio1 *device driver required for this card, and any additional device drivers needed for a specific peripheral device you are installing on the card at this time, are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

   3

   Check the section in this book specific to the peripheral device you are installing for additional device drivers required for that peripheral.

   One way to check for device drivers is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class and you can go on to step 2 now.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Refer to "Adding Device Drivers Using SAM" at the end of this chapter for specific instructions on using SAM to do this.

     or

   - Edit your kernel configuration file and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

2. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

3

Caution	Failure to comply might damage the card.

3. *Select an appropriate slot in the HP Precision Bus (HP-PB) I/O card cage.*

Caution	When handling the card, use a grounding wrist strap.

When selecting a slot in which to install your GPIO card, check your HP 9000 system installation guide for the following information:

■ Particular pre-defined slots specified by the installation guide for installation of GPIO cards.

■ Limitations on the number of GPIO cards that can be installed is system dependent and noted in the system installation guide.

■ The GPIO card complies with HP-PB specifications for a standard power card. Check the HP 9000 installation guide to determine which slots accommodate standard power cards.

Keep in mind also that the HP-PB backplane is a "slot priority" based system. The higher the slot number in which a card is installed, the higher the priority the card has for gaining access to and communicating over the backplane.

4. *Write down on the worksheet (at the back of this book) the slot number in which the GPIO card is installed.*

The slot number is used to calculate the **physical module number** (hardware address). The slot number is the one assigned to the single-high (3U) slot through which the card connects to the backplane.

5. *Install the card according the to instructions provided with the card.* Be sure to follow all safety procedures outlined there.

Note   The GPIO card does not provide a card self-test or status LEDs (light emitting diodes).

Connecting Peripheral Devices

To connect peripheral devices to the GPIO card, perform the following steps:

1. Connect the terminated end of the GPIO cable to the card.

2. Secure the card and cable connectors together. Use the knurled retaining screws assembled on the cable connector.

3. Terminate the other end of the GPIO cable.

Note   The cable supplied with this card is unterminated at the peripheral end. You must terminate the cable before you can connect it.

---

4. Connect the other end of the GPIO cable to the peripheral device.

5. Install and connect all other cards before you turn on the HP 9000 computer. If you have no other cards to install, turn on your computer.

For specific instructions on installing and configuring the HP-UX operating system for a peripheral device connected to your GPIO card, see the chapter and section in this book dedicated to that type of device.

HP 28655A HP-PB SCSI/Parallel Adapter

The HP 28655A HP-PB SCSI/Parallel Adapter is a dual port interface card. One port provides connection to a high-speed Small Computer System Interface (SCSI) bus. The other port provides a standard HP parallel connection to common, output-only devices.

SCSI is an American National Standards Institute (ANSI) specification for a peripheral bus and command set. The SCSI/parallel adapter is for HP 9000 Series 800 computers that use the HP Precision Bus (HP-PB) backplane. The card can connect up to seven SCSI peripheral devices and a parallel device; however, the actual number of devices recommended or supported will depend on your particular computer system. Check your system configuration guidelines.

The SCSI port supports 8-bit parallel data transfers over the SCSI bus. SCSI single-ended ("unbalanced") electrical signals are used. Both synchronous and asynchronous SCSI handshaking protocols are supported. The SCSI port is intended for use on one end of a SCSI bus. Therefore, appropriate SCSI termination resistors are preinstalled on the card. In addition, an external terminator assembly is supplied for terminating the other end of the bus.

The SCSI port supplies termination power ("TERMPWR") to the SCSI bus, and is protected by a replaceable fuse on the card.

Figure 3-3 illustrates typical connections to the SCSI/parallel adapter.
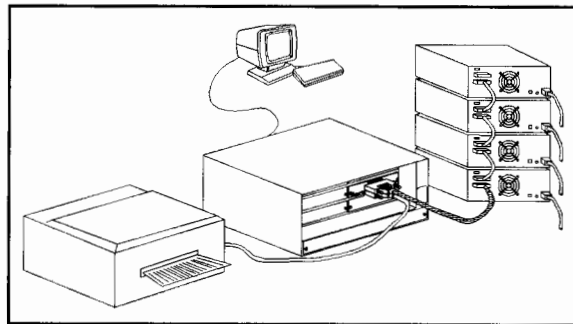
Figure 3-3. Typical HP 28655A Connections

Before Installing This Device

Before you install this interface card:

- Have the installation documentation that came with the card handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installation of interface cards (device adapters) requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the *wall*(1M) command to do this.

- Observe anti-static precautions.

  This product contains electronic components that can easily be damaged by static electricity. Work in a static-free area if possible and follow all precautions outlined in the installation documentation that came with the card.

3

HP 28655A SCSI/Parallel Adapter

- Unpack the card and record its part number, serial number and date code. If you ever need to replace your card you will need this information. This information is provided on a labeled sticker affixed to the card. The following numbers help you identify this card:

  □ The number in the upper left (28655-6xxxx) is the printed circuit assembly part number.

  □ The 5-digit alphanumeric string (A-xxxx) in the lower right is the card version and date code.

Note   *Save the shipping carton and packing material.* If you are going to store this product, do so in its original shipping container, or one of equivalent quality and size. Use anti-static containers for storing cards. The storage area should be clean, dry, and free of corrosive elements. Be sure to not drop or crush the card.

- Check the hardware installation manuals for your particular computer model for any special tools or accessories needed to access the I/O card cage. You should have all of your system and peripheral device manuals available for reference. There might be special system or device dependent requirements that are not noted here.

- This card is a single-high (3U) card. If you need to convert a double-high (6U) slot on the back of your computer into two single-high slots, a slot divider, HP part number 5062-3336, is required. This card does not come with a slot divider. Slot dividers are normally furnished or pre-installed with the computer. Contact your nearest HP Sales and Support Office.

■ Refer to your computer system manuals to identify the following information for your particular computer model:

□ How to access the I/O card cage.
□ Authorized or recommended I/O card configurations.
□ Proper orientation of an I/O card into the card cage.
□ I/O card configuration limitations, if any.

Caution	The HP-UX operating system supports the use of this card. However, the particular computer model into which this card is installed might require special configuration rules due to power supply or slot limitations. This could affect the number or combination of interface cards authorized for use. To prevent card or system damage, be sure to consult your system installation and configuration manuals for authorized I/O card cage configurations.

What You're Going To Do

Caution	The HP-PB SCSI/Parallel adapater card is susceptible to damage by electrostatic discharge. Degraded performance or loss of operation can result. When handling the card, use a grounding wrist strap. Handle the card only by its edges, faceplate (bulkhead) or extractor levers.

3

The device driver for the SCSI port on the HP 28655A HP-PB SCSI/Parallel Device Adapter is `scsi1`. The device driver for the parallel port is `lpr2`. These drivers are software configurable and are a standard part of your operating system as shipped. Follow the instructions for installing this card provided in the next section.

Refer to the table below for detailed configuration information.

Table 3-2.
HP 28655A Adapter Setup Information on HP-PB Computers

Drivers Required by SCSI Disk Drives	`disc3`, `scsi1`
Drivers Required by SCSI Tape Drives	`tape2`, `scsi1`
Drivers Required for parallel devices	`lpr2`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
SCSI Tape Character-mode major number	5
Parallel devices Character-mode major number	26
Minor number format	See Appendix A

Installing the HP 28655A HP-PB SCSI/Parallel Adapter

1. *Verify that the device drivers required for this card, and any additional device drivers needed for a specific peripheral device you are installing on the card at this time, are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

   Check the section in this book specific to the peripheral device you are installing for the required device drivers for that device.

   One way to check for device drivers is to type:

       lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. You can go on to step 2 now.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Refer to "Adding Device Drivers Using SAM" at the end of this chapter for specific instructions on using SAM to do this.

   or

   - Edit your kernel configuration file and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

2. *Play it safe.*

a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

b. TURN OFF the computer and unplug the power cord.

Warning	**Unless otherwise noted in your system manuals, failure to properly shut down the system and remove power might create a personnel hazard, or could result in hardware damage or data corruption.**

Caution	When handling the card, use a grounding wrist strap.

3. *Set the desired parity-checking capability.*

Follow the instructions provided with the adaptar card if you want to change the setting for parity-checking.

Note	All devices on a SCSI bus must have the same parity-checking capability. If any device on the SCSI bus does not generate parity, then all devices on the bus, including the adapter, must not check parity. If there is a SCSI device that cannot match the parity-checking capability of other devices on the bus, an additional SCSI bus will be required.

4. *Set the SCSI bus address and make note of it on the worksheet at the end of this book.*

   The SCSI adapter's address on the bus is set to 7. For most applications, "7" is the best choice for the adapter's SCSI bus address. Refer to the documentation that came with the card if you need to change the bus address.

Note	Up to eight devices (including the SCSI adapter) can be connected to a SCSI bus. Each device must have a unique address, from 0 to 7. The bus address determines the device's priority on the bus. Seven is the highest priority and zero is the lowest priority.

5. *Verify that resistor packs are properly installed.*

   A SCSI bus has two ends between which SCSI devices are attached. Each end of a SCSI bus must be terminated with a resistor network, or "terminator". The adapter card contains two resistor packs mounted in sockets on the card. These resistor packs act as a terminator for one end of the SCSI bus. Your cards documentation will tell you how to identify the resistor packs.

3

6. *Access and select an appropriate slot.* Write it down on the worksheet provided in the back of this book.

   When selecting a slot in which to install your SCSI/parallel adapter, check your HP 9000 system installation guide for the following information:

   ■ Particular pre-defined slots specified by the installation guide for installation of SCSI/parallel cards.

   ■ This card complies with HP-PB specifications for a standard-power card. Check your computer's installation guidelines to determine which slots accommodate standard-power cards.

   Keep in mind also that the HP-PB backplane is a "slot priority" based system. The higher the slot number in which a card is installed, the higher the priority the card has for gaining access to and communicating over the backplane.

   The HP-PB slot number is used to calculate the hardware address. The slot number is the one assigned to the single-high (3U) slot through which the card connects to the host I/O bus.

7. *Insert the card into the slot.* Follow the procedures in the installation documentation that came with the card to prepare the slot for installation and install the card.

8. *Attach the card cables.*

Figure 3-4 shows a typical installation with both the SCSI port and parallel port cables attached.

Caution	SCSI cables with high density squeeze-latch or thumbscrew connectors can be attached to the SCSI port. However, cables with thumbscrew connectors are recommended for improved reliability. The SCSI cable supplied with this product provides a high-density thumbscrew connector.
	Do not connect serial cables (for example, RS-232 cables) to the parallel port. Connecting serial cables can damage the SCSI/parallel adapter.
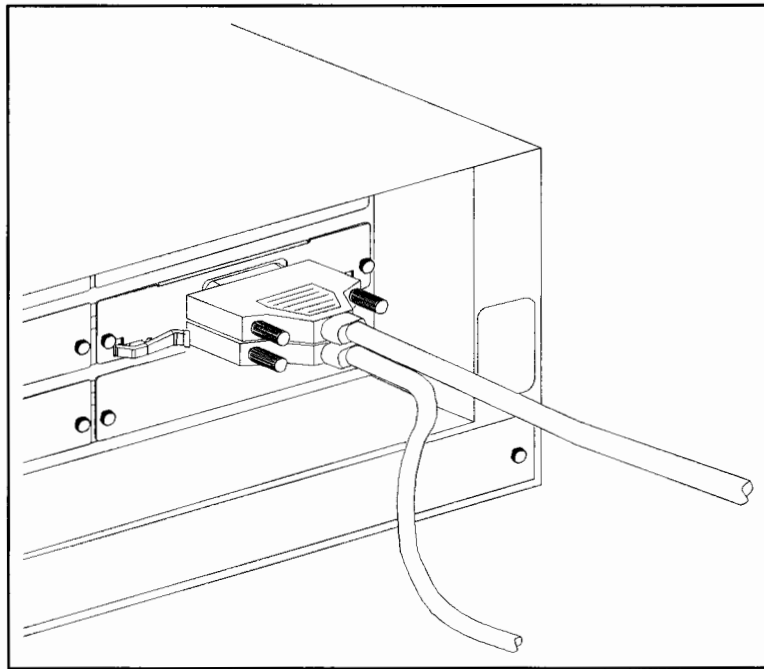
Figure 3-4. Cable Connections to SCSI and Parallel Ports

9. *Connect the SCSI peripheral devices*

You can connect multiple SCSI devices to the SCSI port, and a parallel communication device to the parallel port.

3

When connecting SCSI devices, follow these guidelines:

- Verify that the host system is shut down. There should be no data transfer activity on the SCSI bus.

- Verify that power is OFF to the peripheral device before connecting it to the SCSI bus.

- Check whether your device contains internal SCSI bus terminators, or requires special terminators. If so, refer to your device manuals for instructions on how to prevent excessive or improper SCSI bus termination.

Caution	Only the two ends of a SCSI bus should be terminated. Excessive or improper termination might overload the SCSI port's termination power ("TERMPWR") circuitry. This could result in blowing the TERMPWR fuse on the adapter, or damaging transceivers on any attached device (including the adapter).
	Refer to device manuals to ensure they operate properly on the SCSI bus.

- Set switches or jumpers on your device(s) as appropriate. Be sure each SCSI device has a unique SCSI address.

- Any device that supplies termination power should be enabled to do so. If at least two devices supply termination power, locate them at each end of the SCSI bus.

■ Connect the device end of the SCSI port cable (50-pin, low-density SCSI connector) to the first SCSI device. If applicable, connect subsequent devices. The connection method is often called "daisy-chaining". Refer to your device manuals for proper connection to a SCSI bus.

■ Adhere to the guidelines for SCSI devices given in Chapter 2, "Guidelines for Installing Devices". The SCSI/parallel adapter has an internal SCSI cable length of 0.1 m.

10. *Connect the parallel devices.*

   Output-only parallel devices, such as common printers, are supported on the parallel port. See the documentation that came with your adapter for detailed information on parallel cable wiring and signal pin assignments.

11. *Terminate the SCSI bus.*

   Unless the SCSI bus is properly terminated, the bus will not operate. Terminators provide matching impedance on bus signal lines. An active terminator is recommended.

   As illustrated in Figure 3-5, install the terminator on the end of the SCSI bus (opposite the SCSI/parallel adapter).

Caution	Only the two ends of a SCSI bus should be terminated. Excessive or improper termination might overload the termination power circuitry on the SCSI port. This could result in blowing the TERMPWR fuse on the SCSI/parallel adapter, or might damage transceivers on any attached device (including the adapter). Refer to device manuals for proper device operation on the SCSI bus.

HP 28655A HP-PB SCSI/Parallel Adapter
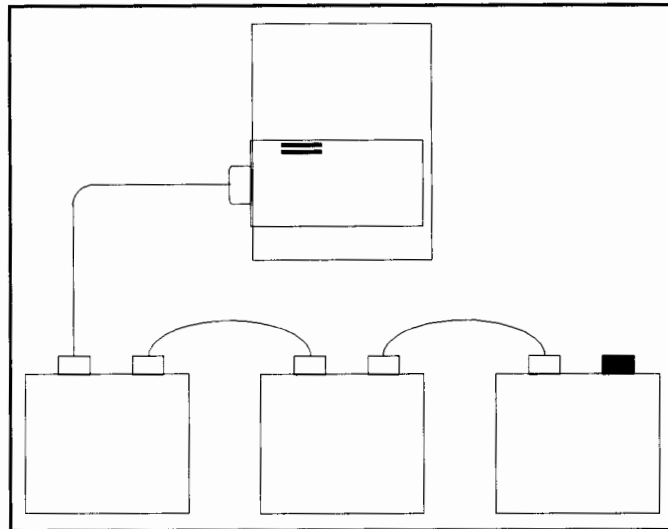
Figure 3-5. Install External Terminator on Last Device

12. *Reassemble the computer.*

    For help, refer to your computer system manuals.

13. *Power ON any newly connected peripheral devices.*

    Before applying power to your system, follow these guidelines:

    ■ Verify that all cables are connected and securely fastened.
    ■ Power ON your peripheral devices BEFORE your computer.

14. *Power on the computer.* When the computer is powered ON, power is supplied to the SCSI/parallel adapter.

Caution	Once the computer power is ON, the termination power ("TERMPWR") is supplied to the SCSI bus. *Do not* switch power ON or OFF for any device connected to an active SCSI bus. Similarly, devices should not be added to, or removed from, an active SCSI bus. Failure to comply could result in data corruption or loss, or damage to hardware.

15. *Verify operation.*

You can check for proper operation of each port by running one of your application programs that accesses your peripheral device(s).

HP 27147A CIO Small Computer System Interface (SCSI) Host Adapter

3

The HP 27147A CIO SCSI Host Adapter (SCSI HA) is an interface card that enables your CIO computer to connect to a Small Computer System Interface (SCSI) bus. SCSI is an American National Standards Institute (ANSI) specification for a peripheral bus and command set.

The HP 27147A SCSI HA is for HP 9000 Series 800 computers that use the HP channel input/output (CIO) backplane. The SCSI HA can connect up to seven SCSI peripheral devices; however, the actual number of devices recommended or supported will depend on your particular computer system. Check your system configuration guidelines.

The SCSI HA supports 8-bit parallel data transfers over the SCSI bus. SCSI single-ended ("unbalanced") electrical signals are used. Both synchronous and asynchronous SCSI handshaking protocols are supported.

The SCSI HA is intended for use on one end of a SCSI bus. Therefore, appropriate SCSI termination resistors are preinstalled on the card. An external terminator assembly is supplied for terminating the other end of the bus.

The SCSI HA supplies termination power ("TERMPWR") to the SCSI bus, and is protected by a replaceable fuse on the card. Figure 3-1 illustrates a typical SCSI bus subsystem.

3

Figure 3-6. Typical SCSI Bus Subsystem

HP 27147A CIO SCSI Host Adapter

Before Installing This Device

Before you install this adapter:

- Have the installation documentation that came with the adapter handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installation of device adapters requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the *wall*(1M) command to do this.

- Observe anti-static precautions.

  This product contains electronic components that can easily be damaged by static electricity. Work in a static-free area if possible and follow all precautions outlined in the installation documentation that came with the card.

■ Unpack the adapter and record the part number and date code for future reference. If you ever need to replace your adapter, the part number, serial number, and date code must be available.

This information is provided on a labeled sticker affixed to the card. The following numbers help you identify this card:

□ The number in the upper left (27147-6xxxx) is the printed circuit assembly part number.

□ The 5-digit alphanumeric string (A-xxxx) in the lower right is the card version and date code.

3

Note	*Save the shipping carton and packing material.* If you are going to store this product, do so in its original shipping container, or one of equivalent quality and size. Use anti-static containers for storing cards. The storage area should be clean, dry, and free of corrosive elements. Be sure to not drop or crush the card. An example of the card identification numbers is provided below.

■ Check the hardware installation manuals for your particular computer model for any special tools or accessories needed to access the I/O card cage. You should have all of your system and peripheral device manuals available for reference. There might be special system or device dependent requirements that are not noted here.

■ Refer to your computer system manuals to identify the following information for your particular computer model:

□ How to access the I/O card cage.

□ Authorized or recommended I/O card configurations.

□ Proper orientation of an I/O card into the card cage.

□ I/O card configuration limitations, if any.

What You're Going To Do

Caution	The HP 27147A CIO SCSI host adapater card is susceptible to damage by electrostatic discharge. Degraded performance or loss of operation can result. When handling the card, use a grounding wrist strap. Handle the card only by its edges, faceplate (bulkhead) or extractor levers.

The device driver for the CIO SCSI host adapter is `scsi2`. This driver is software configurable and is a standard part of your operating system as shipped.

The table below lists the major numbers and device drivers for devices attached to this SCSI adapter.

Table 3-3.
HP 27147A SCSI Adapter HP-UX Setup Information on CIO Computers

Drivers Required by SCSI Disk Drives	`disc3`, `scsi2`, `cio_ca0`
Drivers Required by SCSI Tape Drives	`tape2`, `scsi2`, `cio_ca0`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Installing the HP 27147A CIO SCSI Host Adapter

1. *Verify that the device drivers required for this card, and any additional device drivers needed for a specific peripheral device you are installing on the card at this time, are included in your current kernel configuration file, usually the /etc/conf/gen/S800 file.*

   Check the section in this book specific to the peripheral device you are installing for the required device drivers for that device.

   One way to check for device drivers is to type:

       lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. You can go on to step 2 now.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Refer to "Adding Device Drivers Using SAM" at the end of this chapter for specific instructions on using SAM to do this.

   or

   ■ Edit your kernel configuration file and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

HP 27147A CIO SCSI Host Adapter

2. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

Warning   Unless otherwise noted in your system manuals, failure to properly shut down the system and remove power might create a personnel hazard, or could result in hardware damage or data corruption.

Caution   When handling the card, use a grounding wrist strap.

---

3. *Set the desired parity-checking capability.*

   Follow the instructions provided with the adapter card if you want to change the setting for parity-checking.

Note   All devices on a SCSI bus must have the same parity-checking capability. If any device on the SCSI bus does not generate parity, then all devices on the bus, including the SCSI HA, must not check parity. If there is a SCSI device that cannot match the parity-checking capability of other devices on the bus, an additional SCSI bus will be required.

The SCSI HA is shipped from the factory with parity-checking enabled.

4. *Set the SCSI bus address and make note of it.*

The SCSI adapter's address on the bus is set to 7. For most applications, "7" is the best choice for the adapter's SCSI bus address. Refer to the documentation that came with the adapter if you need to change the bus address.

3

| **Note** | Up to eight devices (which includes the SCSI HA) can be connected to a SCSI bus. Each device must have a unique address, from 0 to 7. The bus address determines the device's priority on the bus. Seven is the highest priority and zero is the lowest priority. |

5. *Verify that resistor packs are properly installed.*

A SCSI bus has two ends, between which SCSI devices are attached. Each end of a SCSI bus must be terminated with a resistor network, or "terminator". The SCSI HA card contains two resistor packs mounted in sockets on the card. These resistor packs act as a terminator for one end of the SCSI bus. Your adapter's documentation will tell you how to identify the resistor packs.

6. *Access and select an appropriate slot.*

   When selecting a slot in which to install your SCSI/parallel adapter, follow these guidelines:

   - The SCSI HA must be in one of the first eight slots (0 through 7) of a CIO backplane. This includes systems that have multiple CIO backplanes or expansion modules.

   - CIO backplane arbitration is slot-priority based. This means that data transfers from a lower-numbered slot will have priority over a higher-numbered slot. Since data transfers over a SCSI bus are performance oriented, your slot selection for the SCSI HA could affect performance of other interface cards in your system.

   - The SCSI HA is a high-performance card with narrow signal-timing tolerances. When used in a CIO bus extender, place the SCSI HA in slot 7 or as near to the buffer card (BC) as possible.

   Be sure to record the slot number selected for later use.

7. *Insert the card.*

   Follow the procedures in the installation documentation that came with the card to prepare the slot for installation and install the card.

8. *Attach the cable.*

   The connectors on the SCSI HA card and adapter cable are designed to ensure a proper connection. A key and keyway are used.

9. *Complete the card installation according to the instructions provided with the card.*

10. *Connect the peripheral devices.*

When connecting SCSI devices, follow these guidelines:

■ Verify that the host system is shut down. There should be no data transfer activity on the SCSI bus.

■ Verify that power is OFF to the peripheral device before connecting it to the SCSI bus.

■ Check whether your device contains internal SCSI bus terminators, or require special terminators. If so, refer to your device manuals for instructions on how to prevent excessive or improper SCSI bus termination.

Caution	Only the two ends of a SCSI bus should be terminated. Excessive or improper termination might overload the termination power ("TERMPWR") circuitry. This could result in blowing the TERMPWR fuse on the SCSI HA, or damaging transceivers on any attached device (including the SCSI HA). Refer to device manuals to ensure they operate properly on the SCSI bus.

■ Set switches or jumpers on your device(s) as appropriate. Be sure each SCSI device has a unique SCSI address.

■ Any device that supplies termination power should be enabled to do so. If at least two devices supply termination power, locate them at each end of the SCSI bus.

■ Connect the SCSI HA cable (50-pin, low density SCSI connector) to the first SCSI device. If applicable, connect subsequent devices. The connection method is often called "daisy-chaining". Refer to your device manuals for proper connection to a SCSI bus.

■ Adhere to the guidelines for SCSI devices given in Chapter 2, "Guidelines for Installing Devices".

HP 27147A CIO SCSI Host Adapter

11. *Terminate the SCSI bus.*

Unless the SCSI bus is properly terminated, the bus will not operate. Terminators provide matching impedance on bus signal lines. Active terminators are recommended.

This product includes an external SCSI bus terminator assembly, part number 1252-3920, to terminate the peripheral end of the SCSI bus. It is an active terminator. The terminator assembly contains a 50-pin, low density, male connector. Adapters can be used to accommodate other types of SCSI connectors. Consult HP for availability.

Caution	Only the two ends of a SCSI bus should be terminated. Excessive or improper termination might overload the termination power circuitry on the SCSI HA. This could result in blowing the TERMPWR fuse on the SCSI HA, or could damage transceivers on any attached device (including the SCSI HA). Refer to device manuals for proper device operation on the SCSI bus.

12. *Reassemble the computer.*

    For help, refer to your computer system manuals.

13. *Power ON the peripherals and the computer.*

    Before applying power to your system, follow these guidelines:

    - Verify that all SCSI bus cabling is connected and securely fastened.
    - Power ON your peripheral devices BEFORE your computer.

    When the computer is powered ON, power is supplied to the SCSI HA.

Caution	Once the computer power is ON, the SCSI HA applies termination power ("TERMPWR") to the SCSI bus. Do not switch power ON or OFF for any device connected to an active SCSI bus. Similarly, devices should not be added to, or removed from, an active SCSI bus. Failure to comply could result in data corruption or loss, or damage to hardware.

14. *Verify operation.*

    You can check for proper operation of the SCSI bus by running one of your application programs that accesses your device(s).

HP 28615A HP-PB Fiber-Optic Link Adapter

The HP 28615A HP-PB Fiber-Optic Link adapter is a computer interface card for connecting mass storage devices through a Hewlett-Packard Fiber-Optic Link (HP-FL). It is intended for use in computers that use HP Precision Bus (HP-PB) backplane for input/output.

Figure 3-7 below illustrates a typical connection of six HP-FL disk drives. The HP 28615A HP-FL card and fiber-optic cable connect the computer to the first drive. The remaining drives are "daisy-chained" on a peripheral bus (PBus) using PBus cables. Note that the PBus must be terminated on each end.
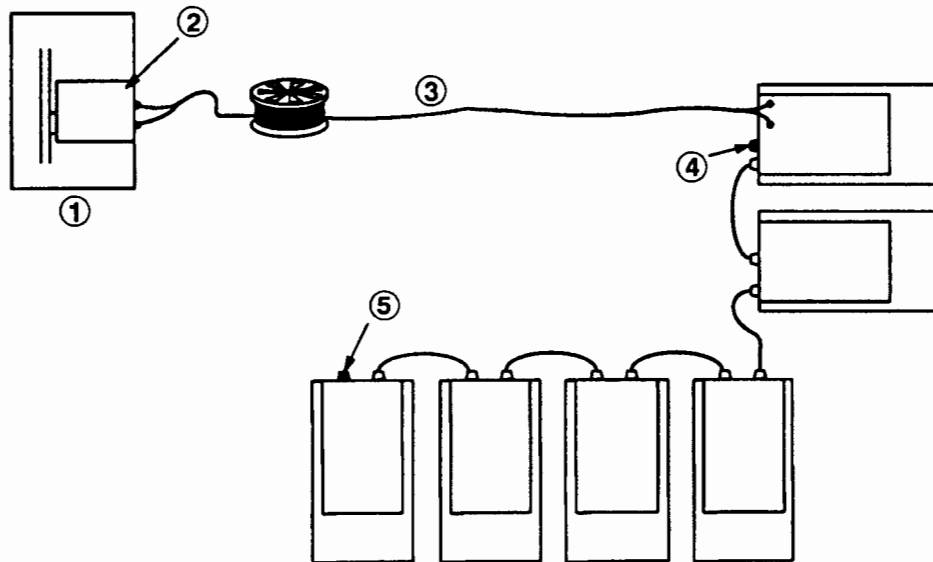
LG200177_019

Figure 3-7. A Typical HP-FL Installation

1	HP-PB computer
2	HP-FL interface card
3	Fiber-optic cable
4 and 5	Peripheral Bus (PBus) terminators

Before Installing This Device

Before you install this device adapter:

- Have the installation documentation that came with the adapter handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installation of device adapters requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

- Observe anti-static precautions.

  This product contains electronic components that can easily be damaged by static electricity. Work in a static-free area if possible and follow all precautions outlined in the installation documentation that came with the card.

HP 28615A Fiber Optic Link Adapter

- Unpack the adapter and record the part number and date code for future reference. If you ever need to replace your adapter, the part number and date code must be available.

This information is provided on a labeled sticker affixed to the card. The following numbers help you identify this card:

- □ The number in the upper left (28615-6xxxx) is the printed circuit assembly part number.

- □ The 5-digit alphanumeric string (A-xxxx) in the lower right is the card version and date code.

Note	*Save the shipping carton and packing material.* If you are going to store this product, do so in its original shipping container, or one of equivalent quality and size. Use anti-static containers for storing cards. The storage area should be clean, dry, and free of corrosive elements.

- Check the hardware installation manuals for your particular computer model for any special tools or accessories needed to access the I/O card cage. You should have all of your system and peripheral device manuals available for reference. There might be special system or device dependent requirements that are not noted here.

- Refer to your computer system manuals to identify the following information for your particular computer model:

- □ How to access the I/O card cage.
- □ Authorized or recommended I/O card configurations.
- □ Proper orientation of an I/O card into the card cage.
- □ I/O card configuration limitations, if any.

What You're Going To Do

Caution	The HP-FL card is susceptible to damage by electrostatic discharge. Degraded performance or loss of operation can result. When handling the card, use a grounding wrist strap. Handle the card only by its edges, faceplate (bulkhead) or extractor levers.

3

The device driver you will need for this interface card is hpfl1. The hpfl1 driver is software configurable and is a standard part of your operating system as shipped. Follow the instructions given in the next section for installing this card.

The table below gives detailed configuration information. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 3-4. HP 28615A Setup Information on HP-PB Computers

Drivers required by disk	disc4, hpfl1
Disk Drive Block-mode major number	7
Disk Drive Character-mode major number	13
Minor number format	See Appendix A

HP 28615A Fiber Optic Link Adapter

Installing the Card

The following summary supplements the procedures outlined in your installation documentation for this device. Read through this summary before proceding with the installation.

1. *Verify that the device drivers required for this card, and any additional device drivers needed for a specific peripheral device you are installing on the card at this time, are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

   Check the section in this book specific to the peripheral device you are installing for the required device drivers for that device.

   One way to check for device drivers is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. You can go on to step 2 now.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Refer to "Adding Device Drivers Using SAM" at the end of this chapter for specific instruction on using SAM to do this.

      or

   ■ Edit your kernel configuration file by hand and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

2. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

Warning	**Unless otherwise noted in your system manuals, failure to properly shut down the system and remove power might create a personnel hazard, or could result in hardware damage or data corruption.**
Caution	When handling the card, use a grounding wrist strap.

3. *Ensure all power switches on any device you are connecting and on the computer are in the OFF position.*

4. *Follow the procedures in the installation manual for the HP-FL device adapter to complete the following steps.*

   a. Select an appropriate slot and record the slot number.
   b. Prepare the slot for use.
   c. Insert the HP-FL adapter into the slot.
   d. Attached the fiber-optic cable to the adapter.
   e. Connect your peripheral device(s).
   f. Install the PBus cables and terminators.
   g. Reassemble the computer.

5. *Connect the power cord to any device(s) you are connecting at this time.*

6. *Turn on any device you are connecting at this time.*

7. *Plug in and power on the computer.*

8. *Verify Operation.*

   To verify operation of the HP-FL adapter, refer to the installation manual that came with the adapter to run the adapter self-test.

Adding Device Drivers Using SAM

When you start your computer, HP-UX automatically detects any new I/O cards which may have been added when it was turned off. However, the device drivers necessary to operate any new cards may not be loaded and configured into the kernel.

SAM can help you add the necessary device drivers to your kernel configuration file.

To configure HP-UX to include a driver for your interface card:

1. If you are not currently logged onto the system, log on as root.

2. Run SAM:

   # /usr/bin/sam

3. Highlight Kernel Configuration-> and activate (Open).

4. Highlight Drivers and activate (Open).

5. If you are presented with a window entitled "Kernel Configuration," go on to the next step.

   If you are presented with a window entitled "Select New Template File," activate (Template path name...). A window entitled "Template Files on the System" appears. Choose /hp-ux from the list in this window and activate (OK).

6. Look in the upper-left corner of the "Kernel Configuration" window. If you see a line that reads Template file: /hp-ux, continue. If not, choose Select New Template File... from the "Actions" menu and go to the previous step.

   Examine the list of drivers in the "Kernel Configuration" window. (You may have to scroll through the list to see them all.) When you find the driver your card needs, examine its entry in the column labeled Current State. If it is Out, add it with the next procedure. If it is In, exit the "Kernel Configuration" window, then exit SAM.

7. Highlight the driver you wish to add. (You may have to scroll through the list to find it.)

Note	If you wish to add more than one driver, you may do so by highlighting several of them.

8. From the "Actions" menu, choose **Add Driver to Kernel** .

Note	You may receive a message that the driver cannot be added because certain software is not loaded on you system. If so, exit SAM and use the **update** program to load the needed software before trying again.

If your selection is successful, the entry under the column labeled **Pending State** will change from **Out** to **In**.

9. From the "Actions" menu, choose **Create a New Kernel** .

Note	Creation of a new kernel requires that the system be rebooted.

10. You will be presented with a confirmation message. Take one of the following actions:

- If you want to create a new kernel now, activate (Yes). After the new kernel is built the system will reboot. You will be given an opportunity to take one of three actions:

  □ Move the new kernel into place and reboot the system.
  □ Move the new kernel into place *without* rebooting the system.
  □ Exit without moving the new kernel into place.

  Turn on the radio button for the action you wish to take and activate (OK). If you chose the option to reboot, the system will reboot itself.

- If you do *not* want to create a new kernel now, activate (No). You may create the new kernel at any time. Exit the "Kernel Configuration" window. You will be given an opportunity to take one of three actions:

  □ Create a new kernel.
  □ Defer creation of a new kernel.
  □ Cancel the kernel modifications you have specified.

  Turn on the radio button for the action you wish to take and activate (OK).

11. Exit SAM by returning to the "System Administration Manager" window and activating (Exit SAM).

4

Installing Terminals and Modems

Introduction

4

This chapter contains the installation and configuration procedures for the following terminals and modems:

HP C1004A/G/W 700/22 ANSI DEC VT220 Compatible Terminal
HP C1003A/G 700/41 Display Entry-Level Terminal
HP C1006A/G/W 700/43 ASCII Terminal
HP C1007A 700/44 Display Terminal
HP C1001A/G/W 700/92 Block-Mode Display Terminal
HP C1002A/G/W 700/94 Alphanumeric Display Terminal
HP 37212B 1200/2400 Baud Modem
HP 92205A/C Hayes Smartmodem 1200

HP Terminals

This section describes the generic installation for all HP terminals. HP Terminals connect to any supported RS-232C interface.

Before Connecting Your Terminal

Before you install you terminal:

- Have the documentation shipped with your terminal handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the *wall*(1M) command to do this.

What You're Going To Do

On a CIO system, the mux0 device driver supports the 6-Channel Multiplexer and mux0_16 device driver supports the 16-Channel Multiplexer.

On a HP-PB system, the mux2 device driver supports the 8-Port Multiplexer and all 16-Channel Multiplexers. On a model 890, mux4 supports the built-in serial ports and on models 808, 810, and 815, the scc1 supports the built in serial ports.

These drivers are software configurable and a standard part of your operating system as shipped. Install your terminal according to the instructions in the following section. Device files are automatically created for the terminal when you follow these procedures.

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The following tables give detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 4-1. Terminal Setup Information on CIO Computers

Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

HP Terminals

Table 4-2. Terminal Setup Information on HP-PB Computers

Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Driver Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial port(s) on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port(s) on Model 808/810/815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 Check your *Owner's Guide* for specific information on the built-in serial ports available on your system.

4-4 Installing Terminals and Modems

Connecting Your Terminal

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported serial interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your* S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->**, then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

HP Terminals

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Connect the terminal to your computer.*

   Connect the terminal to your computer following the instructions provided in the hardware installation manual for the device.

   The following RS-232-C data transmission values should be checked:

   a. baud rate
   b. parity
   c. data length
   d. handshake

   Verify these values with those recommended in Table 4-3.

6. *Connect the power cord.*

7. *Turn on the device.*

8. *If you have any other devices to connect, do so now.*

9. *Plug in and power on the computer.*

During the boot process:

■ Device "special" files were created for this device.

■ A Logical Unit (LU) number was assigned to this device.

- *Verify that the peripheral has been added.*

  Use the `ioscan -f` command to do this. To verify the device has been added, you will need to know what port address the terminal is using. For example, if your terminal is connected to port 3, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

      tty   1   4.3   mux2   ok(*hexadecimal entity id#*) ok

  See chapter 8 for further discussion of `ioscan`.

What To Do Next

Refer to your terminal's manual for instructions on configuring your device and datacomm port to match the characteristics given in Table 4-3. Not all of the characteristics listed in the table will apply to your terminal.

Your HP-UX operating system has now been modified to communicate with your new device. You must add entries in the **/etc/ ttytype** and the **/etc/inittab** files. You can use SAM to do this for you. Refer to the last section in this chapter, "Adding a Terminal or Modem to Your System Using SAM", for complete instructions.

If you intend to complete your configuration using commands, refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for a description of the HP-UX commands method.

HP Terminals

Table 4-3. Recommended Terminal Characteristics

Characteristic	Setting	Comments
Alternate Set	Line(B)	Suggested
ASCII 8 Bits	No	YES required for NLS support
Asterisk	Off	Suggested
AUTO LF	Off	Required
Auto Terminator	No	Suggested
Baud Rate	9600	HP-UX Std.
Bell	On	Suggested
BLOCK MODE	Off	Required
Block Terminator	RS	Suggested
Break Time	200ms	Suggested
BufSiz	128	Suggested
Caps Lock	Off	May change after login
Carrier Detect	Open	Suggested
Check Parity	No	Required
Circuit Assurance	Closed	Cabling may require this
Clear Terminator	No	Suggested
Clock	INT	Required
CPU Break	Open	Suggested
CS(CB)Xmit	No	Cabling may require this
Cursor Type	Line	Your choice

Table 4-3. Recommended Terminal Characteristics (continued)

Characteristic	Setting	Comments
Data Bits	8	Required for NLS support
Data Speed Select	Open	Suggested
Datacomm Handshake	XonXoff	Required
DISPLAY FUNCTIONS	Off	Suggested
Display Off After	15 min.	Your choice
DM(CC)Xmit	No	Cabling may require this
EnqAck	No	EnqAck not supported
Esc Xfer	Yes	Suggested
Fast Binary Read	Closed	Suggested
Field Separator	US	Suggested
GraphCompat		Your choice
Inh DC2	Yes	Required
InhDcTest	Yes	Suggested
InhEolWrp	No (Closed)	Required
InhHndShk	Yes	Required
InhSkfTst	No	Suggested
Insert & delete sense	Closed	Suggested
Inverse Background		Your choice
Keyboard		Should match your keyboard
LINE MODIFY	Off	Suggested

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HP Terminals

Table 4-3. Recommended Terminal Characteristics (continued)

Characteristic	Setting	Comments
Line/Page	Line	Required
Local Echo	Off	Suggested
Main Channel	Closed	Should have no effect
MEMORY LOCK	Off	Suggested
MODIFY ALL	Off	Suggested
Parity	None (Open)	Required for NLS support
Power On	Terminal	Suggested
Printer Code 4		Your choice
Printer Nulls		Your choice
RecvPace	XonXoff (Open)	Required
Remote/Serial Dev	PORT1/PORT2	If using terminal's port 1
	PORT2/PORT1	If using terminal's port 2
Remote	On	Required
Resolution	512x390	Required
RETURN Def	CR	Required
RETURN=ENTER	No	Required
RR(CF)Recv	No	Cabling may require this
SPOW	No (Closed)	Strongly suggested
SR(CH)	Lo	Modem use may require this
SRRInvert	No	Cabling may require this

Table 4-3. Recommended Terminal Characteristics (continued)

Characteristic	Setting	Comments
SRRXmit	No	Cabling may require this
Start Column	1	Suggested
Stop Bits	1	HP-UX
STOP Function	XonXoff	Suggested
StripNulDel	No	Suggested
Tab=Spaces	No	Required
Terminal Id	2622A	Suggested for 2392A
	2623A	Required for DGL on HP150 and 2393A
Terminal Mode	HP	Required by default terminfo
Transmit	All Fields	Suggested
Transmit indicator	Closed	Suggested
TR(CD)	Hi	Modem use may require
XmitFnctn	No (Closed)	vi changes as needed
XmitPace	XonXoff	Suggested

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HP Modems

This section describes the generic installation procedures for all HP modems. HP modems connect to any supported RS-232C interface.

Before Connecting This Device

Before you install this modem:

- Refer to the documentation that shipped with your modem for information on unpacking and preparing your modem for installation. Keep this documentation handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system (server) will be coming down. Use the *wall*(1M) command to do this.

What You're Going To Do

On a CIO system, the mux0 device driver supports the 6-Channel Multiplexer and mux0_16 device driver supports the 16-Channel Multiplexer.

On a HP-PB system, the mux2 device driver supports the 8-Port Multiplexer and all 16-Channel Multiplexers. On a model 890, mux4 supports the built-in serial ports, and on models 808, 810, and 815, the scc1 supports the built-in serial ports.

These drivers are software-configurable and a standard part of your operating system as shipped. Install your modem according to the instructions in the following section. Device files are automatically created for the modem when you follow these procedures.

The following tables give detailed HP-UX configuration information. If you
intend to customize your system's configuration, you will need to refer to
Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need
the information listed below regarding major numbers. Information on minor
numbers is in Appendix A, "Device Files and Minor Numbers".

Table 4-4. Modem Setup Information on CIO Computers

Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

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HP Modems

Table 4-5. Modem Setup Information on HP-PB Computers

Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Driver Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial port(s) on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port(s) on Model 808/810/815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 Check your *Owner's Guide* for specific information on the built-in serial ports available on your system.

Note	Modems require the dial-in modem device file ttyd*xx* and the dial-out ports device file cul*xx*. If you are using a non-HoneyDanBear uucp, you will need a third modem device file, cua*xx* with the same minor as the cul*xx* device file.

Connecting the Modem to an RS-232-C Interface

The following summary supplements the procedures outlined in your hardware installation documentation for this modem. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note	If you have more than one serial port, you need to know the address of your port for testing communications and for configuring your software.

Caution	Many computer systems have both parallel and RS-232-C ports. These ports frequently appear identical. The built-in parallel interface should be labeled PARALLEL. Make sure you plug your cable into the RS-232-C port or you could damage your device.

2. *Verify that the driver(s) required for this device is (are) included in your* S800 *file.* One way to do this is to type:

    lsdev *major number*

substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

4

If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

- Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

    or

- Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

    a. Shut down and halt the system using the **/etc/shutdown -h** command.
    b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Set modem configuration values.*

Before you connect your modem, consider the following:

- Is the DTR (Data Terminal Ready) line forced high? If so, set it to follow the line or do not force it high.
- Is the CD (Carrier Detect) line forced high? If so, set it to follow the line or do not force it high.
- Is the modem a Hayes compatable? If so, the SO register needs to be set to one or greater. If you are going to use cu or uucp then the number should not be greater than three or the connection will fail.

An HP 40242M cable is recommended.

6. *Connect the modem to your telephone cable and to your computer.*

Connect the modem to your telephone cable and to your computer following the instructions provided in the hardware installation manual for the modem. Be sure to set any special modem configuration values as instructed in the installation manual for the modem.

7. *Connect the modem's power cord.*

8. *Turn on the modem.*

9. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.

- A Logical Unit (LU) number was assigned to this device.

- *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. To verify the device has been added, you will need to know what port address the modem is using. For example, if your modem is connected to port 3, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
tty    1   4.3      mux2       ok(hexadecimal entity id#)  ok
```

See chapter 8 for further discussion of `ioscan`.

HP Modems

Refer to your modem's manual for instructions on configuring your device and datacomm port to match the characteristics given in Table 4-3. Not all of the characteristics listed in the table will apply to your modem.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. You must add entries in the **/etc/ ttytype** and the **/etc/inittab** files. You can use SAM to do this following the procedures in the next section.

If you intend to complete your configuration using commands, refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for a description of the HP-UX commands method.

Adding a Terminal or Modem to Your System Using SAM

This section discusses setting up HP-UX to communicate with your terminal or modem. Setting up HP-UX for a terminal or modem consists of:

■ creating the device file, or verifying that the correct device file already exists, for communication with the device.

■ creating an entry in the /etc/inittab file for the device.

The SAM method of setting up HP-UX for terminals and modems is discussed here. Refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for a description of the HP-UX commands method if you are not using SAM to add this device.

Make sure that the terminal or modem is physically connected to a port on your computer's serial interface before continuing.

To configure HP-UX for a new terminal:

1. Log on as root.

2. Run SAM:

   /usr/bin/sam

3. Highlight Peripheral Devices-> and activate (Open).

4. Highlight Terminals and Modems-> and activate (Open).

5. From the "Actions" menu in the "Terminals and Modems" window, choose Add Terminal....

6. In the "Add Terminal" window, set or select the following parameters:

   ■ The hardware path to the serial interface to be used by this terminal.
   ■ The port number to be used by this terminal.
   ■ The speed (baud rate) to be used by this terminal.
   ■ Whether or not this will be a UUCP connection.

   When you finish setting the parameters, activate (OK).

7. You will receive a series of messages indicating the progress of the task.

Note   You will receive a message advising you of the necessity to connect the terminal.

When you receive the message `Task completed`, activate ⌜OK⌝.

8. Exit SAM by returning to the "System Administration Manager" window and activating ⌜Exit SAM⌝.

To configure HP-UX for a new modem:

1. Log on as `root`.

2. Run SAM:

   `/usr/bin/sam`

3. Highlight `Peripheral Devices->` and activate ⌜Open⌝.

4. Highlight `Terminals and Modems->` and activate ⌜Open⌝.

5. From the "Actions" menu in the "Terminals and Modems" window, choose `Add Modem...`.

6. In the "Add Modem" window, set or select the following parameters:

   - The hardware path to the serial interface to be used by this modem.
   - The port number to be used by this modem.
   - The speed (baud rate) to be used by this modem.
   - Whether of not this modem will be used for calling out from your system.
   - Whether or not this modem will receive incoming calls.
   - Whether of not this is a CCITT (international protocol) modem.
   - Whether or not this will be a UUCP connection. If you specify that this will be a UUCP connection, a list of modem types will appear from which to select.

   When you finish setting the parameters, activate (OK).

7. You will receive a series of messages indicating the progress of the task.

Note   You will receive a message advising you of the necessity to connect the modem.

   When you receive the message Task completed, activate (OK).

8. Exit SAM by returning to the "System Administration Manager" window and activating (Exit SAM).

5

Installing Disk and Tape Drives

Introduction

This chapter contains installation and configuration procedures for the following disk and tape drives:

HP C1707A Series 6100 Model 600/A HP-IB CD-ROM Drive
HP A1999A Series 6100 Model 700/S SCSI CD-ROM Drive
Optical Disk Library Systems; Models 10, 20, 60, and 100
HP C1701A/M/C Model 650 Optical Disk Drives
HP 7907A Disk Drive
HP 7911P/R, 7912P/R, and 7914P/R/CT Disk and Tape Drives
HP 7933H/7935H Disk Drives
HP 7935H Disk Drives
HP 7936H/7937H Disk Drives
HP 7957A/B,7958A/B, and 7959B/62B/63B Disk Drives
HP 7957/58/59S SCSI Disk Drives
HP 9122D/S/C Flexible Disk Drives
HP 9127A Flexible Disk Drive
HP C2201/04A HP-FL Disk Drives
HP C2200/03A HP-IB Disk Drives
HP C2252B/HA and C2254B/HA Multiuser Disk Arrays
Mass Storage Systems
HP C2283/84A SCSI Disk Drives
HP 9144A/45A Tape Drive
HP 7974A Tape Drive
HP 7978A/B Tape Drive
HP 7979A/7980A/7980XC Tape Drives
HP 7980S/SX Tape Drives
HP C1511A Series 6400 Model 1300H HP-IB DDS-Format Drive
HP C1512A HP Series 6400 Model 1300S SCSI DDS-Format Drive
HP C1503A/C1504A DDS-Format Tape Drives

HP C1707A Series 6100 Model 600/A
HP-IB CD-ROM drive

The Model 600/A is a Command Set 80 (CS/80) Compact Disk-Read Only Memory (CD-ROM) Drive. It supports the ISO-9660 (or High Sierra Group) data format and connects to your computer via the high-speed HP-IB disk interface card.

The *HP Series 6100 Model 600/A HP-IB CD-ROM User's Guide*, HP part number C1707-90000, provides detailed information about this device. For references to further information on CD-ROM technology, and details on the CD-ROM File System, refer to the *How HP-UX Works: Concepts for the System Administrator* manual.

Before Installing This Device

Before you install this device:

■ Have the documentation that came with your CD-ROM handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

The device driver you will need for this CD-ROM drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install the CD-ROM drive according to the instructions given in the following section. Device files are automatically created for the drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-1. HP C1707A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-2. HP C1707A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP Series 6100 Model 600/A HP-IB CD-ROM Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface type.*

    You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

    One way to do this is to type:

    > lsdev *major number*

    substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

    If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

    - Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

      or

    - Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.

   b. Follow the procedures in the hardware installation documentation that came with the device for setting the HP-IB bus address.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the Model 600/A to your computer.*

   Connect your Model 600/A to your computer following the instructions in the User's Guide for the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord to your device.*

8. *If you have any other devices to connect, do so now.*

9. *Turn on the CD-ROM drive.*

10. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.
- A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk    3   4.0.7   cio_ca0.hpib0.disc1   ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Determining the mount point directory on your system.
2. Using the `mount` command to mount the device on your system. Note that CD-ROM file systems are read only.

HP A1999A Series 6100 Model 700/S
SCSI CD-ROM Drive

The HP A1999A Series 6100 Model 700/S SCSI CD-ROM drive is a half height device.

Before Installing This Device

Before you install this device:

■ Have the documentation that came with your CD-ROM handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

5

What You're Going To Do

The device driver you will need for this CD-ROM drive is `disc3`. The `disc3` device driver is software configurable and is a standard part of your operating system as shipped. Install this CD-ROM drive according to the instructions given in the following section. Device files are automatically created for the drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-3. HP A1999A Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Disk Drives	`disc3`, `scsi2`, `cio_ca0`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

Table 5-4. HP A1999A Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Interface	Built-in SCSI ports on some $8X7$ models[1]
Drivers Required by SCSI Disk Drives	`disc3`, `scsi1`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the HP Series 6100 Model 700/S CD-ROM Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

Refer to your *HP Series 6100 Model 700/S User's Guide* for specific instructions on how to set the SCSI bus address on your device.

5. *Set the Parity, Arbitration, and Test switches on your device.*

   Parity and Arbitration switches should be set to 1 (up) and the Test switch should be set to 0 (down). Refer to your User's Guide for specific instructions on how to set these switches.

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the CD-ROM drive to your computer.*

   Connect your Model 700/S to your computer following the instructions in the documentation that came with your CD-ROM drive.

   The HP Series 6100 Model 700/S CD-ROM drive has an internal bus length of 0.3 meters.

   See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

8. *Connect the power cord to your device.*

9. *If you have any other devices to connect, do so now.*

10. *Turn on the CD-ROM drive.*

11. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for this device.
   ■ A Logical Unit (LU) number was assigned to this device.

12. *Verify that the peripheral has been added.*

   Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

   ```
   disk   3  4.5.0  scsi1.target.disc3   ok(hexadecimal entity id#)   ok
   ```

   See chapter 8 for further discussion of `ioscan` .

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

■ Determining the mount point directory on your system.
■ Using the `mount` command to mount the device on your system. Note that CD-ROM file systems are read only.

Optical Disk Library Systems

The Deskside and Rackmount Optical Disk Library Systems are direct access secondary storage (DASS) peripherals that allow multiple rewritable optical disks to be shared between one, two or four optical disk drives.

- The Model 10 Optical Disk Library System can hold as many as 16 disks. Each disk can store 325 Mbytes of data per side providing a total of 10.4 Gbytes of storage. The Model 10 is can be upgraded to a Model 20 with a 32 disk capacity.

- The Model 10LC Optical Disk Library System is the same as a Model 10 except it cannot be upgraded to a Model 20.

- The Model 20 Optical Disk Library System can hold as many as 32 disks. Each disk can store 325 Mbytes of data per side providing a total of 20.8 Gbytes of storage.

- The Model 60 Optical Disk Library System can hold as many as 88 disks. Each disk can store 325 Mbytes of data per side providing a total of 57.2 Gbytes of storage.

- The Model 100 Optical Disk Library System can hold as many as 144 disks. Each disk can store 325 Mbytes of data per side providing a total of 93.6 Gbytes of storage.

The Optical Disk Library Systems connect to your computer with a SCSI interface and can be accessed as a conventional magnetic disk drive.

Note   Optical disk libraries and optical disk drives do not support logical volumes.

Before Installing This Device

Note	This device *is not* customer installable. Your Hewlett-Packard Customer Engineer will install this device for you. Set-up and Installation costs are included in the price of the device.

Before having this device installed:

■ Have the documentation that came with your optical disk library handy.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

Check the documentation that came with your model Optical Disk Library System for information on internal SCSI cabling lengths.

What You're Going To Do

Note	The Optical Disk Library Systems should be installed by an HP Customer Engineer. Your HP Customer Engineer will install and set up your Optical Disk Library System for you. The installation cost is included in the purchase price of the library. For details regarding this, refer to the unpacking and installation procedures that came with your library.

There are one, two or four optical disk drive devices for read/write data transfer (depending on which library model you have) inside the autochanger. Each optical disk drive and the autochanger require a unique SCSI address.

The autox0 driver is required for optical autochangers and it requires the autoch driver. On CIO systems the autox0 driver requires the disc3 driver, the scsi2 driver, and the cio_ca0 driver. On HP-PB systems the autox0 driver requires the disc3 and scsi1 drivers.

These device drivers are software configurable and are a standard part of your operating system as shipped. Once the optical library is installed according to the instructions given in the following section, device files are automatically created for each disk surface containing an optical disk.

The table shown below lists the, interface cards, device drivers and major numbers that your SCSI Optical Disk Library System requires. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-5.
Optical Disk Library Setup Information on CIO Computers

Interface card required	HP 27147A SCSI card
Drivers Required	autox0, autoch, disc3, scsi2, cio_ca0
autox0 block-mode major number	12
autox0 character-mode major number	19
disc3 block-mode major numbers	7
disc3 character-mode major number	13
Minor number format	See Appendix A

Table 5-6.
Optical Disk Library Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Interface	Built-in SCSI port on some $8X7$ models[1]
Drivers Required	autox0, autoch, disc3, scsi1
autox0 block-mode major number	12
autox0 character-mode major number	19
disc3 block-mode major numbers	7
disc3 character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the Optical Disk Library Systems

The following summary supplements the procedures outlined in the hardware installation documentation that came with this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the /etc/conf/gen/S800 file.*

   One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Complete the hardware installation.*

   Complete hardware installation as outlined in the Optical Disk Library Systems Setup Guide for the optical disk library model you have purchased.

6. *Connect the power cord to your device.*

7. *If you have any other devices to connect, do so now.*

8. *Turn on the device.*

   Do NOT turn on the power to the computer before the disk drive.

9. *Plug in and power on the computer.*

   During the boot process:

   - Device "special" files were created for this device.
   - A Logical Unit (LU) number was assigned to this device.

Optical Disk Library Systems

10. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB
    system, if you chose bus address 5 for the autochanger, the following is an
    example of a display line that `ioscan -f` could return showing that the
    autochanger with one magneto-optical drive have been added:

    ```
    disk    3  24.4.0    scsi1.target.disc3    ok0x(hex id#)  ok
    autox0 0  24.5.0    scsi1.target.autox0   ok0x(hex id#)  ok
    ```

    See chapter 8 for further discussion of `ioscan`.

Note   SAM can also configure your system to communicate with this
                device. However, this support is limited to configuration of
                section 2 only.

What To Do Next

The necessary device drivers required for the Optical Disk Library System have
been bound by the host system and logical unit numbers have been assigned to
the devices. Next, complete the system set up by doing the following:

1. Follow the procedures outlined in the *Configuring and Using the Optical
   Disk Library System* manual that came with your Optical Disk Library for
   instructions on completing your system setup.

2. If you are not using pre-initialized media, initialize each optical disk surface.

3. Create new file systems. Note that logical volumes are not supported on
   optical disk libraries.

Note   Since optical media is removable, do not use the media as part
                of your automatically-mounted file systems (that is, do not add
                this disk drive to `/etc/checklist`).

HP C1701A/M/C Model 650 Optical Disk Drives

The HP C1701A, C1701M, and C1701C are stand-alone 5.25-inch Rewritable Optical disk drives. The removable Magneto-Optical (MO) disk can store 650 Mbytes of data (325 Mbytes per side) and complies with the Continuous-Composite format. These disk drives connect to your computer with a SCSI interface and can be accessed as conventional magnetic disk drives.

The HP C1701A, C1701M and C1701C optical disk drives are supported as mass storage devices or as boot devices, although they are not recommended for use as boot devices.

Note	Optical disk libraries and optical disk drives do not support logical volumes.

Before Installing This Device

Before you install this device:

■ Have the hardware installation documentation that came with the optical disk drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". Chapter two gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

HP C1701A/M/C Model 650 Optical Disk Drives

What You're Going To Do

The device driver you will need for this disk drive is disc3. The disc3 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for the disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-7. HP C1701A/M/C Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Disk Drives	disc3, scsi2, cio_ca0
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

Table 5-8.
HP C1701A/M/C Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Interface	Built-in SCSI ports on some $8X7$ models[1]
Drivers Required by SCSI Disk Drives	disc3, scsi1
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the Model 650 Optical Disk Drive

The following summary supplements the procedures outlined in your installation documentation for this device. Read through this summary before proceeding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

   One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

      or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

---

   a. Choose an available SCSI bus address and make note of it.

   b. Follow the procedures in the hardware installation documentation that came with the device for setting the SCSI bus address.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect your device to your computer following the instructions in the installation documentation for the device.

   See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

   The HP C1701A/C optical disk drive has an internal bus length of 0.3 meters.

7. *Connect the power cord to your device.*

8. *If you have any other devices to connect, do so now.*

9. *Turn on the disk drive.*

   Do NOT turn on the power to the computer before the disk drive.

Caution   If you are using the Model 650 as a boot device, insert the optical disk *before* the system is powered up and do not remove it until after the system is powered down.

---

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.5.0  scsi1.target.disc3   ok(hexadecimal entity id#)   ok
```

    See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Determining the mount point directory on your system.
2. Using the mount command to mount the device on your system.

Note	Since optical media is removable, do not use the media as part of your automatically-mounted file systems (that is, do not add this disk drive to /etc/checklist).

5

HP 7907A Disk Drive

The HP 7907A is a Command Set 80 (CS/80) device containing a 20.5 Mbyte fixed disk and a 20.5 Mbyte removable cartridge disk. It connects to your computer via the high-speed HP-IB disk interface card.

Note	■ The HP 7907A disk drive is not supported as a system disk and can only be used for secondary "mounted volumes" *or* LIF utility volumes.
	■ Additional information can be found in the *HP 7907A Owner's Manual*, HP part number 07907-90901.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

HP 7907A Disk Drive

What You're Going To Do

The device driver you will need for this disk drive is `disc1`. The `disc1` device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-9. HP 7907A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	`disc1`, `hpib0`, `cio_ca0`
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-10. HP 7907A Setup Information on HP-PB Computers;

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	`disc1`, `hpib1`
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 7907A Disk Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

HP 7907A Disk Drive

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note
Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions given in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect your HP 7907A to your computer following the instructions in the hardware installation documentation provided with the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord to your device.*

8. *If you have any other devices to connect, do so now.*

9. *Turn on the device.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    `disk   3   4.0.7   cio_ca0.hpib0.disc1   ok(`*hexadecimal entity id#*`)     ok`

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes.

2. Sectioning the disk.

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP 7911P/R, HP 7912P/R, and HP 7914P/R/CT Disk and Tape Drives

These disk and tape drives are Command Set 80 (CS/80) devices. They connect to your computer via the high-speed HP-IB disk interface card.

- The HP 7911P/R is a 28.1 Mbyte disk with cartridge tape drive.

- The HP 7912P/R is a 65.6 Mbyte disk with cartridge tape drive.

- The HP 7914P/R is a 132 Mbyte disk with cartridge tape drive.

- The HP 7914CT is an HP 7914R disk drive and an HP 9144A cartridge tape drive in an HP 92211R cabinet.

Additional information can be found in the *HP 7911, 7912, and 7914 Disc/Tape Drives Operating and Installation Manual*, HP part number 07912-90902.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the device handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

Caution	Do not attempt to operate the unit until it is moved to the installation site and the spindle and actuator are unlocked. Do not apply any sudden mechanical shocks to the unit.

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

HP 7911P/R,7912P/R,7914P/R/CT
Disk/Tape Drives

Table 5-11.
HP 7911/12P/R and 7914P/R/CT Setup Information on CIO
Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-12.
HP 7911/12P/R and 7914P/R/CT Setup Information on HP-PB
Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 7911/7912/7914 Disk/Tape Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your disk interface.*

2. *Determine the tape interface. (Dual Controller Only).*

Note   Do not install HP-IB tape drives on the same interface as the root device (main disk drive). Doing so can degrade your disk drive's performance.

You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

3. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the /etc/conf/gen/S800 file.*

One way to do this is to type:

lsdev *major number*

substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. You can go on to step two now.

If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration->, then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

or

■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

4. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

5. *Set the disk HP-IB bus address.*

Note	Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.
	You are limited to eight devices per HP-IB card, addresses 0 through 7.

If you have a dual controller, you must allocate two HP-IB addresses: one for the disk drive and one for the tape drive. If you do not have a dual controller, the tape is accessed through the same HP-IB connector as the disk.

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions provided in the installation documentation for the device.

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the disk to your computer.*

Connect the disk to your computer following the instructions in the hardware installation manual provided with the device.

Note	Complete steps 8 and 9 only if you have a dual controller. If you do not have a dual controller, skip to step 10.

8. *Set the tape HP-IB bus address (Dual Controller Only).*

   a. Choose an available HP-IB bus address and make note of it.

Note	Make sure to select a different bus address than the one you selected in the previous step for the disk drive.

   b. Set the tape HP-IB bus address according to the instructions provided in the installation documentation for the device.

9. *Connect the tape to your computer (Dual Controller Only).*

Connect the tape to your computer following the instructions in the hardware installation manual provided with the device.

If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

10. *If you have any other devices to connect, do so now.*

11. *Connect the power cord.*

12. *Turn on the device.*

13. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for these devices.
- Logical Unit (LU) numbers were assigned to these devices.

14. *Verify that the peripherals have been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(hexadecimal entity id#)   ok
tape   4  4.0.8  cio_ca0.hpib1.tape1  ok(hexadecimal entity id#)   ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the **mount** command to mount the device on your system.

5. Editing the **/etc/checklist** file if you want this device mounted each time you boot the system.

5

HP 7933H/7935H Disk Drives

These disk drives are Command Set 80 (CS/80) devices. They connect to your computer via the high-speed HP-IB disk interface card.

- The HP 7933H is a 404 Mbyte fixed disk.
- The HP 7935H is a 404 Mbyte removable disk.

Additional information about the HP 7933H/35H can be found in the documentation that came with the device.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

5

What You're Going To Do

Caution	Do not attempt to operate the unit until it is moved to the installation site and the spindle and actuator are unlocked.
	Do not apply any sudden mechanical shocks to the unit.

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

HP 7933H and 7935H Disk Drives

Table 5-13. HP 7933/35H Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-14. HP 7933/35 Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 7933H/7935H Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ∗∗∗no such driver∗∗∗, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk to your computer.*

   Connect the disk to your computer following the instructions provided in the hardware installation manual for the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.
- A Logical Unit (LU) number was assigned to this device.
- *Verify that the peripheral has been added.*

  Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3   4.0.7   cio_ca0.hpib0.disc1   ok(hexadecimal entity id#)   ok
```

  See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP 7936H/7937H Disk Drives

These disk drives are Command Set (CS/80) devices. The HP 7936H is a 308 Mbyte fixed disk and the 7937H is a 571 Mbyte fixed disk. They connect to your computer via the high-speed HP-IB disk interface card.

Additional information can be found in the documentation that came with your device.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

5

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

Caution	Do not attempt to operate the unit until it is moved to the installation site and the spindle and actuator are unlocked.
	Do not apply any sudden mechanical shocks to the unit.

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

5

HP 7936H/7937H Disk Drives

Table 5-15. HP 7936/7937H Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-16.
HP 7936/7937H Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

5

Connecting the HP 7936H/7937H Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

HP 7936H/7937H Disk Drives

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect the device to your computer following the instructions in the hardware installation manual for the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord to your device.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(hexadecimal entity id#)   ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP 7957/58A/B and HP 7959/62/63B Disk Drives

These disk drives are Command Set (CS/80) devices. They connect to your computer via the high-speed HP-IB disk interface card and have the following storage capacities:.

The HP 7957A/B   80 Mbytes storage capacity.
The HP 7958A   131 Mbytes storage capacity.
The HP 7958B/62B   152 Mbytes storage capacity.
The HP 7959B/63B   304 Mbytes storage capacity.

Additional information can be found in the documentation that came with your device.

Before Installing This Device

5

Before you install this device:

■ Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the wall command to do this.

What You're Going To Do

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-17.
HP 7957/58A/B and 7959/62/63B Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-18.
HP 7957/58A/B and 7959/62/63B Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 7957/58A/B, and 7959/62/63B Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

                  You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.

Caution   Do not use address positions 8 and 9. On the HP 7957B/58B/59B/62B/63B disk drives, positions 8 and 9 on the ADDRESS wheel are for use by service personnel only. If the drive is powered on with 8 or 9 selected, loss of data can occur.

---

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect the device to your computer following the instructions provided in the hardware installation manual for the device.

7. *Connect the power cord to your device.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.

- A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP 7957/58/59S SCSI Disk Drives

These disk drives are Small Computer Systems Interface (SCSI) devices. They connect to your computer via the SCSI interface card and have the following storage capacities:

The HP 7957S   107 Mbytes storage capacity.

The HP 7958S   161 Mbytes storage capacity.

The HP 7959S   323 Mbytes storage capacity.

Additional information can be found in the *HP 7957S, 7958S, and 7959S Disc Drives Owner's Manual*, HP part number 07959-90911.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

HP 7957/58/59S SCSI Disk Drives

What You're Going To Do

The device driver you will need for this disk drive is disc3. The disc3 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for the disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-19.
HP 7957/58/59S Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Disk Drives	disc3, scsi2, cio_ca0
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

Table 5-20.
HP 7957/58/59S Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Interface	Built-in SCSI ports on some $8X7$ models[1]
Drivers Required by SCSI Disk Drives	disc3, scsi1
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the HP 7957/58/59S SCSI Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

5

   a. Choose and available SCSI bus address and make note of it.
   b. Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

Note   Setting the SCSI bus address to 8 or 9 selects the bus addresses 0 or 1 respectively.

---

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect your device to your computer following the instructions in the hardware installation manual provided with the device.

   The HP 7957/58/59S SCSI disk drives have internal bus lengths of 0.3 meters.

   See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

7. *Connect the power cord to your device.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

   DO NOT turn on the power to the computer before the disk drive.

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    disk   3   4.5   scsi1.target.disc3    ok(hexadecimal entity id#)    ok
    ```

    See chapter 8 for further discussion of `ioscan`.

HP 7957/58/59S SCSI Disk Drives

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the **mount** command to mount the device on your system.

5. Editing the **/etc/checklist** file if you want this device mounted each time you boot the system.

5

HP 9122D/S/C Flexible Disk Drives

The HP 9122D/S records 630 Kbytes of data on double-sided (high density) or 315 Kbytes of data on single-sided (low density) 3 1/2 inch disks.

The HP 9122S has a single disk drive, while the HP 9122D has two disk drives in the unit.

The HP 9122C records 2 Mbytes of data unformatted and 1.4 Mbytes formatted on double-sided (high density) 3 1/2 inch disks. The HP 9122C unit is available with one or two disk drives per unit.

These disk drives connect to your computer via the standard-speed HP-IB disk interface card. The HP 9122 uses the Command Set 80 (CS-80) protocol.

Additional information about these disk drives can be found in the documentation that came with your device.

Note   The HP 9122D/S/C flexible disk drives are not supported as system disks and can only be used for secondary "mounted volumes" *or* LIF utility volumes.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

HP 9122D/S/C
Flexible Disk Drives

What You're Going To Do

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-21. HP 9122D/S/C Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-22.
HP 9122D/S/C Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 9122D/S/C Flexible Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the /etc/conf/gen/S800 file.*

   One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel.

Note   SAM does not support installation of flexible disk drives.

If you need to edit your kernel configuration file by hand and reconfigure the kernel using the **uxgen** command, see Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure that all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect the device to your computer following the instructions in the hardware installation manual provided with the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord to your device.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP 9127A Flexible Disk Drive

The HP 9127A is single 5 1/4 inch flexible disk drive and has a capacity of 270 Kbytes.

This disk drive connects to your computer via the built-in, standard-speed HP-IB or the standard-speed, HP-IB disk interface card.

Note	The HP 9127A flexible disk drive is not supported as a system disk and can only be used for secondary "mounted volumes" *or* LIF utility volumes.

Additional information can be found in the *Getting Started with Your HP 9127A Disc Drive* (Manual kit), HP part number 09127-90099.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-23. HP 9127A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-24. HP 9127A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 9127A Flexible Disk Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the /etc/conf/gen/S800 file.*

   One way to do this is to type:

   > `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel.

   Refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions on editing your kernel configuration file and running **uxgen** to reconfigure the kernel.

Note	SAM does not support configuration of flexible disk drives.

3. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note	Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.
	You are limited to eight devices per HP-IB card, addresses 0 through 7.

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

Connect your device to your computer following the instructions in the hardware installation manual for the device.

If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord to your device.*

8. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.

- A Logical Unit (LU) number was assigned to this device.

HP 9127A Flexible Disk Drive

9. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP C2201/04A HP-FL Disk Drives

The HP C2201/04A 5 1/4 inch disk drives are HP-FL devices. The HP C2201A (Model 670FL) has a capacity of 670 Mbytes and the HP C2204A (Model 134FL) has a capacity of 1.34 Gbytes.

For more information about this disk drives see the documentation that came with the device.

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the wall command to do this.

5

HP C2201/04A HP-FL Disk Drives

What You're Going To Do

The device driver you will need for this disk drive is disc2. The disc2 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-25. HP C2201/04A Setup Information on CIO Computers

Interface card	HP 27111A CIO HP-FL Device Adapter
Drivers Required	disc2, hpfl0, cio_ca0
Block-mode major number	10
Character-mode major number	12
Minor number format	See Appendix A

Table 5-26.
HP C2201/04A Setup Information on HP-PB Computers

Interface card	HP 28615A HP-FL Device Adapter[1]
Drivers required	disc4, hpfl1
Block-mode major number	7
Character-mode major number	13
Minor number format	See Appendix A
Interface card	HP A1749A HP-PB PBA-FL Device Adapter[2]
Drivers Required	disc2, hpfl0, cio_ca0
Block-mode major number	10
Character-mode major number	12
Minor number format	See Appendix A

1 This device adapter is not supported on systems running DataPair/800. Use the HP A1749A described below.

2 The CIO bus address is hardwired to address zero (0). For example, if the card is in HP-PB slot 11 and a disk is at address three (3), the notation 44.0.3 would be used for accessing the disk. The direct connection possible with the HP 28615A device adapter is preferred. However, you must use this adapter if your system is running DataPair/800. The HP A1749A is not supported on models 807S, 817S, or 837S.

Connecting Your HP C2201/04A Disk Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   `lsdev` *major number*

5

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->`, then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the `uxgen` command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Connect the device to your computer.*

   Connect the device according to the instructions provided in the hardware installation manual for the device.

6. *Connect the power cord to your device.*

7. *If you have any other devices to connect, do so now.*

8. *Turn on the device.*

9. *Plug in and power on your computer.*

   During the boot process:

   ■ Device "special" files were created for this device.

   ■ A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    `disk    3   32.5    hpfl1.disc4   ok(`*hexadecimal entity id#*`)     ok`

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the **mount** command to mount the device on your system.

5. Editing the **/etc/checklist** file if you want this device mounted each time you boot the system.

HP C2200/03A HP-IB Disk Drives

The HP C2200/03A 5 1/4 inch disk drives are HP-IB interface devices. The HP C2200A (Model 335H) has a capacity of 335 Mbytes and the HP C2203A (Model 670H) has a capacity of 670 Mbytes.

These disk drives connect to your computer via the high-speed HP-IB disk interface card or the standard-speed HP-IB disk interface card.

Additional information can be found in the following documents:

HP Series 6000 Disk Storage Systems Owner's Manual Models 335H, 670H, and 670XP, HP part number C2200-90901

HP Series 6000 Disk Storage Systems Installation Guide Models 335H, 670H, and 670XP, HP part number C2200-90902

Before Installing This Device

Before you install this device:

- Have the hardware installation documentation that came with the device handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

Note	You can install the HP C2200/03A disks yourself if you deleted the installation option when you purchased the units. If you deleted the installation support, refer to the *HP Series 6000 Disk Storage Systems Installation Guide Models 335H, 670H, and 670XP* that was shipped with your units for installation details.
	The HP C2200/03A disks can be installed by an HP Customer Engineer. The installation cost is included in the purchase price of the unit if you did not select the "delete installation" option. Your HP Customer Engineer will unpack and install your disk for you. For these details, please refer to the unpacking and installation procedures that came with the disk drive.

The device driver you will need for this device is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-27. HP C2200/03 Setup Information on CIO Computers

Interface card required	HP 27110B HP-IB card
Drivers Required	disc1, hpib0, cio_ca0
Block-mode major number	8
Character-mode major number	7
Minor number format	See Appendix A

Table 5-28. HP C2200/03 Setup Information on HP-PB Computers

Interface card required	HP 28651A HP-IB card
Drivers Required	disc1, hpib1
Block-mode major number	8
Character-mode major number	7
Minor number format	See Appendix A

Connecting the C2200/03A Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

                      You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

Caution   Positions 8 and 9 on the ADDRESS wheel are for use by service personnel only. If the drive is powered on with 8 or 9 selected, loss of data can occur.

---

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect the device to your computer following the instructions provided in the hardware installation manual for the device.

7. *Select the Line Voltage.*

   Refer to the *HP Series 6000 Disk Storage Systems Installation Guide Models 335H, 670H, and 670XP* that was shipped with your disk drive to set the proper setting for the voltage select switch.

HP C2200/03 Disk Drives

8. *Connect the power cord to the device.*

9. *Turn on the device.*

10. *If you have any other devices to connect, do so now.*

11. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.

    ■ A Logical Unit (LU) number was assigned to this device.

12. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB
    bus address 7 and the HP-IB interface occupies slot 0 on your CIO system,
    the following is an example of a display line that `ioscan -f` could return
    showing that this device has been added:

```
disk    3   4.0.7   cio_ca0.hpib0.disc1   ok(hexadecimal entity id#)     ok
```

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with
your new device. For some devices, you may have to initialize the disk or
media before proceeding. Refer to the hardware installation documentation
that came with the device to determine if this is necessary. Refer to the *System
Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes.
2. Sectioning the disk.
3. Determining the mount point directory on your system.
4. Using the `mount` command to mount the device on your system.
5. Editing the `/etc/checklist` file if you want this device mounted each time
   you boot the system.

Mass Storage Systems

The following Mass Storage Systems are covered in this section:

- HP C2460R/F
- HP C2461R/F
- HP C2463R/F

C2460R/F Mass Storage System

The HP C2460R Mass Storage System contains a power supply, 3.5-inch hard disk drive, three full-height slots within the cabinet to install additional SCSI (Small Computer System Interface) devices and a 422 Mbyte disk. (The HP C2460R is also referred to as a Series 6000 Model 420R. Text in this section will refer to this product as the HP C2460R.)

The HP C2460F Mass Storage System is the same as the C2460R, except in a floor-standing model with seven shelves.

C2461R/F and C2463R/F Mass Storage Systems

The HP C2461R/C2463R Mass Storage Systems contain a power supply, 5.25-inch hard disk drive, three full-height slots within the cabinet to install additional SCSI (Small Computer System Interface) devices, and a 677 Mbyte disk drive or 1300 Mbyte disk drive respectively. (The HP C2461R/C2463R are also referred to as a Series 6000 Models 670R and 1300DR respectively. Text in this section will refer to these products as the HP C2461R and C2463R.)

The HP C2461F/C2463F Mass Storage Systems are the same as the C2461R/C2463R systems, except in floor-standing models.

Additional Mass Storage Systems

Many HP Series 6000 Mass Storage Systems are available with various combinations of SCSI devices, either standard in the model or available as factory installed options or field upgrade kits. It is not possible to list all these devices and their respective product and model numbers here. The configuration information shown should be used as a guideline for other models. Refer to the *HP Series 6000 Mass Storage System Configuration Quick Reference Card* for complete information on the options and upgrade kits available.

Before Installing This Device

Before you install this device:

■ Have the hardware installation documentation that came with the device handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

Disk Drive Setup Information

The device driver you will need for this disk drive is `disc3`. The `disc3` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed in this table. If you need more information on minor numbers, go to Appendix A, "Device Files and Minor Numbers".

5

Mass Storage Systems

Table 5-29.
Mass Storage System Disk Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Disk Drivers Required	disc3, scsi2, cio_ca0
Disk Block-mode major number	7
Disk Character-mode major number	13
Minor number format	See Appendix A

Table 5-30.
Mass Storage System Disk Setup Information on HP-PB Computers

5

Interface card	HP 28655A SCSI card
Interface card	Built-in SCSI port on some 8X7 models[1]
Disk Drivers Required	disc3, scsi1
Disk Block-mode major number	7
Disk Character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Tape Drive Setup Information

The device driver you will need for these SCSI tape drives is `tape2`. The `tape2` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed in this table. If you need more information on minor numbers, go to Appendix A, "Device Files and Minor Numbers".

Table 5-31.
Mass Storage System Tape Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Tape Drivers Required	tape2, scsi2, cio_ca0
Tape Block-mode major number	5
Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-32.
Mass Storage System Tape Setup Information on HP-PB
Computers

Interface card	HP 28655A SCSI card
Interface card	Built-in SCSI port on some 8X7 models[1]
Tape Drivers Required	tape2, scsi1
Tape Block-mode major number	5
Tape Character-mode major number	5
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the Mass Storage Systems

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

    You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

    lsdev *major number*

    substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

    If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

    ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

    or

    ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address(es) on your devices.*

Note	Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.
	You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

   a. Set the hard disk SCSI bus address(es).

   - Choose an available SCSI bus address and make note of it.
   - Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

Note	For optimum disk performance, your system disk should be set to SCSI address 6. The SCSI interface gives highest priority to the highest address (6) and priority decreases as you work back towards zero (0).

   b. Set the SCSI bus address of any additional SCSI devices that are part of your Mass Storage system. For example, the CD-ROM, DDS-format tape drive, and/or the optical disk drive. Setting the SCSI address of other devices supported in the Mass Storage System is described in the *HP Series 6000 Mass Storage Systems Owner's Manual* specific to your model of Mass Storage System.

Mass Storage Systems

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the Mass Storage System to your computer.*

   Connect the mass storage device to your computer following the instructions outlined in the hardware installation manual provided with the device.

   Check your hardware installation documentation for internal SCSI cable lengths on each device.

7. *Connect the power cord to the device.*

8. *Turn on the power to the Mass Storage System.*

   Do NOT turn on the power to the computer before you power on the Mass Storage System.

Note	Apparent disk drive self test failure will occur when only computer power is off. When computer power is added, the self test failure should clear. If you are concerned about the apparent self test failure, disconnect both SCSI connectors from the Mass Storage System and observe the self test completion.

9. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for each device.

   ■ A Logical Unit (LU) number was assigned to each device.

10. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5 for your hard disk drive, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
disk   3  4.5.0  scsi1.target.disc3   ok(hexadecimal entity id#)    ok
tape_drive  0  4.0.0  scsi1.target.tape2   ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes
2. Sectioning the disk
3. Determining the mount point directory on your system.
4. Using the `mount` command to mount the device on your system.
5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

HP C2252B/HA and C2254B/HA Multiuser Disk Arrays

The HP C2252B/HA and C2254B/HA are multiuser disk array devices consisting of a power supply, controller and multiple disk devices in a single cabinet. When operated in independent mode, each disk mechanism functions as a unique logical unit. Each disk mechanism transfers data independently and concurrently with the other disk mechanisms. Independent mode *does not* provide the data protection feature available on the striped mode configurations with the parity device.

Note	Only striped mode operation is supported on CIO systems. Independent operation mode is not supported on these systems.

When the disk array is operated in striped mode, two or four synchronized disk mechanisms are grouped into a single array for high-speed, parallel data transfers. Each group appears as a single logical unit to the system. An additional disk mechanism functions as a parity device for data protection in the HP C2252HA (two-way striped mode configuration) or HP C2254HA (four-way striped mode configuration). Disk array configurations are set manually on the device.

Caution	Do not remove a mechanism from a disk array operating in striped mode with a parity device. If a mechanism is removed from the array, your HP Customer Engineer will need to run the `rebuild` command to restore the array's data integrity. It is best to label the mechanism and their associated positions in the disk array.

The product configurations are as follows:

HP C2252B   This disk array consists of two 5.25 inch mechanism disk modules, each having 1.36 Gbytes capacity, providing a total storage capacity of 2.72 Gbytes.

HP C2252HA   This disk array is the same as the C2252B except that it has an additional 5.25-inch disk module configured as a parity disk. This configuration is recommended for optimum data protection.

HP C2254B   This disk array consists of four 5.25 inch mechanism disk modules, each having 1.36 Gbyte capacity, providing a total storage capacity of 5.44 Gbytes.

HP C2254HA   This disk array is the same as the C2254B except that it has an additional 5.25-inch disk module configured as a parity disk. This configuration is recommended for optimum data protection.

5

What You're Going To Do

On CIO systems, the device driver you will need for this HP-FL device is
disc2. On HP-PB systems, the device driver you will need for this HP-FL
device is disc4. The disc2 and disc4 drivers are software configurable and
are a standard part of your operating system as shipped. Device files are
automatically created for these devices when standard installation procedures
are followed.

Note   This device *is not* customer installable. Your Hewlett-Packard
                   Customer Engineer will install this device for you. Installation
                   costs are included in the price of the device.

The tables shown below list the interfaces, device drivers, and major numbers
that this HP-FL disk array requires. For information on minor numbers, refer
to Appendix A, "Device Files and Minor Numbers".

5

Table 5-33. Disk Array Setup Information on CIO Computers

Interface card required	HP 27111A HP-FL Device Adapter
Drivers Required for HP-FL Disks	disc2, hpfl0, cio_ca0
HP-FL Block-mode major number	10
HP-FL Character-mode major number	12
Minor number format	See Appendix A

Table 5-34. Disk Array Setup Information on HP-PB Computers

Interface card	HP 28615A HP-FL Device Adapter[1]
Drivers Required for HP-FL Disks	disc4, hpfl1
HP-FL Block-mode major number	7
HP-FL Character-mode major number	13
Minor number format	See Appendix A
Interface card	HP A1749A HP-PB PBA-FL Device Adapter[2]
Drivers Required	disc2, hpfl0, cio_ca0
Block-mode major number	10
Character-mode major number	12
Minor number format	See Appendix A

1 This device adapter is not supported on systems running DataPair/800. Use the HP A1749A described below.

2 The CIO bus address is hardwired to address zero (0). For example, if the card is in HP-PB slot 11 and a disk is at address three (3), the notation 44.0.3 would be used for accessing the disk. The direct connection possible with the HP 28615A device adapter is prefered. However, you must use this adapter if your system is running DataPair/800. The HP A1749A is not supported on models 807S, 817S, or 837S.

Caution	The HP C2252B and HP C2254B Disk Arrays operated in striped mode *are not* recommended for situations requiring a high degree of data protection. The striped mode with the parity disk module offers the greatest degree of data protection.

5

Connecting the HP C2252B/HA and C2254B/HA Disk Arrays

The following summary supplements the procedures outlined in the hardware installation documentation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.*

   One way to do this is to type:

   > lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Have your Hewlett-Packard Customer Engineer complete the hardware installation.*

6. *Verify that the peripheral has been added.*

   Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5 for the disk array, the following line in the display that `ioscan -f` returns shows that this device has been added:

   ```
   disk    3   32.5   hpfl1.disc4   ok(hexadecimal entity id#)    ok
   ```

   See chapter 8 for further discussion of `ioscan`.

5

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the `mount` command to mount the device on your system.

5. Editing the `/etc/checklist` file if you want this device mounted each time you boot the system.

5	**Caution**	Use of this Disk Array device is limited in the following ways:
		On CIO Systems Only
		■ DO NOT use as a `root`, `boot`, `swap`, or `dump` device. This use is not supported.
		■ DO NOT use `mediainit`. Contact your Hewlett-Packard representative if you suspect any disk failure.
		■ ONLY striped operation mode is supported.
		On all Systems
		■ DO NOT use section 2 when operating the device in striped mode. Section 2 is not supported on these configuration of the device because of HP-UX limitations. HP-UX cannot address more than 2 Gbytes of disk space at a time, therefore selecting section 2 would limit the amount of addressable disk space to 2 Gbytes. The remaining disk space would be unusable.

HP 2283/84A SCSI Disk Drives

These disk drives are Small Computer Systems Interface (SCSI) devices. They connect to your computer via the SCSI interface card.

The HP 2283A has a capacity of 331 Mbytes.
The HP 2284A has a capacity of 663 Mbytes.

Additional information can be found in the installation documentation that came with your device.

Before Installing This Device

Before you install this device:

- Have the documentation that came with your disk drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

HP 2283A/2284A SCSI Disk Drives

What You're Going To Do

The device driver you will need for this SCSI disk drive is `disc3`. The `disc3` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures in the next section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed here. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-35. HP C2283/84A Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Disk Drives	`disc3`, `scsi2`, `cio_ca0`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

Table 5-36. HP C2283/84 Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Interface	Built-in SCSI ports on some $8X7$ models[1]
Drivers Required by SCSI Disk Drives	`disc3`, `scsi1`
SCSI Disk Block-mode major number	7
SCSI Disk Character-mode major number	13
Minor number format	See Appendix A

1 Check your *Owner's Guide* for specific interface availability.

Connecting the HP 2283A/2284A SCSI Disk Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

5

HP 2283A/2284A SCSI Disk Drives

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

---

   a. Choose an available SCSI bus address and make note of it.
   b. Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the disk drive to your computer.*

   Connect your device to your computer following the instructions in the hardware installation manual provided with the device.

   The HP 2283A/2284A SCSI disk drives have internal bus lengths of ? meters.

7. *Connect the power cord to your device.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

   DO NOT turn on the power to the computer before the disk drive.

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following line in the display that `ioscan -f` returns shows that this device has been added:

    ```
    disk   3  4.5.0  scsi.target.disc3    ok(hexadecimal entity id#)    ok
    ```

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. For some devices, you may have to initialize the disk or media before proceeding. Refer to the hardware installation documentation that came with the device to determine if this is necessary. Refer to the *System Administration Tasks* manual for instructions on the following tasks:

1. Creating file systems or swap areas in either disk sections or logical volumes

2. Sectioning the disk

3. Determining the mount point directory on your system.

4. Using the **mount** command to mount the device on your system.

5. Editing the **/etc/checklist** file if you want this device mounted each time you boot the system.

HP 9144A/45A Tape Drive

The HP 9144A/45A Tape Drives use 1/4 inch tape cartridges. Two formatted storage capacities are available using the 88140SC (a package of 5, 150 ft. cartridge tapes, each 16.7 megabyte) or the 88140LC (a package of 5, 600 ft. cartridge tapes, each 67.0 megabyte) cartridges. The tape drive provides read-after-write capability for data verification as well as data-recovery and auto-sparing, and it is compatible with existing 1/4 inch cartridges built into other HP mass storage devices.

The HP 9144A tape drive can read and write to 16 track tape only. The HP 9145A tape drive reads 16 track tape and can read and write to 32 track tape.

The 9144A/45A tape drives connect to your computer via the HP-IB disk interface cards.

Before Installing This Device

Before you install this device:

- Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

The device driver you will need for this disk drive is disc1. The disc1 device driver is software configurable and is a standard part of your operating system as shipped. Install this disk drive according to the instructions given in the following section. Device files are automatically created for this disk drive when you follow these procedures.

Refer to the tables below for detailed HP-UX configuration information. If you intend to customize your system's configuration, you will need this detailed information and you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands". Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-37. HP 9144/45A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib0, cio_ca0
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Table 5-38. HP 9144/45A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Disks	disc1, hpib1
HP-IB Disk Block-mode major number	8
HP-IB Disk Character-mode major number	7
Minor number format	See Appendix A

Connecting the HP 9144A/45A Tape Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Do not install HP-IB tape drives on the same interface as the root device (main disk drive). Doing so can degrade your disk drive's performance.

5

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address.*

Note	Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.
	You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose and available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the tape drive to your computer.* Connect the device to your computer following the instructions given in the hardware installation manual for the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If your have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

HP 9144A/45A Tape Drive

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, you will see a line in the display that `ioscan -f` returns that looks like this:

    `disk   3  4.0.7  cio_ca0.hpib0.disc1  ok(`*hexadecimal entity id#*`)    ok`

    See chapter 8 for further discussion of `ioscan`.

Note   The HP 9144/45A are CS80 devices and use the `disk1` driver.

---

5   What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP 7974A Tape Drive

The HP 7974A is a 100/50 ips, 1/2 inch, 9-track, open-reel tape drive supplied in an upright cabinet. It supports 1600 cpi Phase Encoded (PE) format and optionally 800 cpi NRZI format. The HP 7974A operates in either start/stop (50 ips) or streaming (100 ips) mode depending on whether data is available on the bus.

This tape drive connects to your computer via the high-speed HP-IB disk interface card.

Before Installing This Device

Before you install this device:

■ Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

The device driver you will need for this HP-IB tape drive is tape1. The tape1 driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all of the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed here. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-39. HP 7974A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Tape Drives	tape1, hpib0, cio_ca0
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-40. HP 7974A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Tape Drives	tape1, hpib1
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Connecting the HP 7974A Tape Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Do not install HP-IB tape drives on the same interface as the root device (main disk drive). Doing so can degrade your disk drive's performance.

---

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

       lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *TURN ON your HP 7974A Tape Drive.*

5. *Set the HP-IB bus address.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

6. *Connect the tape drive to your computer.*

   Connect the device to your computer following the instructions in the hardware installation manual for the device.

   If you need to replace your HP-IB cable for any reason, refer to chapter 2 for a list of available HP-IB cables and their lengths.

7. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for this device.

   ■ A Logical Unit (LU) number was assigned to this device.

8. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, you will see a line in the display that `ioscan -f` returns that looks like this:

```
tape    3   4.0.7   cio_ca0.hpib0.tape1   ok(hexadecimal entity id#)    ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

5

HP 7978A/B Tape Drives

The HP 7978A/B are 75 ips, 1/2 inch, 9-track, open-reel tape drives supplied in an upright cabinet. They support 1600 cpi Phase Encoded (PE) format and 6250 cpi Group Code Recording (GCR) format. The HP 7978A/B operates only in streaming mode.

These tape drives connect to your computer via the built-in, high-speed HP-IB or the high-speed HP-IB disk interface card.

Before Installing This Device

Note	Arrange to have your HP Customer Engineer install the HP 7978A/B Tape drive. The installation cost is included in the purchase price of the unit.

Before having this device installed:

■ Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

What You're Going To Do

The device driver you will need for this HP-IB tape drive is `tape1`. The `tape1` driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all of the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed here. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-41. HP 7974A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1, hpib0, cio_ca0`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-42. HP 7974A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1, hpib1`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Connecting the HP 7978A/B Tape Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Ensure that the power switch is in the OFF position.*

5. *Connect the power cord to the device.*

6. *Turn ON the tape drive.*

7. *Set the HP-IB bus address.*

Note	Find out which HP-IB addresses are currently in use on this system. Determine the available HP-IB address(es). Use the worksheet at the end of this book to note already-used addresses. You are limited to eight devices per HP-IB card, addresses 0 through 7.

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

8. *Ensure all power switches on the device and on the computer are in the OFF position.*

9. *Connect the Tape Drive to the Computer.*

   Connect the device to the computer following the instructions provided in the hardware installation documentation for the device.

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.

    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, you will see a line in the display that `ioscan -f` returns that looks like this:

    `disk   3  4.0.7   cio_ca0.hpib0.disc1   ok(`*hexadecimal entity id#*`)     ok`

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP 7979A/7980A/7980XC Tape Drives

The HP 7979A is an HP-IB 125 ips 1/2-inch 9-track open-reel tape drive supplied in an upright cabinet. It supports 1600 cpi Phase Encoded (PE) format (can be upgraded to 6250 cpi).

The HP 7980A is an HP-IB 125 ips 1/2-inch 9-track open-reel tape drive which supports 1600 Phase Encoded (PE) format and 6250 Group Coded Recording (GCR) format.

The HP 7980XC is the same as the 7980A, with the added feature of being able to read and write in compressed format.

Before Installing This Device

Note	Arrange to have your HP Customer Engineer install your tape drive. The installation cost is included in the purchase price of the unit.

Before you have this device installed:

- Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the wall command to do this.

HP 7979A/7980A/7980XC Tape Drives

What You're Going To Do

Your HP Customer Engineer will unpack and install your tape drive, following these general procedures.

Caution   Do not attempt to operate the unit until your HP Customer Engineer has installed the unit for you.

The device driver you will need for this HP-IB tape drive is `tape1`. The `tape1` driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all of the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed here. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-43. HP 7974A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1, hpib0, cio_ca0`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-44. HP 7974A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1, hpib1`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Connecting the HP 7979A/7980A/7980XC Tape Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Ensure that the power switch is in the OFF position.*

5. *Connect the power cord to the device.*

6. *Turn ON the tape drive.*

7. *Set the HP-IB bus address.*

Note	Find out which HP-IB addresses are currently in use on this system. Determine the available HP-IB address(es). Use the worksheet at the end of this book to note already-used addresses.
	You are limited to eight devices per HP-IB card, addresses 0 through 7.

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

8. *Ensure all power switches on the device and on the computer are in the OFF position.*

9. *Connect the tape drive to the computer.*

Connect the device to the computer following the instructions provided in the hardware installation documentation for the device.

10. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.

- A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, you will see a line in the display that `ioscan -f` returns that looks like this:

```
tape   3   4.0.7   cio_ca0.hpib0.tape1   ok(hexadecimal entity id#)   ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP 7979S and 7980S/SX Tape Drives

The HP 7979S is a SCSI 125 ips 1/2-inch 9-track open-reel tape drive which supports 1600 Phase Encoded (PE) format.

The HP 7980S is a SCSI 125 ips 1/2-inch 9-track open-reel tape drive which supports 1600 Phase Encoded (PE) format and 6250 Group Coded Recording (GCR) format.

The HP 7980SX is the same as the 7980S, with the added feature of being able to read and write in compressed format.

There is an orderable option (option 800) to both of these products to support 800 cpi Non-Return to Zero Inverted (NRZI) format.

Before Installing This Device

Note	Arrange to have your HP Customer Engineer install your tape drive. The installation cost is included in the purchase price of the unit.

Before you have this device installed:

- Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

Your HP Customer Engineer will unpack and install your tape drive, following these general procedures.

Caution	Do not attempt to operate the unit until your HP Customer Engineer has installed the unit for you.

The device driver you will need for this SCSI tape drive is `tape2`. The `tape2` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-45. HP 7980S/SX Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Tape Drives	`tape2`, `scsi2`, `cio_ca0`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-46.
HP 7980S/SX Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Drivers Required by SCSI Tape Drives	`tape2`, `scsi1`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

HP 7980S/SX Tape Drives

Connecting the HP 7980S/SX Tape Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine the interface.*

   Any of the supported interfaces listed in the preceding tables can be used. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open
     Kernel Configuration-> , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Connect the power cord to the device.*

5. *Turn ON the tape drive to set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

---

   a. Choose an available SCSI bus address and make note of it.

   b. Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

6. *Turn OFF the tape drive and unplug the power cord.*

7. *Ensure all power switches on the device and on the computer are in the OFF position.*

8. *Connect the tape drive to the computer.*

   Connect the device to the computer following the instructions provided in the hardware installation documentation for the device.

   See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

   Consult the documentation that came with your tape drive for internal bus lengths.

HP 7980S/SX Tape Drives

9. *Plug in and power on the tape drive.*

10. *Plug in and power on the computer.* During the boot process:
    - Device "special" files were created for this device.
    - A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following line in the display that `ioscan -f` returns shows that this device has been added:

    `tape   3  4.5.0  scsi.target.tape2`   ok(*hexadecimal entity id#*)   ok

    See chapter 8 for further discussion of `ioscan`.

5

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP C1511A Series 6400 Model 1300H HP-IB DDS-Format Tape Drive

The HP C1511A Model 1300H tape drive stores data in a format called Digital Data Storage (DDS). DDS cassettes can each hold up to 1.3 gigabytes (1300 megabytes) of data. The C1511A is a standalone tape drive and uses a high-speed HP-IB interface. It is a high-capacity, medium transfer-rate device for offline data storage on tape.

Note	Use only HP labeled DDS media in HP DDS-format tape drives. A box of five (60m) HP labeled DDS-format tapes is available, HP part number 92283A. Full height (5 1/2-inch) DDS-format tape drives cannot read or write to 90 meter cassettes.

Refer to the documentation that came with your device for more information.

Before Installing This Device

Before you install this device:

- Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

HP C1511A HP-IB DDS-Format Tape Drive

Connecting the HP C1511A HP-IB DDS-Format Tape Drive

The device driver you will need for this HP-IB tape drive is `tape1`. The `tape1` driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created for this device when you follow the procedures listed in this section.

For most installations, you will not need all of the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed here. For information on minor numbers, refer to Appendix A, "Device Files and Minor Numbers".

Table 5-47. HP C1511A Setup Information on CIO Computers

Interface card	HP 27110B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1`, `hpib0`, `cio_ca0`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-48. HP C1511A Setup Information on HP-PB Computers

Interface card	HP 28650A/B HP-IB card
Drivers Required by HP-IB Tape Drives	`tape1`, `hpib1`
HP-IB Tape Character-mode major number	5
Minor number format	See Appendix A

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

       lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ∗∗∗no such driver∗∗∗, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ▪ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

       or

   ▪ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

HP C1511A HP-IB DDS-Format Tape Drive

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the HP-IB bus address*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

5

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the hardware installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the tape drive to your computer.*

   Connect your device to your computer following the instructions in the hardware installation manual for the device.

7. *Turn on the drive.*

8. *Insert tape.*

Note   You must insert the tape *before* turning on the computer. If the DDS-format drive is found on the bus before the root disk during the automatic boot sequence, and no tape is inserted, the system will wait for you to insert a tape.

---

9. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for this device.

   ■ A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your CIO system, you will see a line in the display that `ioscan -f` returns that looks like this:

    ```
    tape_drive   0   52.0.0 cio_ca0.hpib0.tape1   ok(hexadecimal entity id#)     ok
    ```

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP C1512A HP Series 6400 Model 1300S SCSI DDS-Format Tape Drive

The HP C1512A Model 1300S tape drive stores data in a format called Digital Data Storage (DDS). DDS cassettes can each hold up to 1.3 gigabytes (1300 megabytes) of data. The C1512A is a standalone tape drive and uses a SCSI (Small Computer System Interface) interface. It is a high-capacity, medium transfer-rate device for offline data storage on tape.

Note	Use only HP labeled DDS media in HP DDS-format tape drives. A box of five (60m) HP labeled DDS-format tapes is available, HP part number 92283A. Full height (5 1/2-inch) DDS-format tape drives cannot read or write to 90 meter cassettes.

Before Installing This Device

Before you install this device:

■ Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

Refer to the documentation that came with your tape drive for more information.

What You're Going To Do

The device driver you will need for this SCSI tape drive is `tape2`. The `tape2` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-49. HP C1512A Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Tape Drives	`tape2, scsi2, cio_ca0`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-50. HP C1512A Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Drivers Required by SCSI Tape Drives	`tape2, scsi1`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Connecting the HP C1512A SCSI DDS-Format Tape Drive

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ▪ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ▪ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

   b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

5

   a. Choose an available SCSI bus address and make note of it.

   b. Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

5. Set parity to on.

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the tape drive to your computer.*

   Connect your device to your computer following the instructions in the hardware installation manual for the device.

   The HP C1512A DDS-Format drive has an internal bus length of .55 meters.

   See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

C1512A SCSI DDS-Format Tape Drive

8. *Turn on the drive.*

9. *Insert tape.*

Note   You must insert the tape *before* turning on the computer. If the DDS-format drive is found on the bus before the root disk during the automatic boot sequence, and no tape is inserted, the system will wait for you to insert a tape.

---

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.

    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you choose HP-IB bus address 7 and the HP-IB interface occupies slot 0 on your HP-PB system, you will see a line in the display that `ioscan -f` returns that looks like this:

        tape_drive 3 4.7.0 scsi1.target.tape2   ok(hexadecimal entity id#)   ok

    See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

HP C1520A/C1521A HP Series 6400 SCSI DDS-Format Tape Drives

The HP C1520A Digital Audio Tape (DAT) drive is a streaming tape drive that stores data in a format called Digital Data Storage (DDS). It is a high-capacity, medium transfer-rate standalone tape drive that uses a SCSI (Small Computer System Interface) interface. The C1520A has a fast search capability and can read data compressed tapes.

The HP C1521A is the same as the HP C1520A except that it can both read and store data in a data compressed DDS format.

A sixty meter (60m) DDS cassette can hold up to 1.3 gigabytes (1300 megabytes) of uncompressed data. In compressed mode, a 60m DDS cassette can hold approximately 5.2 gigabytes (5200 megabytes) of data. A ninety meter (90m) DDS cassettes can hold up to 2.0 gigabytes (2000 megabytes) of uncompressed data. In compressed mode, a 90m DDS cassette can hold approximately 8.0 gigabytes (8000 megabytes) of data.

Note	■ Data storage rate and capacity, especially in compressed mode, is dependent upon the computer's capacity to keep up with the device and the type of data being stored.
	■ Use only HP labeled DDS-format tapes in HP DDS-format tape drives. HP 92283A contains five (60m) HP labeled DDS-format tapes; and HP 92283B contains five (90m) HP labeled DDS-format tapes.

Before Installing This Device

Before you install this device:

■ Have the documentation that came with your tape drive handy. You will need to refer to it during this procedure.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system, you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

5

Refer to the User's Guides that came with your device for information on setting up, using, and maintaining this tape drive.

What You're Going To Do

The device driver you will need for this SCSI tape drive is `tape2`. The `tape2` device driver is software configurable and is a standard part of your operating system as shipped. Device files are automatically created when you follow the procedures listed in this section.

For most installations, you will not need all the detailed information given in these tables. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 5-51. HP C1520/21A Setup Information on CIO Computers

Interface card	HP 27147A SCSI card
Drivers Required by SCSI Tape Drives	`tape2, scsi2, cio_ca0`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Table 5-52.
HP C1520/21A Setup Information on HP-PB Computers

Interface card	HP 28655A SCSI card
Drivers Required by SCSI Tape Drives	`tape2, scsi1`
SCSI Tape Character-mode major number	5
Minor number format	See Appendix A

Connecting the HP C1520A/C1521A SCSI DDS-Format Tape Drives

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your current kernel configuration file, usually the* /etc/conf/gen/S800 *file.* One way to do this is to type:

       `lsdev` *major number*

5

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

      or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

  a. Shut down and halt the system using the `/etc/shutdown -h` command. On systems with powerfail mode, be sure to also turn off the battery back-up.

  b. TURN OFF the computer and unplug the power cord.

4. *Set the SCSI bus address on your device.*

Note   Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.

              You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

---

  a. Choose an available SCSI bus address and make note of it.

  b. Set the SCSI bus address according to the instructions in the hardware installation documentation provided with the device.

5. Set the parity to on.

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the tape drive to your computer.*

  Connect your device to your computer following the instructions in the hardware installation manual for the device.

  See the "SCSI Device Guidelines" section of chapter 2 if you need information on SCSI cables and terminators or SCSI bus length limitations and guidelines.

8. *Turn on the drive.*

9. *Insert tape.*

| **Note** | You must insert the tape *before* turning on the computer. If the DDS-format drive is found on the bus before the root disk during the automatic boot sequence, and no tape is inserted, the system will wait for you to insert a tape. |

---

10. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.

- A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, on an HP-PB system, if you chose bus address 5, the following line in the display that `ioscan -f` returns shows that this device has been added:

```
tape_drive  3  4.5.0  scsi1.target.tape2   ok(hexadecimal entity id#)   ok
```

See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Consult the documentation that came with your tape drive for specifics on tape drive start up and operating instructions.

6

Installing Printers

Introduction

This chapter contains installation and configuration procedures for the following printers:

HP 2106A DeskJet 500 Printer
HP 2276A DeskJet Printer
HP 2277A DeskJet Plus Printer
HP 2225C/D/P ThinkJet Printer
HP 2227A/B QuietJet Plus Printer
HP 2228A QuietJet Printer
HP 2563B Printer
HP 2564B Printer
HP 2566B Printer
HP 2562C Printer
HP 2684A LaserJet 2000 Printer
HP 2684D LaserJet 2000 Printer
HP C2753A Model F100 Printer
HP 2686A/D LaserJet Printer
HP 33440A LaserJet II Printer
HP 33447A LaserJet IID Printer
HP 33471A LaserJet IIP Printer
HP 33449A LaserJet Series III Printer
HP 33459A LaserJet Series IIID Printer
HP 33491A LaserJet Series IIIsi Printer
HP 2932A and 2934A Printers
HP 3630A PaintJet Printer
HP C1602A PaintJet XL Printer
HP 2563/64/66/67C Impact Printers

HP 2225C/D/P ThinkJet Printer

The HP 2225C/P ThinkJet printers connect to the computer through a parallel interface. The HP 2225D connects to the computer through an RS-232 interface.

Before Installing This Device

Before you install this device:

■ Refer to your printer's manuals for instructions on unpacking and preparing the printer for installation. Keep this documentation handy. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 6-1. HP 2225D Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Table 6-2. HP 2225C/D/P Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up.
Connect low usage devices, such as modems or printers (NOT the default printer) to
Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your S800 file.*

   One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

6. *Connect the power cord.*

7. *Turn on the device.*

8. *If you have any other devices to connect, do so now.*

9. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for this device.
   ■ A Logical Unit (LU) number was assigned to this device.

6

10. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
tty       0  16       mux2       ok(hexadecimal entity id#)       ok
```

See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

6

HP 2106A Deskjet 500
HP 2276A/77A DeskJet and DeskJet Plus Printers

The HP 2106A, 2276A and 2277A DeskJet printers can connect to your computer through parallel and RS-232 interfaces.

Before Installing This Device

Before you install this device:

- Refer to your printer's manuals for instructions on unpacking and preparing the printer for installation. Keep this documentation handy. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

6

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 6-3. HP DeskJet Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

6

Note   CIO systems do not support a parallel interface.

HP 2106A DeskJet 500
HP 2276A/77A DeskJet and DeskJet Plus Printers

Table 6-4. HP DeskJet Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

2. *Verify that the drivers required for this device are included in your S800 file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

6. *Connect the power cord.*

7. *Turn on the device.*

8. *If you have any other devices to connect, do so now.*

9. *Plug in and power on the computer.*

   During the boot process:

   ■ Device "special" files were created for this device.
   ■ A Logical Unit (LU) number was assigned to this device.

6

10. *Verify that the peripheral has been added.*

   Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

   tty   0 16   mux2   ok(*hexadecimal entity id#*)   ok

See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

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HP 2227A/B QuietJet Plus
and HP 2228A QuietJet Printers

The HP 2227A QuietJet Plus and 2228A QuietJet printers can connect to the computer via the RS-232-C or parallel interface.

The HP 2227B QuietJet Plus printer connects to the computer via an HP-IB interface.

Before Installing This Device

Before you install this device:

■ Refer to your printer's manuals for instructions on unpacking and preparing the printer for installation. Keep this documentation handy. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

Table 6-5.
HP 2227A/28A and 2227B Printer Setup on CIO Computers

RS-232-C Interfaces (2227A/2228B only)	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces (2227B only)	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr1, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

Table 6-6. HP 2227A/28A Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

6

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

       lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

       or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.

   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

               You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.

   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

   c. Enable the Secondary Command Protocol.

      Follow the procedure in your printer's installation material to enable the secondary command protocol. This allows HP-UX to pace the printer (time-share the bus with other devices on the interface) if the printer's address is in the range 0 to 7.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    tty       0  16        mux2         ok(hexadecimal entity id#)        ok
    ```

See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP 2563A/B/C Printer

The HP 2563A/B/C is a dot-matrix impact printer. These printers can connect to your computer system via an RS-232-C, parallel, or HP-IB interface. However, not all models support all interface types. Check the tables that follow for specific configuration support.

Before Installing This Device

Before you install this device:

- Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

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What You're Going To Do

Note	This printer is installed by an HP Customer Engineer. Make arrangements for installation with your nearest HP Sales and Service office.

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Have your printer installed according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 6-7. HP 2563A/B/C Printer Setup on CIO Computers

RS-232-C Interfaces Models 2563B/C Only	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces model 2563A Only	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr0, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note CIO systems do not support a parallel interface.

Note HP-PB systems do not support HP-IB printers.

HP 2563A/B/C Printer

Table 6-8. HP 2563B Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

6-24   Installing Printers

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before having your printer installed.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

2. *Verify that the drivers required for this device are included in your S800 file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->`, then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note   If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

---

7. *Connect the power cord.*

8. *Turn on the device.*

9. *Plug in and power on the computer.*

During the boot process:

- Device "special" files were created for this device.
- A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
tty           0  16        mux2       ok(hexadecimal entity id#)    ok
```

See Chapter 8, "Setting Up Devices Using HP-UX Commands" for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP 2564B and 2566B Printers

The HP 2564B and 2566B are dot-matrix impact printers. They connect to your computer system via the HP-IB, RS-232-C, or parallel interfaces.

Before Installing This Device

Note	These printers are installed by an HP Customer Engineer. Make arrangements for installation with your nearest HP Sales and Service office.

Before you have this printer installed:

- Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation handy. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

HP 2564B and 2566B Printers

Table 6-9. HP 2564/66B Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr0, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

Table 6-10. HP 2564B/66B Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->`, then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note   If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

---

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

   During the boot process:

   - Device "special" files were created for this device.
   - A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

   Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

   ```
   tty        0  16       mux2       ok(hexadecimal entity id#)     ok
   ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

6

HP 2562C Low Cost HP 2563B Printer

The HP 2562C is a 420 lpm impact printer. It connects to your system via an HP-IB, RS-232-C, or parallel interface.

Before Installing This Device

Before you install this device:

- Refer to your printer's documentation for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

Table 6-11. HP 2562 Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr0, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support the parallel interface.

Note   HP-PB systems do not support HP-IB printers.

HP 2562 Impact Printer

Table 6-12. HP 2562 Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   - Edit your kernel configuration using commands and reconfigure the kernel using the `uxgen` command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

    a. Shut down and halt the system using the **/etc/shutdown -h** command.
    b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note	Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses. You are limited to eight devices per HP-IB card, addresses 0 through 7.

    a. Choose an available HP-IB bus address and make note of it.
    b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note	If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    tty          0   16       mux2        ok(hexadecimal entity id#)     ok
    ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP 2684A/D LaserJet 2000 Printer

The HP 2684A/D laserjet printer connects to the computer via an RS-232/422 or parallel interface.

Note	These printers are installed by an HP Customer Engineer. Make arrangements for installation with your nearest HP Sales and Service office.

Before Installing This Device

Before having this device installed:

■ Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 6-13. HP 2684A/D Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

6

Note   CIO systems do not support a parallel interface.

Table 6-14. HP 2684A/D Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->`, then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   ■ Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Set the printer's switches.* Refer to the *LaserJet 2000 Technical Reference Manual* for the appropriate configuration settings.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

6

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, if you have a printer connected to an RS-232 multiplexer interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
tty          0  16        mux2        ok(hexadecimal entity id#)      ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP C2753A Model F100 High-Speed Printer

The HP 5000 Model F100 (HP product number C2753A) is a production capacity, fanfold printer capable of printing 100 pages per minute. It connects to your system via SCSI interface card.

Note   HP-UX does not support the page level recovery feature of the C2753A.

Before Installing This Device

Before you install this device:

- Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer is lpr3. The lpr3 driver needs the scsi2 driver on CIO systems and the scsi1 driver on HP-PB systems. The lpr3 driver is software configurable and is a a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

HP C2753A Model F100 Printer

Caution   A dedicated SCSI interface is required for the HP C2753A. Do not connect this printer to a shared SCSI interface.

Table 6-15. HP C2753A Printer Setup on CIO Computers

SCSI Interface	
Interface card	HP 27147-60002 SCSI card[1]
Drivers Required	lpr3, scsi2
Character-mode major number	26
Minor number format	See Appendix A

1 Use this version of the SCSI interface card. This printer does not operate properly on earlier versions of this card. If your printer stops (the bus hangs) you may need to upgrade your interface card.

Table 6-16. HP C2753A Printer Setup on HP-PB Computers

SCSI Interface	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	lpr3, scsi1
Character-mode major number	26
Minor number format	See Appendix A

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

   > `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You must reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

6

| **Note** | SAM does not support installation of this printer. |

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command.

   b. TURN OFF the computer and unplug the power cord.

HP C2753A Model F100 Printer

4. *Set the SCSI bus address on your device.*

Note	Determine which SCSI address(es) are in use on the system. Use the worksheet at the end of this book to note already-used addresses.
	You are limited to seven devices per SCSI interface, bus addresses 0 through 6. Address 7 is reserved for the system's SCSI controller.

5. *Configure the printer.*

   Refer to the documentation shipped with your printer for instructions on appropriate operator panel settings.

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

8. *Connect the power cord and turn on the printer.*

9. *Plug in and power on the computer.*

   During the boot process:

   - Device "special" files were created for this device.

   - A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. To verify the device has been added, you will need to know what SCSI bus address you choose in step 4 above. For example, if you chose SCSI bus address 1, an example of a display line that `ioscan -f` could return showing that this device has been added follows:

```
printer   2   16.1.0   scsi1.target.lpr3   ok(hexadecimal entity id#) ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on using commands to add this printer to the line printer spooling system. This printer requires the `pc14` file.

| **Note** | Administration of this printer is not supported by SAM. |

HP 2686A/D LaserJet
HP 33440A LaserJet-II
HP 33447A LaserJet-IID
HP 33471A LaserJet-IIP Printer

The HP 2686A/D LaserJet, HP 33440A LaserJet-II, HP 33447A LaserJet-IID and HP 33471A LaserJet-IIP printers connect to the computer via an RS-232-C or parallel interface.

These LaserJet printers also support network based printing via a LAN interface card installed in the printer. Detailed installation instructions are provided with the interface card. If you intend to use your printer as a network-based printer, you must use SAM to install the printer. Refer to the procedure entitled "Adding a Network-Based Printer Using SAM", at the end of this chapter.

Before Installing This Device

Before you install this device:

- Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the wall command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

HP LaserJet, LaserJet II/IID, and LaserJet-IIP Printers

Table 6-17.
HP 2686A/D, HP33440A/47A/71A Printer Setup on CIO
Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

6

Table 6-18. HP 2686A/D, HP 33440/47/71A Printer HP-PB Setup

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   See the tables at the beginning of this section to determine which interfaces can be used. If you intend to connect this printer via a LAN, refer to the procedure entitled "Adding a Network-Based Printer Using SAM", at the end of this chapter.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

  ■ Edit your kernel configuration using commands and reconfigure the
    kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices
    Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Configure the printer.*

   Refer to the documentation shipped with your printer to configure the
   printer for either the RS-232-C serial interface or the parallel interface.

5. *Ensure all power switches on the device and on the computer are in the
   OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in
   the hardware installation manual for the device.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, connected to a
parallel interface on an HP-PB computer, the following is an example of a
display line that `ioscan -f` could return showing that this device has been
added:

    printer 0 25   lpr2   ok(*hexadecimal entity id#*)   **ok**

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with
your new device. Refer to Chapter 10, "Managing Printers and Printer
Output" of the *System Administration Tasks* manual for instructions on adding
this printer to the line printer spooling system. If you intend to connect this
printer via a LAN, refer to the procedure entitled "Adding a Network-Based
Printer Using SAM", at the end of this chapter.

6

HP 33449A LaserJet III
HP 33459A LaserJet IIID
HP 33491A LaserJet IIIsi Printers

The HP 33449A LaserJet III, 33459A LaserJet IIID and 33491A LaserJet IIIsi printers can connect to your system via an RS-232-C or parallel interface.

The LaserJet III, IIID, and IIIsi printers also support network based printing via a LAN interface card installed in the printer. Detailed installation instructions are provided with the interface card. If you intend to use your printer as a network-based printer, use the procedure entitled "Adding a Network-Based Printer Using SAM", at the end of this chapter.

Before Installing This Device

Before you install this device:

■ Refer to your printer manuals for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

HP 33449A LaserJet III
HP 33459A LaserJet IIID
HP 33491A LaserJet IIIsi Printers

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

Table 6-19. HP 33449A/59A Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Table 6-20. HP 33449A/59A Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

HP 33449A LaserJet III
HP 33459A LaserJet IIID
HP 33491A LaserJet IIIsi Printers

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   See the tables at the beginning of this section to determine which interfaces can be used. If you intend to connect this printer via a LAN, refer to the procedure entitled "Adding a Network-Based Printer Using SAM", at the end of this chapter.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.* One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message *****no such driver*****, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   ■ Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

- Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the **/etc/shutdown -h** command.
   b. TURN OFF the computer and unplug the power cord.

4. *Ensure all power switches on the device and on the computer are in the OFF position.*

5. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

6. *Connect the power cord.*

7. *Turn on the device.*

8. *If you have any other devices to connect, do so now.*

9. *Plug in and power on the computer.*

   During the boot process:

   - Device "special" files were created for this device.
   - A Logical Unit (LU) number was assigned to this device.

HP 33449A LaserJet III
HP 33459A LaserJet IIID
HP 33491A LaserJet IIIsi Printers

10. *Verify that the peripheral has been added.*

Use the `ioscan -f` command to do this. For example, connected to a parallel interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

```
printer   0   25   lpr2      ok(hexadecimal entity id#)      ok
```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system. If you intend to connect this printer via a LAN, refer to the procedure entitled "Adding a Network-Based Printer Using SAM", at the end of this chapter.

6

HP 2932A and 2934A Printers

The HP 2930 Series of printers provide features for several levels of printer categories. However, installation for all printers in the series is the same. These printers connect to your system via the RS-232, HP-IB, or parallel interface.

Before Installing This Device

Before you install this device:

■ Refer to the manuals that came with your printer for instructions on unpacking and preparing the printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the wall command to do this.

6

HP 2932A and 2934A Printers

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

Table 6-21. HP 2932A/34A Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr1, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

HP 2932A and 2934A Printers

Table 6-22. HP 2932A/34A Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

6-70 Installing Printers

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

2. *Verify that the drivers required for this device are included in your S800 file.* One way to do this is to type:

   lsdev *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open **Kernel Configuration->** , then **Drivers** and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

         You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.
   c. ENABLE the Secondary Command Protocol. Your device will not automatically install if you fail to do this step.

   Follow the procedure in your printer's installation material to enable the secondary command protocol. This allows HP-UX to pace the printer (time-share the bus with other devices on the interface) if the printer's address is in the range 0 to 7.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note   If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

---

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, connected to a parallel interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    printer  0   25    lpr2      ok(hexadecimal entity id#)      ok
    ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP 3630A PaintJet Printer

The HP 3630A PaintJet printer connects to your computer via an RS-232-C or parallel interface.

Before Installing This Device

Before you install this device:

■ Refer to the manuals that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

■ If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

■ Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

HP 3630A PaintJet Printer

Table 6-23. HP 3630A Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr1, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

Table 6-24. HP 3630A Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.* One way to do this is to type:

   lsdev *major number*

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substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

If the system returns the message ✳✳✳no such driver✳✳✳, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

■ Use SAM for the whole procedure. Run SAM, highlight and open Kernel Configuration-> , then Drivers and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

■ Edit your kernel configuration using commands and reconfigure the kernel using the uxgen command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the /etc/shutdown -h command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

   You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.
   c. ENABLE the Secondary Command Protocol. Your device will not automatically install if you fail to do this step.

   Follow the procedure in your printer's installation material to enable the secondary command protocol. This allows HP-UX to pace the printer (time-share the bus with other devices on the interface) if the printer's address is in the range 0 to 7.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

7. *Connect the power cord.*

8. *Turn on the device.*

9. *If you have any other devices to connect, do so now.*

HP 3630A PaintJet Printer

10. *Plug in and power on the computer.*

    During the boot process:

    ■ Device "special" files were created for this device.
    ■ A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, connected to a
    parallel interface on an HP-PB computer, the following is an example of a
    display line that `ioscan -f` could return showing that this device has been
    added:

    ```
    printer   0   25    lpr2       ok(hexadecimal entity id#)        ok
    ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with
your new device. Refer to Chapter 10, "Managing Printers and Printer
Output" of the *System Administration Tasks* manual for instructions on adding
this printer to the line printer spooling system.

HP C1602A PaintJet XL Printer

The HP C1602A PaintJet XL printer is a high-speed color printer suited for a shared, high-volume user environment. Some of the features offered by the HP C1602A are:

- Presentation mode for highest quality graphics on paper; transparency mode for top-quality printing on overhead transparency film.

- Eight primary colors with many shades and hues available.

- Unattended, fast print speed (167 characters per second at 10 pitch) operation.

- Large standard buffer for downloadable fonts.

- Automatic sheet feed for standard paper and transparency sizes; manual feed capability for non-standard media sizes.

- RS-232-C, Centronics parallel and HP-IB interfaces available.

If you use graphics software, check your software documentation (or software supplier) for specific computer hardware and memory requirements. When you install your software, you might have to **configure** the graphics software.

6

Before Installing This Device

Before you install this device:

- Refer to the documentation that came with your printer for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

6

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

HP C1602A PaintJet XL Printer

Table 6-25. HP C1602A Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr1, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

Table 6-26. HP C1602A Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note   Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

---

2. *Verify that the drivers required for this device are included in your* S800 *file.* One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->`, then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

   or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note
Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.
   c. ENABLE the Secondary Command Protocol. Your device will not automatically install if you fail to do this step.

   Follow the procedure in your printer's installation material to enable the secondary command protocol. This allows HP-UX to pace the printer (time-share the bus with other devices on the interface) if the printer's address is in the range 0 to 7.

5. *If you are connected to an RS-232-C interface, the following data transmission values should be set.*

   ■ baud rate
   ■ parity
   ■ media size
   ■ handshake
   ■ symbol set (character set)

   Refer to your printer's documentation for instructions on setting these values.

Note
Do not reset these values unless you change your computer/printer system set up.

---

6. *Ensure all power switches on the device and on the computer are in the OFF position.*

7. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note	If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

8. *Connect the power cord.*

9. *Turn on the device.*

10. *Plug in and power on the computer.*

    During the boot process:

    - Device "special" files were created for this device.
    - A Logical Unit (LU) number was assigned to this device.

11. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, connected to a parallel interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    printer   0   25    lpr2      ok(hexadecimal entity id#)      ok
    ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

HP 2563/64/66/67C Impact Printers

The high-speed, impact line printers discussed in this section replace the previous models with the same model numbers and a "B" suffix. They are used in situations requiring high-volume system printing applications.

The HP 2563C prints at a rate of 420 lines per minute.
The HP 2564C prints at a rate of 840 lines per minute.
The HP 2566C prints at a rate of 1200 lines per minute.
The HP 2567C prints at a rate of 1600 lines per minute.

These printers support the following interfaces:

- HP-IB
- RS-232-C
- Parallel

Before Installing This Device

Before you install this device:

- Refer to your printer's documentation for instructions on unpacking and preparing your printer for installation. Keep this documentation at hand. You will need to refer to it during this procedure.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It gives interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the `wall` command to do this.

What You're Going To Do

The device driver you will need for this printer depends on what model of S800 system you are using and onto which interface you plan to install the device. The following tables outline this information for you. All the drivers listed in these tables are software configurable and are a standard part of your operating system as shipped. Install your printer according to the instructions in the following section. Device files are automatically created for the printer when you follow these instructions.

The tables that follow provide detailed HP-UX configuration information. For most installations, the detailed information given in these tables will not be needed to install this device. However, if you intend to customize your system's configuration, you will need to refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" and you will need the information listed below regarding major numbers. Information on minor numbers is in Appendix A, "Device Files and Minor Numbers".

6

Table 6-27. HP 2563/64/66/67C Printer Setup on CIO Computers

RS-232-C Interfaces	
Interface card	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	mux0, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	mux0_16, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 27110B HP-IB card
Drivers Required	lpr0, hpib0, cio_ca0
Printer Character-mode major number	26
Minor number format	See Appendix A

6

Note   CIO systems do not support a parallel interface.

Note   HP-PB systems do not support HP-IB printers.

Table 6-28.
HP 2563/64/66/67C Printer Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial ports on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A
Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers Required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems or printers (NOT the default printer) to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Connecting the Printer

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

Note	Your printer may be preconfigured at the factory to operate in parallel mode. If you intend to connect the printer to a serial interface, you will need to reconfigure the printer for serial operation. See your printer's documentation for details.

2. *Verify that the drivers required for this device are included in your* S800 *file.*

   One way to do this is to type:

   `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message `***no such driver***`, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the **uxgen** command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command.
   b. TURN OFF the computer and unplug the power cord.

4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

              You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

   a. Choose an available HP-IB bus address and make note of it.
   b. Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the printer to your computer.*

   Connect the printer to your computer following the instructions provided in the hardware installation manual for the device.

Note   If you are using an HP-IB interface, avoid connecting the printer to the same interface used by your disk or tape drives. On systems that support the HP-IB interface, a dedicated HP-IB interface is recommended. The performance of your disk or tape drive of your disk or tape drive could be substantially affected if a printer is attached to the same interface.

---

7. *Connect the power cord.*

8. *Turn on the device.*

9. *Plug in and power on the computer.*

   During the boot process:

   ▪ Device "special" files were created for this device.
   ▪ A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

    Use the `ioscan -f` command to do this. For example, connected to a parallel interface on an HP-PB computer, the following is an example of a display line that `ioscan -f` could return showing that this device has been added:

    ```
    printer   0   25   lpr2      ok(hexadecimal entity id#)      ok
    ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

Your HP-UX operating system has now been modified to communicate with your new device. Refer to Chapter 10, "Managing Printers and Printer Output" of the *System Administration Tasks* manual for instructions on adding this printer to the line printer spooling system.

6

Adding a Network-Based Printer Using SAM

To add a network-based printer or plotter using SAM:

1. Ensure that the printer is connected to the network according to the installation instructions shipped with the network-based printer or the network interface card for the printer.

2. Gather the following information:

   ■ The name you are giving to this printer or plotter.

   ■ The printer node name.

   ■ The model or interface that the printer will use.

   ■ The link-level address of the network card installed in the printer.

   ■ The TCP-IP protocol printer requires an Internet Protocol (IP) address.

   ■ The priority for this printer.

   ■ The class to which the printer or plotter will be added (optional).

   In addition, decide whether or not you wish to make this device your system's default printer.

3. Run SAM; type:

   `/usr/bin/sam`

   See Chapter 2, "Guidelines for Installing Devices" for additional information about using SAM.

4. Highlight `Peripheral Devices` and activate the `(Open)` control button.

5. Highlight `Printers and Plotters` and activate the `(Open)` control button.

6. Highlight `Printers/Plotters` and activate the `(Open)` control button.

7. Choose `Add a network-based printer` then
   `Add TCP-IP protocol printer...` or `Add NPX protocol printer...`
   from the "Actions" menu.

8. Fill in the printer interface dialog box fields and turn on and off check box values.

   Activating the (Help) button from a dialog or message box gives you information about the attributes and tasks you can perform from the currently displayed window.

   Pressing the (f1) key gives you context-sensitive information for the object field at the location of the cursor.

9. Activate the (OK) control button.

Additional Task Information

SAM provides an on-line help system to assist you when you need additional information.

Activating the (Help) button from the SAM main window, a dialog box, or message box gives you information about the attributes and tasks you can perform from the currently displayed window.

From within a functional area, choosing an item from the "Help" menu gives you information about:

- the current functional area
- keyboard navigation within SAM
- using the SAM help system
- displaying the version of SAM you are currently running

From a dialog box (a window displaying fields to be filled in), pressing the (f1) key gives you context-sensitive information for the object at the location of the cursor.

Ensure that the NET-PERIPH file set is loaded on your system. To load this additional software from your operating system media, refer to the *Installing and Updating HP-UX* manual.

7

Installing Plotters

Introduction

This chapter contains installation and configuration procedures for the following plotters:

HP Plotter (HP-IB Interface)
HP 7550B Plus Plotter
HP C1600A/01A Series 7600 Models 240D and 240E Plotters
HP C1620A Series 7600 Model 355 Electrostatic Plotter
HP C1625A/27A Series 7600 Models 250 and 255 Plotters

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HP Plotters

HP plotters can connect to your computer via an HP-IB, parallel, or RS-232 (serial) interface.

Find and read the description of the plotter you are installing in the following sections. Note that some plotters *are not* customer installable and attempting to install them could invalidate your warranty. This will be noted in the descriptive section that follows, and in the documentation that came with your plotter.

HP 7550B Plus Plotter

The HP 7550B Plus plotter is a desktop color plotter, that is compatible with the HP-GL and HP-GL/2 languages. An additional 1- or 2-megabyte board option allows you to download plot files to the plotter and regain control of computer.

The HP 7550B Plus plotter has two back panel configuration options:

- RS-232-C and parallel option

  This option of the HP 7550B Plus plotter has a parallel and an RS-232-C (serial) interface. For optimum data transmission speed, use the parallel instead of the RS-232-C interface.

- RS-232-C and HP-IB option

  This option of the HP 7550B Plus plotter has an HP-IB and two RS-232-C (serial) interfaces.

7

HP C1600A/01A Series 7600 Models 240D and 240E Plotters

The HP C1600A/01A are monochrome electrostatic plotters compatible with the HP-GL and HP-GL/2 languages. They are intended for use in a computer-aided design (CAD) environment. A built-in 40 megabyte hard disk automatically stores the current drawing. The plotters support RS-232-C, parallel and HP-IB interfaces.

Pen plotters are vector devices. Vectors are straight line segments that form images such as squares, circles, or other polygons. Electrostatic plotters are raster devices. A raster device creates an image using an array of dots to form an image. Most graphics software programs send data in vector formats. Your electrostatic plotter has a vector-to-raster converter (VRC) to convert your design from the vector data to raster data.

Caution   Do not install the VRC or set up the plotter yourself. Defects that result from customer setup invalidate the plotter's warranty.

Call your local HP Sales and Support Office for a certified representative to install the vector-to-raster converter (VRC) and set up your plotter. The installer will install the VRC, load toner and media, and ensure the plotter is operating properly.

A list of worldwide HP offices was included in your accessories box that accompanies the plotter.

7

HP Plotters

HP C1620A Series 7600 Model 355 Electrostatic Plotter

The HP C1620A is a color electrostatic plotter that is compatible with HP-GL/2 and PCL-based raster graphics input. A rasterizer and built-in 40 megabyte hard disk provide simultaneous rasterization and printing. This plotter supports RS-232-C, parallel and HP-IB interfaces.

Pen plotters are vector devices. Vectors are straight line segments that form images such as squares, circles, or other polygons. Electrostatic plotters are raster devices. A raster device creates an image using an array of dots to form an image. Most graphics software programs send data in vector formats. Your electrostatic plotter has a vector-to-raster converter (VRC) to convert your design from the vector data to raster data.

Caution   Do not install the VRC or set up the plotter yourself. Defects that result from customer setup invalidate the plotter's warranty.

Call your local HP Sales and Support Office for a certified representative to install the vector-to-raster converter (VRC) and set up your plotter. The installer will install the VRC, load toner and media, and ensure the plotter is operating properly.

A list of worldwide HP offices was included in your accessories box that accompanies the plotter.

7

HP C1625A/27A Series 7600 Models 250 and 255 Plotters

The HP C1625A/27A are monochrome electrostatic plotters and is compatible with HP-GL/2 and PCL-based raster graphics input. These plotters have a rasterizer and built-in 40 megabyte hard disk for simultaneous rasterization and printing. They supports RS-232-C, Centronics and HP-IB interfaces.

Pen plotters are vector devices. Vectors are straight line segments that form images such as squares, circles, or other polygons. Electrostatic plotters are raster devices. A raster device creates an image using an array of dots to form an image. Most graphics software programs send data in vector formats. Your electrostatic plotter has a vector-to-raster converter (VRC) to convert your design from the vector data to raster data.

Caution   Do not install the VRC or set up the plotter yourself. Defects that result from customer setup invalidate the plotter's warranty.

Call your local HP Sales and Support Office for a certified representative to install the vector-to-raster converter (VRC) and set up your plotter. The installer will install the VRC, load toner and media, and ensure the plotter is operating properly.

A list of worldwide HP offices was included in your accessories box that accompanies the plotter.

HP 7575/76A DraftPro DXL/EXL Plotters

The DraftPro plotters support the standard HP-GL language and have a one- or two-megabyte buffer option which will allow you to download an entire plot, freeing your computer. The HP7575/76A support HP-IB, HP-IB Secondary Command Support, and RS-232-C interfaces.

Installing Your Plotter

Before you Install This Device

- Refer to your plotter's manuals for instructions on unpacking and preparing the plotter for installation. Keep this documentation handy. You will need to refer to it during this procedure.

- If you have not added this type of device to your system before, read the material in Chapter 2, "Guidelines for Installing Devices". It provides interface and cabling guidelines to follow when adding devices to your system.

- Plan ahead. Installing new peripherals on your system requires that you shut down and power off the system. On a multiuser system you will want to warn users in advance that the system will be coming down. Use the **wall** command to do this.

7

What You're Going To Do

The device driver you will need for your plotter depends on what model of
S800 system you are using and onto which interface you plan to install the
plotter. The following tables outline this information for you. All the drivers
listed in these tables are software configurable and are a standard part of your
operating system as shipped. However, the instr0 driver is not supported
by autoconfiguration. Install your plotter according to the instructions in
the following section. Device files will be created for all plotters except those
requiring the instr0 driver. For those devices you will need to create device
files. You can use SAM or HP-UX commands to do this.

Table 7-1. HP Plotter Setup on CIO Computers

RS-232-C Interfaces	
Interface card required	HP 98196A CIO Asynchronous 6-Channel Multiplexer Interface
Drivers Required	**mux0**, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
Interface card required	HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface
Drivers Required	**mux0_16**, cio_ca0
Character-mode major number	1
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card required	HP 27110B HP-IB card
Drivers Required	**instr0**, hpib0, cio_ca0
Printer Character-mode major number	21
Minor number format	See Appendix A

Table 7-2. HP Plotter Setup on HP-PB Computers

RS-232-C Interfaces	
Interface card	HP 40299B HP-PB Asynchronous Eight Port Multiplexer Interface
Interface card	HP J2092/93A RS-232-C and RS-422 HP-PB Asynchronous 16-Port Multiplexer Interface[1]
Interface card	HP J2094A RS-232-C HP-PB Asynchronous 16-Port Multiplexer Interface[2]
Drivers Required	**mux2**
Character-mode major number	58
Minor number format	See Appendix A
Interface card	Built-in serial port(s) on Model 890
Drivers Required	**mux4**
Character-mode major number	18
Minor number format	See Appendix A
Interface card	Built-in serial port on the Models 808 and 815[3]
Drivers Required	**scc1**
Character-mode major number	10
Minor number format	See Appendix A

1 With DDP (Data Distribution Panel)

2 With ADP (Active Distribution Panel)

3 The 808/815S is designed to have the system console connected to Port A at boot up. Connect low usage devices, such as modems, printers (NOT the default printer), or plotters to Port B. Port A is scc1 lu (logic unit) 0 address 1; Port B is scc1 lu 1 address 1.

Table 7-2. HP Plotter Setup on HP-PB Computers (continued)

Parallel Interfaces	
Interface card	HP 28655A HP-PB SCSI/Parallel Adapter
Drivers required	**lpr2**
Character-mode major number	26
Minor number format	See Appendix A
HP-IB Interfaces	
Interface card	HP 28651A HP-IB card
Drivers required	**instr0**, hpib1
Character-mode major number	21
Minor number format	See Appendix A

Note   CIO systems do not support a parallel interface.

7

Connecting Your Plotter

The following summary supplements the procedures outlined in your hardware installation documentation for this device. Read through this summary before proceding with the installation.

1. *Determine your interface.*

   You can use any of the supported interfaces listed in the preceding tables. Note the device driver for the interface you will be using.

2. *Verify that the driver required for this plotter is included in your* S800 *file.*

   One way to do this is to type:

   > `lsdev` *major number*

   substituting the actual major number shown in the previous table in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

   If the system returns the message ***no such driver***, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. You can:

   - Use SAM for the whole procedure. Run SAM, highlight and open `Kernel Configuration->` , then `Drivers` and add the necessary drivers. Use SAM's help system to complete the task or refer to "Adding Device Drivers Using SAM" in Chapter 3 for complete instructions.

     or

   - Edit your kernel configuration using commands and reconfigure the kernel using the `uxgen` command. See Chapter 8, "Setting Up Devices Using HP-UX Commands" for detailed instructions.

3. *Play it safe.*

   a. Shut down and halt the system using the `/etc/shutdown -h` command.

   b. TURN OFF the computer and unplug the power cord.

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4. *If you are using an HP-IB interface, set the HP-IB bus address now. If not, skip this step.*

   a. Check the plotters documentation for information on preset bus addresses. If the preset address is unused on your system, make note of it and go on to the next step.
   b. If the preset bus address is already in use, choose an available HP-IB bus address and make note of it.

   Set the HP-IB bus address according to the instructions in the installation documentation provided with the device.

Note   Determine which HP-IB address(es) are in use by other devices on this HP-IB card. Use the worksheet at the end of this book to note already-used addresses.

You are limited to eight devices per HP-IB card, addresses 0 through 7.

---

5. *Ensure all power switches on the device and on the computer are in the OFF position.*

6. *Connect the plotter to your computer.*

   ■ If you are connecting your plotter via an HP-IB interface, use a standard-speed HP-IB cable. Follow the instructions provided in the plotter's installation manual.

Note   Avoid placing the plotter on the same HP-IB interface used by your disk or tape drives. A dedicated HP-IB interface is recommended. Placing a plotter on the same standard-speed HP-IB interface as your disk or tape drive could substantially affect the performance of your disk or tape drive.

7

HP Plotters

- If you are connecting your plotter to an RS-232 interface, make note of the address of the serial port you are using. You will need this information for testing and configuring your device.

Caution   Many computer systems have both parallel and RS-232-C ports. These ports frequently appear identical. The built-in parallel interface should be labeled PARALLEL. Make sure you plug your parallel cable into the parallel port or you could damage your plotter.

- *For RS-232 interfaces, determine the type of connection.*
  - ☐ standalone
  - ☐ eavesdrop
  - ☐ local
  - ☐ remote

  Refer to the plotter's documentation to determine the appropriate configuration settings.

7. *Connect the power cord to the plotter.*

8. *Turn on the plotter.*

   For RS-232 installations, configure the data transmission values.

   baud rate   Set to match your computer's baud rate.
   parity   Set to match your computer's parity setting.
   data length
   handshake
   symbol set
   (character set)

9. *Plug in and power on the computer.*

   During the boot process, for all devices except those requiring the `instr0` driver:

   - Device "special" files were created for this device.
   - A Logical Unit (LU) number was assigned to this device.

10. *Verify that the peripheral has been added.*

   Use the `ioscan -f` command to do this. For example, connected to a
   parallel interface on an HP-PB computer, the following is an example of a
   display line that `ioscan -f` could return showing that this device has been
   added:

   ```
   plotter  0  25  lpr2     ok(hexadecimal entity id#)      ok
   ```

See chapter 8 for further discussion of `ioscan`.

What To Do Next

If you connected your plotter via an HP-IB interface using the `instr0` driver,
you will have to create device special files for the plotter. You can do this using
SAM, as described in the next section, or using commands as described in
Chapter 8, "Setting Up Devices Using HP-UX Commands".

For all other connections, your HP-UX operating system has been modified
to communicate with your new device. Refer to Chapter 10, "Managing
Printers and Printer Output" of the *System Administration Tasks* manual for
instructions on adding this plotter to the line printer spooling system.

7

Installing Plotters Using SAM

If you installed your plotter on an HP-IB interface using the instr0 driver, you need to create device files for the plotter. This section describes how to use SAM to do this and to complete the set up of your plotter. If you do not intend to use SAM, refer to Chapter 8, "Setting Up Devices Using HP-UX Commands" for the command method of creating device files.

Gather the necessary information:

■ The name you are giving to this plotter.

■ The model or interface that the plotter will use.

■ The name of the device file that the plotter will use.

■ The priority for this plotter.

■ The class to which the plotter will be added (optional).

■ Whether or not you wish to make this device your system's default plotter.

If you are adding a remote plotter, be sure to have this additional information on hand:

■ The name of the remote system to which the plotter is attached.

■ The name of the remote plotter.

■ The "cancel" model on the remote system (optional).

■ The "status" model on the remote system (optional).

■ Whether or not you wish to allow any user to cancel any plotting request.

■ Whether or not the remote plotter is on a system using BSD (Berkeley Software Distibution) UNIX.

If you are adding a network-based plotter, make a note of the link-level address used by the plotter's network interface.

To configure your plotter:

1. Log on as root.

2. Run SAM:

    /usr/bin/sam

3. Highlight `Peripheral Devices->` and activate (Open).

4. Highlight `Printers and Plotters->` and activate (Open).

5. Highlight `Printers/Plotters` and activate (Open).

6. From the "Actions" menu title in the "Printer/Plotter Manager" window, highlight and choose the appropriate one of the following menu items:

   ■ `Add a printer/plotter ->`

   ■ `Add a remote printer/plotter...`

   ■ `Add a network based printer`

7. If you are adding a local plotter, SAM will search for any interfaces to which the plotter might be connected. This information appears in an object list within a "Printer/plotter hardware location" window. Highlight and choose the appropriate hardware path.

    An "Add plotter" dialog box appears. The titling and appearance of the dialog box will vary according to the type of connection you are using.

8. Type the required information into the fields displayed.

Note   Some of the field names in the dialog box may be buttons ((Plotter class), for example). Activate these for information about available choices for entering in the fields.

---

9. When you have entered all the information into the dialog box, activate (OK).

SAM will create the device file needed to communicate with the plotter. SAM uses the device file naming convention lp_xxxx, where $xxxx$ is the name of your plotter.

8

Setting Up Devices Using HP-UX Commands

This chapter describes how to add peripheral devices using the HP-UX commands methods. The tasks required to add a peripheral device vary, depending on the type of device you are adding and whether or not the driver for that device is included in the kernel. For example, in the case of devices that cannot be automatically configured, you have to specify the address of the I/O card and the device by editing the S800 file before you can build a new kernel.

Begin by looking up the device you want to add in this manual; it provides you with the following necessary information:

- how to physically install I/O cards and connect your devices.
- what device driver the device requires.
- whether or not the HP-UX operating system can automatically configure the device.

8

Summary of Tasks Required to Add Peripheral Devices

The following is a summary of all the tasks required to add a peripheral device to your system. This list is followed by an expanded explanation of each task.

1. Determine the required driver.

2. Check whether the S800 file "includes" the required driver.

3. Determine whether the card or device is automatically configurable.

4. Edit the S800 file to "include" the driver, or add an I/O statement, if necessary.

5. Run **uxgen** to build a new kernel if you've edited the S800 file.

   a. Shut down and halt the system using the **/etc/shutdown -h** command.

   b. TURN OFF the computer and unplug the power cord.

6. Add the I/O card required by the device, if necessary.

7. Connect your device to the I/O card.

8. Set the bus address on the device (if this applies).

9. Turn your devices on.

10. Reconnect the computer power cord.

11. Turn on the computer.

12. Verify your I/O card or device has been added.

The next section expands on each one of these steps.

8

Adding a Device Using Commands

STEP 1. Determine the required driver.

Refer to the "What You're Going To Do" section within the section dedicated to the peripheral device you are connecting for device driver information.

STEP 2. Check that the current kernel configuration file, usually the S800 file, includes the driver.

One way to do this is to type:

```
lsdev major number
```

substituting the actual major number for the device in the command line above. If the device driver is part of your current kernel configuration file, the system will return a line showing the major number, device driver name, and device class. If this is the case, you can proceed to the next step.

If the system returns the message ✱✱✱no such driver✱✱✱, you will have to edit your kernel configuration file to include the necessary device drivers and reconfigure the kernel. First, go on to the next step to determine if you will have to further edit to the S800 file.

STEP 3. Is the I/O card or device automatically configurable?

Many Hewlett-Packard disk drives, tape drives, and printers are automatically configurable. However, if the device or I/O card you are adding requires one of the following device drivers, the system *cannot* automatically configure (create device files and assign a logical unit number) your peripheral device:

gpio0	psi0	rti0
gpio1	pdn0	instr0

If you found that the driver you needed was already in the kernel at STEP 2, and it is not one of those listed above, skip the next two steps and proceed to STEP 6 now.

If either the driver was missing from the kernel configuration file, or the driver is listed above as one that is not autoconfigurable, you must edit the S800 file. Proceed to the next step.

STEP 4. Edit the S800 file, adding the driver and/or an I/O statement.

■ If, in STEP 2, you found that the driver you need for your new peripheral device is not in the currently running kernel configuration file, (in this case we are assuming that this is the S800 file) you will have to edit the file to include the driver, or remove comment marks, such as *, and then reconfigure the kernel.

For example, if the device you are adding requires the **tape1** driver, edit the **/etc/conf/gen/S800** file to include this driver. The entry will look like this:

```
include tape1;
```

If this entry is commented out as in the following example:

```
*include tape1;
```

remove the *. If you have edited the S800 file to either add a device driver or remove comment marks from an existing entry, and the device driver you are adding is supported by autoconfiguration, go on to STEP 5 now. If the device driver you are adding is not supported by autoconfiguration, (that is, it is listed in STEP 3), proceed to the next part of this instruction.

■ If the device driver you are adding *is not* automatically configurable, then you need to specify its hardware and driver path in the S800 file.

Suppose, for example, you have a Model 825 and you want to add an instrument that requires the **gpio0** driver. You plan to install a GPIO card at CIO slot 7 of the channel adapter which is plugged into the System Card at Mid-bus slot 1.

You need to add the following statements in the S800 file:

```
io {
        cio_ca0 address 4 {
                        gpio0   address 7;
        }
}
```

The line, `cio_ca0 address 4 {`, identifies Mid-bus slot 1 as the location of the channel adapter; Mid-bus slot numbers are multiplied by 4 to get the address. This line might already be in your S800 file if you have previously added I/O statement entries for I/O cards installed in channel adapter. The next line, `gpio0 address 7` identifies the GPIO card you plan to install in CIO slot 7. If you have other lines for cards installed in other slots of the channel adapter, then place this line after them; the addresses do not have to be in numerical order.

The location of the interface card in the card cage must match the address specified in the I/O statement (On HP-PB machines the value specified in the I/O statement is four times the slot number). Remember the address you have specified in the I/O statement.

Add a closing bracket if one is not present.

For more information on hardware addressing on the Series 800 computer, refer to the "HP 9000 Series 800 Architecture Types" section in this chapter. The "Adding Non-Automatically Configurable Devices" section in this chapter gives examples of `io` statements for the other drivers that the system cannot automatically configure. For a complete understanding of the Series 800 bus structure and architecture and a complete walk-through of the I/O statement of an S800 file refer to the *How HP-UX Works: Concepts for the System Administrator* manual.

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STEP 5. Run uxgen to build a new kernel.

If you have edited the S800 file—either to add an I/O statement or to include a driver, then you must build a new kernel based on the changes you made to the S800 file.

Also, if you used SAM to edit the S800 file but did not have SAM generate the kernel, you now need to run the kernel generator, uxgen.

1. Change to the directory containing the S800 file:

   cd /etc/conf/gen

2. Issue the command:

   /etc/uxgen S800

   (If you named the file something other than S800, use that name here instead. We strongly recommend using the name S800 since many system administration programs like update and regen expect the S800 filename.)

   The uxgen program generates a new kernel, calling it hp-ux, and puts it in the directory /etc/conf/S800.

   If you make a syntax error in the S800 file (for example if you spelled a driver's name incorrectly), the uxgen program complains by issuing error messages. Re-edit the S800 file so that it is correct, and run uxgen again.

3. After uxgen has successfully executed, make backup copies of the old kernel: for example:

   cp /hp-ux /SYSBCKUP

4. Change the working directory:

   cd /etc/conf/S800

5. Move the new file created by uxgen into the **root** (/) dirctory:

   mv hp-ux /hp-ux

An alternate method of regenerating the kernel is to run the *regen*(1M) utility instead of uxgen. regen is friendlier and does more for you than uxgen; however, regen allows you less flexibility.

There is more information about regen in the manual *HP-UX Reference Manual*.

8-6 Setting Up Devices Using HP-UX Commands

STEP 6. Shut down and halt the system using the `/etc/shutdown -h` command.

STEP 7. TURN OFF the computer and unplug the power cord.

STEP 8. Ensure all power switches on the device and on the computer are in the OFF position.

STEP 9. Add the I/O card required by the device, if necessary.

STEP 10. Connect your device to the I/O card.

STEP 11. Set the bus address on the device (if this applies).

If you are adding a device with a configurable bus address (such as an HP-IB disk or a SCSI disk), set that address after connecting your device. Refer to the accompanying peripheral device installation guide for instructions.

If you are setting a bus address on a device that is not automatically configurable (the HP-IB address on an HP-IB plotter, for example), be sure to match that setting to the address you specify in the S800 file I/O statement.

STEP 12. Turn your devices on.

Turn your device on before you reboot the system.

STEP 13. Plug in and power on the computer.

Turn on your computer to reboot your system with its newly configured kernel.

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STEP 14. Verify your I/O card or device has been added.

After your system has rebooted, you can examine the I/O configuration of your system by typing the command:

```
ioscan -f
```

A listing is then displayed on the screen that resembles the following example:

```
Class        LU  H/W Path Driver               H/W Status   S/W Status
========================================================================
processor    -   0        processor            ok(0x0)      ok
cio          -   4        cio_ca0              ok(0x1000)   ok
hpib         -   4.0      cio_ca0.hpib0        ok(0x2)      ok
disk         6   4.0.1    cio_ca0.hpib0.disc1  ok(0x260)    ok
tape_drive   0   4.0.3    cio_ca0.hpib0.tape1  ok(0x174)    ok
disk         3   4.0.7    cio_ca0.hpib0.disc1  ok(0x270)    ok
tty          1   4.1      cio_ca0.mux0         ok(0x7)      ok
hpfl         -   4.2      cio_ca0.hpfl0        ok(0x8)      ok
disk         1   4.2.0    cio_ca0.hpfl0.disc2  ok(0x2)      ok
disk         2   4.2.1    cio_ca0.hpfl0.disc2  ok(0x2)      ok
lan          1   4.4      cio_ca0.lan0         ok(0x6)      ok
memory       -   12       16Meg_memory         ok(0x800)    ok
```

If you add an HP-IB disk with its bus address set to 7 and connect that disk to the HP-IB interface located in slot 0 of the channel adapter in a Model 835, you would see that the disk included in the system's configuration. The line that reads,

```
disk      3  4.0.7     cio_ca0.hpib0.disc1     ok(0x270)          ok
```

shows that.

8

What To Do Next

To learn what device files have been created for your newly installed peripheral, run the `ioscan` command specifying the hardware path of the device. For the disk drive in the preceding example, type:

```
ioscan -nfH 4.0.7
```

The system will display a listing of all the device "special" files that `insf` has created for the disk drive.

In terms of the physical installation of the device, you are done. Additional tasks may be required to use your device however. For example, if you added a new printer to your system, you must add the printer to your Line Printer Spooler subsystem. Check the section entitled "What To Do Next" at the end of any similar device in the device specific installation chapters for a listing of any additional tasks that need to be performed for that type of device.

8

Device (Special) Files

Each I/O device on your system needs a special file that enables the system to communicate with it. These files are automatically created for devices that are configured into your system.

What are Device Files?

The system treats devices as if they were files. Files associated with devices are called device files or special files. In order for the system to communicate with a peripheral, a device file for that peripheral must exist. See Figure 8-1.

For example, the following command transfers data between two files, creating a new file with identical contents to the original.

```
cp partslist partslist2
```

The contents of the file partslist is copied into the new file partslist2. (If partslist2 already exists, the original contents of the file are overwritten.)

A similar command can be used to transfer data to a device:

```
cp partslist  /dev/lp0
```

The contents of partslist is sent to the line printer specified by the special file /dev/lp0.
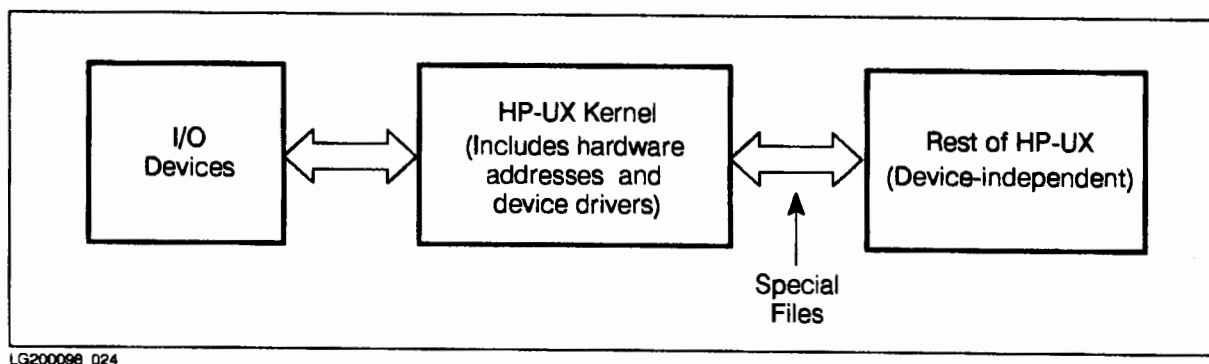
LG200098_024

Figure 8-1. Special Files Link the Kernel with the Rest of HP-UX

8-10 Setting Up Devices Using HP-UX Commands

Each I/O device has one or more device files located in the **/dev** directory. Device files do not contain data as ordinary files do. Instead, they specify how HP-UX is to communicate with the device. Device files have a major number (which identifies the driver) and a minor number (which contains the lu number and miscellaneous information for the device, such as block or character data transfer). Appendix A, "Device Files and Minor Numbers" describes minor numbers in detail.

Device File Example

For example, the device file for block data transfer that corresponds to section 15 on a disk assigned lu 3 would look like:

    /dev/dsk/c3d0s15

The directory **/dev** contains device files. The subdirectory **dsk** contains *block* transfer device files (the **rdsk** subdirectory contains *character* transfer device files). In the next part of the file name, **c3d0s15**, **c3** indicates that this disk is logical unit number 3, **d0** indicates the file is for a disk unit and **s15** indicates that the file is for disk section 15.

For a detailed explanation of device (special) files, see the manual *How HP-UX Works: Concepts for the System Administrator*; also see *insf* (1M) and *mksf* (1M) in the *HP-UX Reference Manual* for descriptions of the device file naming conventions.

8

Creating Device Files

Device files are made automatically for a device that you add to the system. When you add a disk, for example, the system—in addition to adding the disk to the I/O configuration—makes the special files the disk requires by using the `insf` command (install special files).

The *insf*(1M) command reads information about I/O devices from the kernel, creates a standard set of special files, and assigns logical units numbers for all devices that have not yet had logical unit numbers assigned to them. `insf` creates both the block and character special files needed, the special files for each section of each disk, as well as the special files for all options of a tape device. In addition, `insf` sets file permission and file ownership to appropriate values, and creates diagnostic files if necessary.

You can use the `insf` command directly, if necessary. The `-e` option creates new device file names for existing devices, that is, devices that already have associated logical unit numbers. This option is useful in restoring device files that have been removed.

Caution   You must be in single-user mode to safely run `insf` because the mode, owner, or group of existing special files might be changed; any currently open special files could be left in an indeterminate state.

First, change the working dirctory:

        cd /dev

Then, issue the command:

        /etc/insf

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Listing Device Files

Device files are located in subdirectories of the /dev directory.

You can, however, use the ioscan command with the -nfH option to list those devices associated with a specific hardware address.

For example, to list the device files that have been created for new HP-FL disk you added, (assuming the new disk has the hardware address 4.2.0,) you can issue the command:

```
ioscan -nfH 4.2.0
```

You will get a listing of all the block and character device files associated with each of the possible sections of the disk located at that hardware address.

How insf Assigns Logical Unit Numbers

When insf assigns a logical unit number to a device, it assigns the next available logical unit number for the device class.

For example, the drivers disc1, disc2, disc3 and disc4 are in the same class, "disk". Suppose your system has two HP-IB disks (which use the disc1 driver), logical unit numbers 0 and 1. When you add an HP-FL disk (which uses the disc4 driver), insf will assign it logical unit number 2. The next HP-IB disk you add will be assigned logical unit 3.

8

HP 9000 Series 800 Architecture Types

When you are working with peripherals that are not supported by autoconfiguration on an HP9000 Series 800 computer, you need to know about the Series 800 hardware addressing scheme.

There are two types of architecture associated with HP 9000 Series 800 computers, CIO and HP-PB. Addressing hardware on each of these architectures is similar, but differs due to differences in the layering of system busses.

The following table shows which modesl belong to which type of architecture.

Table 8-1. HP 9000 Series 800 Architecture Types

Architecture Type	Model Numbers
HP-PB	807, 808, 815, 817, 822, 827, 832, 837, 842, 847, 852, 857, 867S, 877S, 887S, 890S, 897S
CIO	825, 834, 835, 840, 845, 850, 855, 860, 865, 870S/xxx

The following sections of this chapter show how hardware is addressed on each of these two architectures. You need to understand hardware addressing if you intend to edit your S800 file to add an io statement for a device that is not supported by autoconfiguration. For a complete description of hardware addressing, refer to Chapter 10, "System Architectures" in the *How HP-UX Works: Concepts for the System Administrator* manual.

Once you understand hardware addressing on your computer model, you can use the examples shown in the "Adding Non-Automatically Configurable Devices" section as a guide for editing your S800 file.

8

HP 9000 Series 600/800 Computers - CIO Architecture

The HP 9000 Series 800 computer models that use CIO architecture are listed in the preceding table. Details on each SPU family can be found in the appendices in the *Installing and Updating HP-UX* manual and in the *How HP-UX Works: Concepts for the System Administrator* manual.
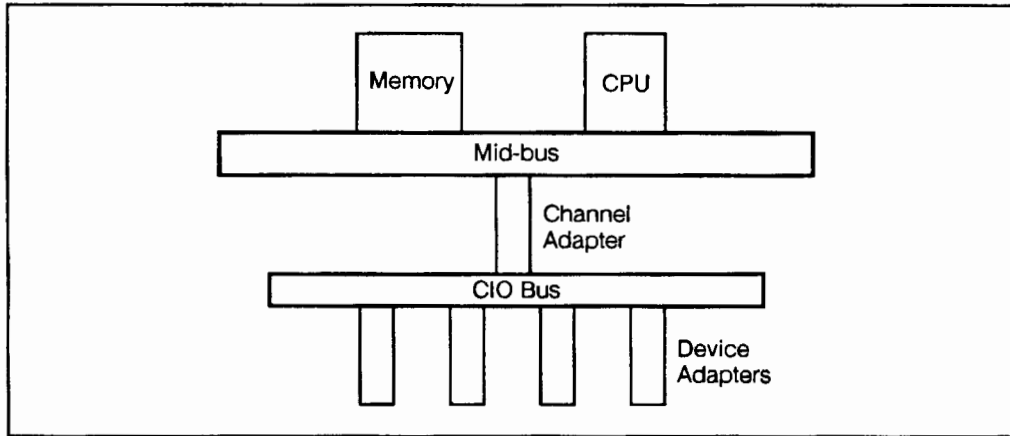
LG200098_005a

Figure 8-2. Basic CIO Architecture of Series 600/800 Computers

As you can see in Figure 8-2, the CPU, memory, and Channel Adapter communicate over the Mid-bus. (A **bus** is a communications path that carries data and signals between hardware modules.) Inside the SPU, there are Mid-bus slots into which circuit cards can be inserted. These **Mid-bus cards** can then communicate over the Mid-bus. Two examples of Mid-bus cards are memory cards and Channel Adapter cards.

The Channel Adapter serves as an interface between the Mid-bus and the rest of the I/O system. Specifically, the Channel Adapter performs the conversion between the Mid-bus and the lower speed Channel Input/Output (CIO) bus.

Channel Input/Output (CIO) Bus

The **CIO bus** is the general-purpose I/O bus on Series 800 computers that use CIO architecture. Inside the SPU, there are CIO slots into which CIO cards (also known as Device Adapters, or DAs) can be inserted. These cards communicate over the CIO bus with the Channel Adapter, and from there to other parts of the system. Some examples of CIO cards (Device Adapters) are:

- HP-IB cards for HP-IB devices such as HP-IB disk drives, tape drives, CD-ROM drives, and HP-IB printers.

- HP-FL cards for devices which use a fiber-optic link, such as HP-FL disk drives.

- SCSI cards for devices which use a SCSI bus, such as SCSI disk drives, tape drives, CD-ROM drives, and magneto optical drives.

- MUX cards for serial devices like terminals, modems, and serial printers.

- LAN (or LANIC) cards for Local Area Networks (LANs).

- Access Port (AP) cards for remote support.

Connected to each CIO card are one or more peripheral devices. Thus, in order for main memory to pass data to an I/O device (such as a disk drive), the data travels a path involving several components. The data will go from main memory over the Mid-bus, through the Channel Adapter, over the CIO bus, through the CIO card (Device Adapter) and finally to the device.

Typical I/O paths are shown in Figure 8-3.

8
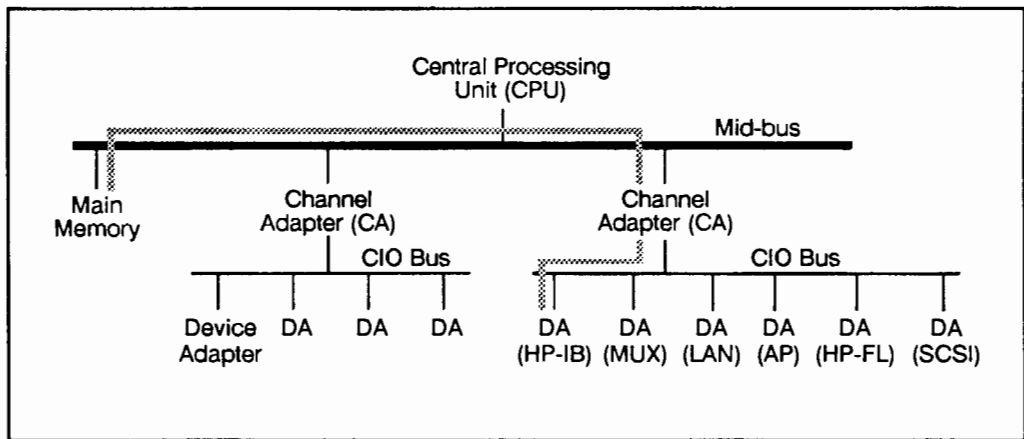
LG200098_006a

Figure 8-3. Typical CIO Architecture I/O Paths

8

Hardware Addressing for CIO Architecture

Each peripheral in your system has a unique **hardware address**, which is derived from the I/O path leading to that device. Figure 8-4 shows a typical CIO hardware address. The 850, 855, 860, 865, and 870 models include a another part to the address, as explained shortly. (HP-PB architecture computers use a somewhat different hardware addressing scheme which is discussed later in this chapter.)
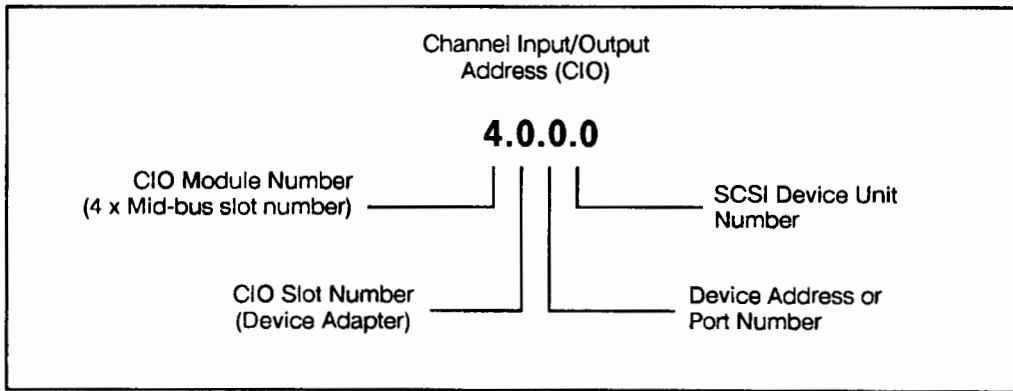
LG200098_007a

Figure 8-4. Sample Hardware Address

As shown in Figure 8-4, there are three basic parts to a CIO address (and an additional part for SCSI devices). These three basic parts specify a path through the I/O system. In this example, the hardware address says in effect: "Go to the Channel Adapter represented by module number 4 (the card in Mid-bus slot 1). Then go to the Device Adapter in CIO slot 0. Finally go to the device attached to this Device Adapter which has the device address of 0."

The fourth part of the address is the SCSI unit number, which is needed for SCSI devices only. It says in effect: "Go to a particular unit within a SCSI device." At this time, the SCSI unit number is always zero.

Module Number

The location of the Channel Adapter determines the Module Number, which is the first part of the hardware address. To calculate the Module Number,

find out which Mid-bus slot the Channel Adapter is installed in (the Channel Adapter can be either a discrete card or a chip located on another card). Multiply the Mid-bus slot number by 4. If the Channel is in Mid-bus slot 2, for example, the Module Number is 8 (4 x 2).

Since Channel Adapters may be in different slots on different systems, the Module Numbers may be different. Also, an SPU may have multiple Channel Adapters. See the hardware appendices in the manual, *Installing and Updating HP-UX*, HP part number B3108-90006, for information on individual SPUs.

CIO Slot Number

The second part of the hardware address is easier to determine than the Module Number. The number is the CIO slot number of the Device Adapter card. For example, an HP-IB card in CIO slot 2 means that all the devices attached to it will have 2 as the second part of their hardware addresses.

For a specific I/O configuration, only certain kinds of Device Adapter card can be installed in a given slot. For example, a system may be configured so that only a MUX card can go in CIO slot 5. To change the I/O configuration, use the procedure in chapter 8. However, the default I/O configuration is suitable for most systems. The default I/O configuration for an SPU is described in the hardware appendices in the manual, *Installing and Updating HP-UX*, HP part number B3108-90006, as well as in the hardware Installation and Configuration Guide shipped with the SPU.

Device Address or Port Number

The third part of the hardware address is the device address or port number. Since a Device Adapter can have several devices attached to it, this number indicates which of those devices is addressed. On disk drives and magnetic tapes, this number is the HP-IB, HP-FL, or SCSI device address which is set on the device itself. For MUX cards, the device address is the port number.

Figure 8-5 shows how HP-IB addresses on a CIO system differentiate between the disk drives attached to an HP-IB card.

SCSI Unit Number

The fourth part of the address is the SCSI unit number (also known as a **lun** number), which is needed for SCSI devices only. It indicates which SCSI unit

within a particular SCSI device is being addressed. At this time, the SCSI unit number is always zero.
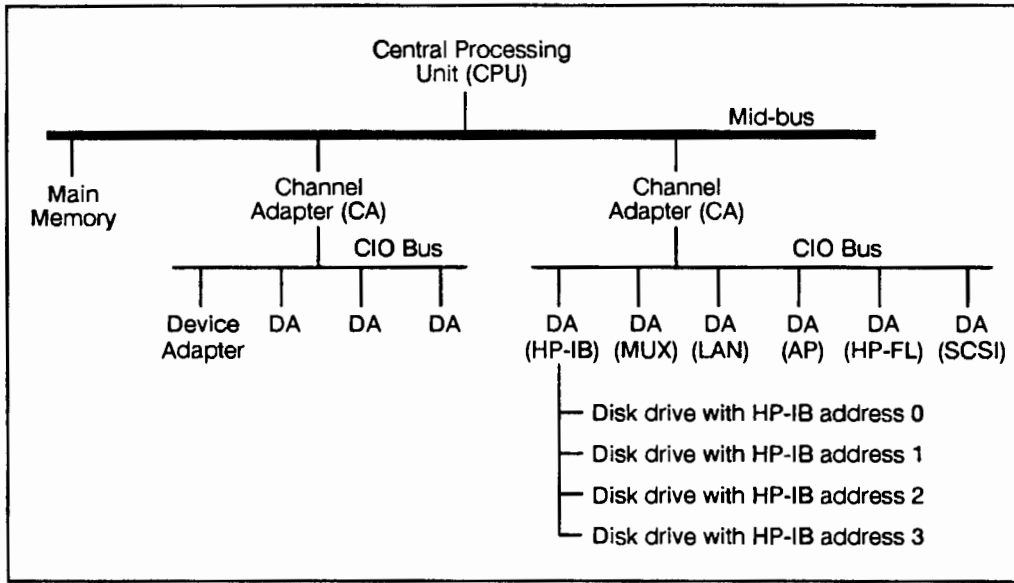
Figure 8-5. HP-IB Addressing on CIO Systems

8

Hardware Paths on the 850/855/860/865/870

The 850/855/860/865/870 models have two Mid-buses, Mid-bus 0 and Mid-bus 1. Each is serviced by a Bus Converter (Bus Converter 0 and Bus Converter 1). These are shown in Figure 8-6.
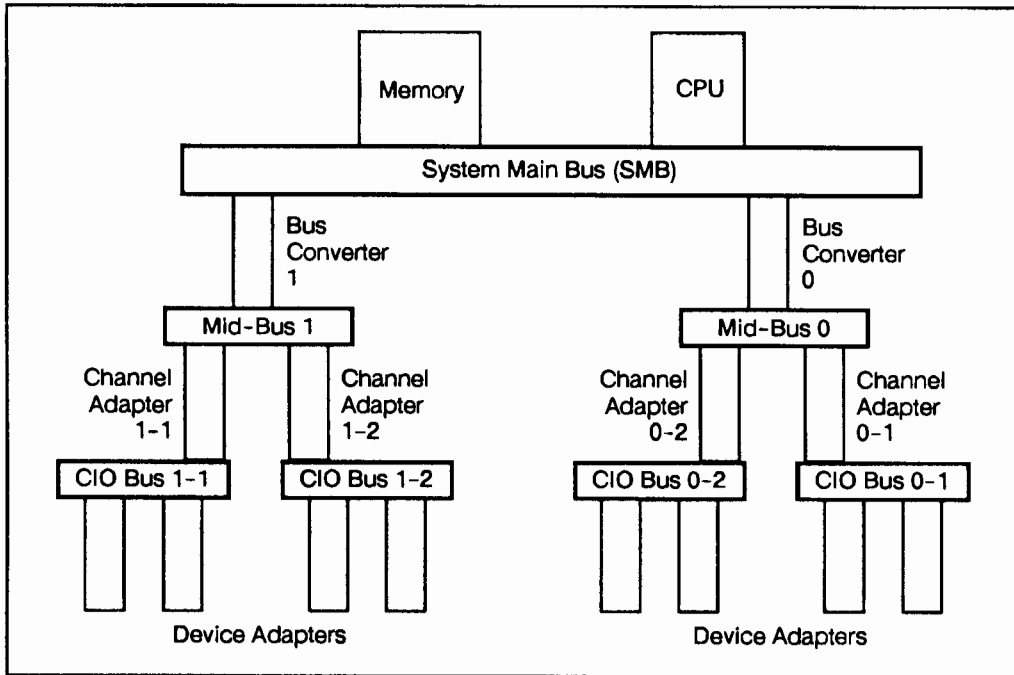
LG200098_032a

Figure 8-6. Hardware Architecture of the 850/855/860/865/870

To specify a hardware address, you must identify the correct Bus Converter. This is done by adding a Bus Converter (BC) address to the front of the hardware address (separated with the "/" symbol). A 2 is added for Bus Converter 0, and a 6 is added for Bus Converter 1.

For an example, see Figure 8-7. For more details and examples, refer to the manual, *Installing and Updating HP-UX*, HP part number B3108-90006. This manual shows the physical layout of the 850/855/860/870.

```
        Bus Converter _____                    _____ SCSI Device Unit
        Module Number        |                    |        Number
                             |                    |
                             
                          2/4.0.0.0
                             |  |  |
        CIO Module Number ___|  |  |___ Device Address or
        (4 x mid-bus slot #)    |       Port Number
                                |
                         CIO Slot Number
                         (device adapter)
```

LG200098_029b
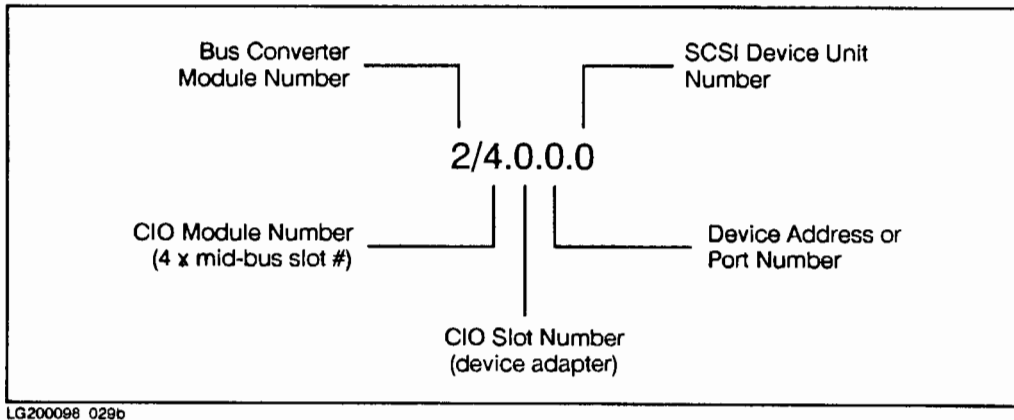
Figure 8-7. Hardware Paths on 850/855/860/870 Computers

8

HP 9000 Series 800 Computers - HP-PB Architecture

The HP 9000 Series 800 computers that use a type of hardware architecture known as **HP-PB** (Hewlett-Packard Precision Bus) are listed in Table 8-1. Details on each SPU family can be found in the appendices of the manual, *Installing and Updating HP-UX*, HP part number B3108-90006.

Figure 8-8 compares the HP-PB architecture to the architecture of other Series 800 machines (referred to as **CIO** or **Mid-bus** architecture because of the two-tier bus structure).
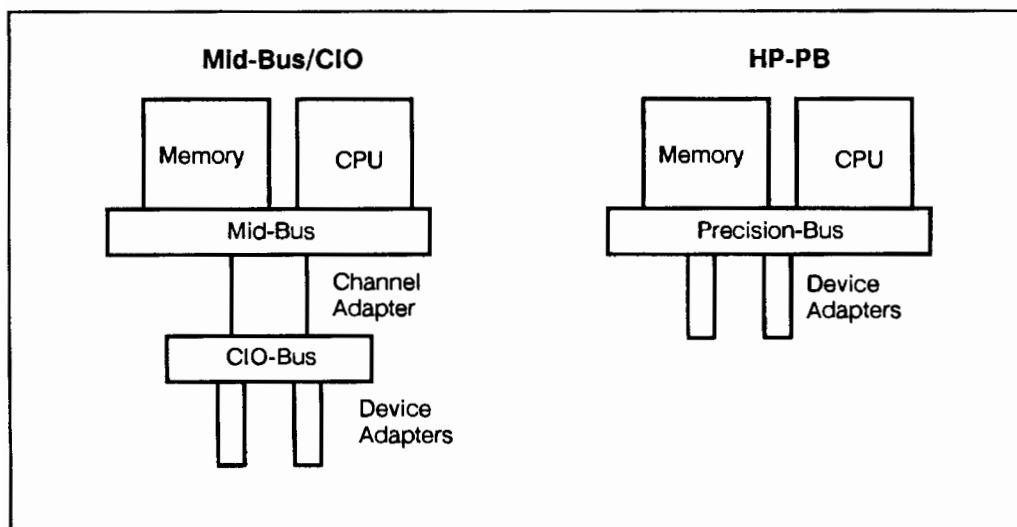
LG200098_040a

Figure 8-8. Comparison of HP-PB and CIO System Architecture

As you can see in Figure 8-8, in HP-PB architecture, the CPU, memory, and I/O Adapters communicate over the Precision Bus. (A **bus** is a communications path that carries data and signals between hardware modules.) Inside the SPU, there are Precision Bus slots into which Device Adapters (also known as I/O cards) can be inserted.

Precision Bus (HP-PB)

The **Precision bus** is the general-purpose bus on Series 800 computers with HP-PB architecture. These computers have Precision Bus slots into which I/O cards (Device Adapters) can be inserted. These cards communicate over the Precision bus with the CPU and memory, and from there to other parts of the system. Some examples of I/O cards are:

- HP-IB cards for HP-IB devices such as HP-IB disk drives, tape drives, CD-ROM drives, and HP-IB printers

- HP-FL Card for HP-FL devices, which use a fiber-optic link, such as HP-FL disks

- SCSI cards for devices which use a SCSI bus, such as SCSI disk drives, tape drives, CD-ROM drives, and magneto optical drives.

- MUX cards for serial devices like terminals, modems, and serial printers

- LAN (or LANIC) cards for Local Area Networks (LANs)

- Access Port (AP) cards for remote support

Connected to each I/O card are one or more peripheral devices. Thus, for main memory to pass data to an I/O device (such as a disk drive), the data travels a path involving several components. The data will go from main memory over the Precision Bus, through the I/O card and finally to the device.

Typical I/O paths are shown in Figure 8-9.

8
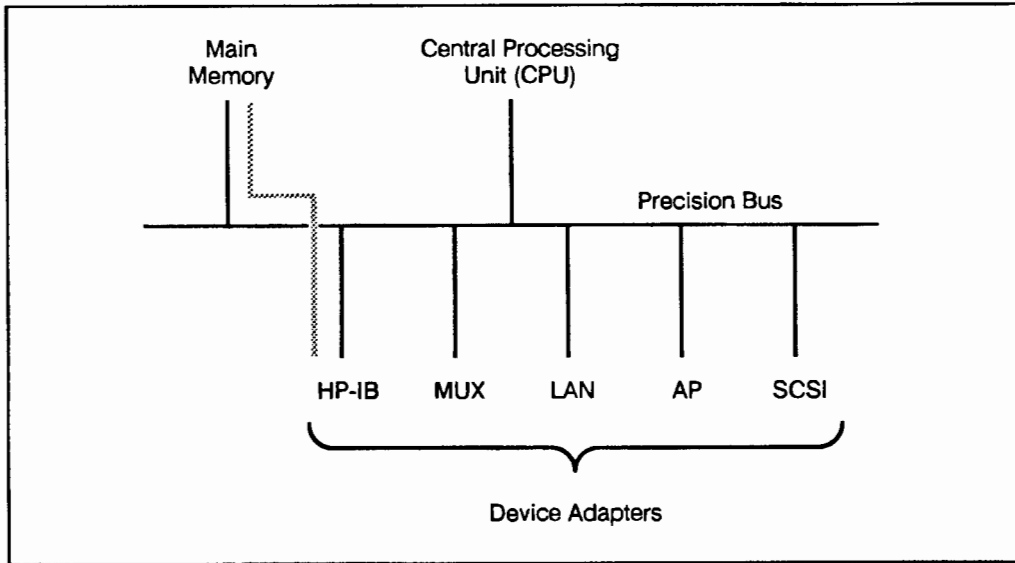
LG200098_043a

Figure 8-9. Typical HP-PB Architecture I/O Paths

8

Hardware Addressing for HP-PB Architecture

Each peripheral in your system has a unique **hardware address**, which is derived from the I/O path leading to that device. Hardware addressing is simpler on an HP-PB machine than on a CIO machine, because cards plug directly into the Precision Bus. Because there is no CIO bus, one level of addressing goes away.

Figure 8-10 shows the difference:

CIO

4.0.0.0

CIO Module Number
(4 x Mid-bus slot number) ———

CIO Slot Number
(Device Adapter)

SCSI Device Unit
Number

Device Address or
Port Number

HP-PB

4.0.0

HP-PB Physical Module
(4 x HP-PB slot number)

SCSI Device Unit
Number

Device Address or
Port Number

LG200098_044
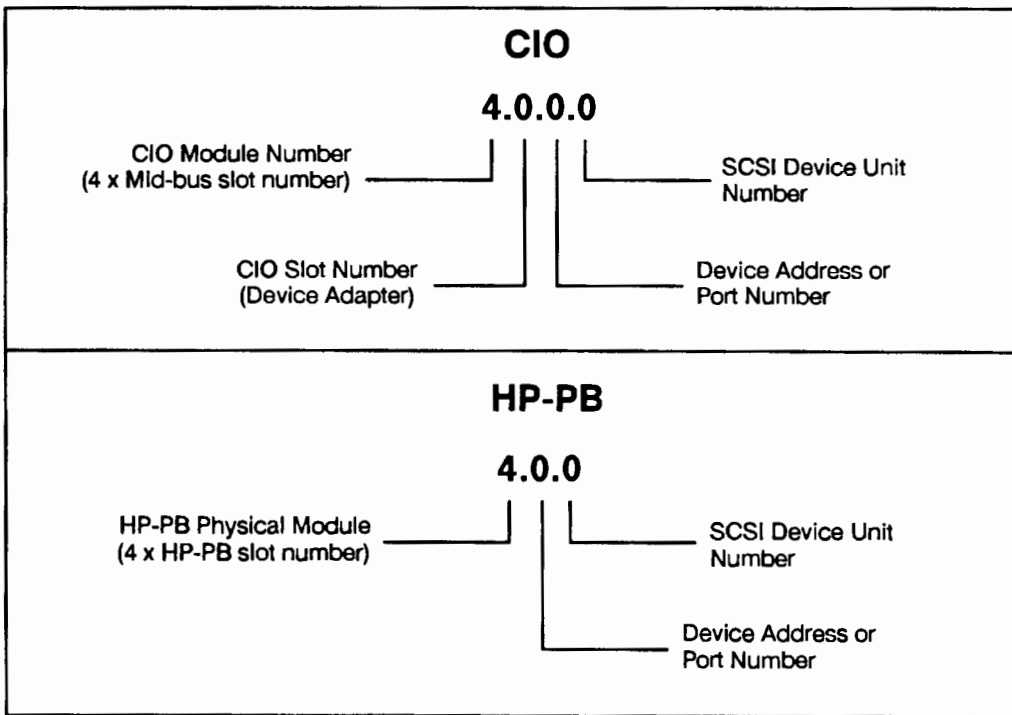
Figure 8-10. HP-PB Addressing Compared to CIO Addressing

8-26   Setting Up Devices Using HP-UX Commands

As shown in Figure 8-10, there are two basic parts to a HP-PB address (and an additional part for SCSI devices). These parts specify a path through the I/O system. In this example, the hardware address says in effect: "Go to the Device Adapter represented by module number 4 (the card in Precision Bus slot 1). Then go to the device attached to this device adapter which has the device (bus) address of 0."

The third part of the address is the SCSI unit number, needed for SCSI devices only. It says in effect: "Go to a particular unit within a SCSI device." At this time, the SCSI unit number is always zero.

The hardware appendices in the manual, *Installing and Updating HP-UX*, HP part number B3108-90006, provide more information about hardware addressing for specific SPU models.

HP-PB Physical Module Number

The location of the I/O card determines the Physical Module Number, which is the first part of the hardware address. To calculate the Module Number, find out which Precision Bus slot the I/O card is installed in. Multiply the Precision Bus slot number by 4. If the I/O card is in Precision Bus slot 2, for example, the Module Number is 8 (4 x 2).

For a specific I/O configuration, only certain kinds of I/O card can be installed in a given slot. For example, a system may be configured so that only a MUX card can go in Precision bus slot 4. To change the I/O configuration, use the procedure in chapter 8. However, the default I/O configuration is suitable for most systems. The default I/O configuration for an SPU is described in the hardware appendices in the manual, *Installing and Updating HP-UX*, HP part number B3108-90006, as well as in the hardware Installation and Configuration Guide shipped with the SPU.

Device Address or Port Number

The second part of the hardware address is the device address or port number. Since an I/O card can have several devices attached to it, this number indicates which of those devices is addressed. On disk drives and magnetic tapes, this number is the HP-IB, HP-FL, or SCSI device address which is set on the device itself. For MUX cards, the device address is the port number.

Figure 8-11 shows how HP-IB addresses on an HP-PB system differentiate between the disk drives attached to an HP-IB card.

SCSI Unit Number

The third part of the address is the SCSI unit number (also known as a **lun** number), needed for SCSI devices only. It indicates which SCSI unit within a particular SCSI device is being addressed. At this time, the SCSI unit number is always zero.
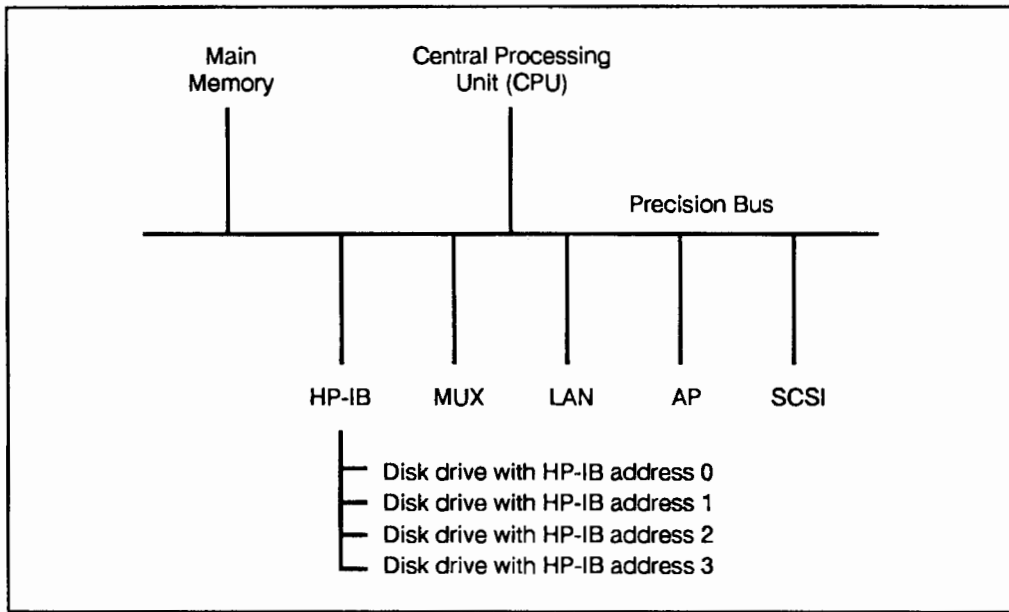
LG200098_042a

Figure 8-11. HP-IB Addressing on HP-PB Systems

8

Addressing an HP-FL Device using the PBA-FL Adapter

HP-FL is supported on HP-PB systems through HP 28615A Fiber-Optic Link adapter and the HP A1749A PBA-FL device adapter. Use of the HP 28615A Fiber-Optic link adapter is preferred because it provides a direct connection from you HP-FL device to your computer. However, on HP-PB system running DataPair/800, this interface is not supported. In this instance you must use the HP A1749A PBA-FL device adapter (note that this adapter is not supported on Models 807S, 817S and 837S).

The PBA-FL adapter card uses a CIO address as part of the hardware path. This CIO address is hardwired at 0. Therefore, the path for a peripheral device connected through a PBA-FL adapter is:

```
(4 X PB slot number).CIO slot number (0).device address
```

For example, if the PBA-FL adapter is installed in PB slot 8 (PB8), and the disk HP-FL address is 0, then the path for the disk device is:

```
(4 X 8).0.0 = 32.0.0
```

8

Adding Non-Automatically Configurable Devices

The system cannot automatically configure the devices or I/O cards that use the following drivers:

```
instr0          gpio1          rti0
gpio0           pdn0           psi0
```

Except for psi0 and rti0, however, SAM can add the device drivers listed above and reconfigure your kernel. The complete procedures for using SAM to add drivers to your kernel configuration file are at the end of Chapter 3, "Installing Interface Cards".

We recommend using SAM. If you do not have SAM on your system, edit your S800 file to include the necessary drivers and their addressing manually.

The following examples describe manually editing your S800 file to include the driver and to specify the hardware address of the I/O card or device you are adding to your system. Hardware addressing varies on different Series 800 computers, as shown in the previous sections, therefore the io statements will vary. Refer to Chapter 11, "System Configuration" in the *How HP-UX Works: Concepts for the System Administrator* manual for detailed information on the S800 file and the io statement structure for specific hardware models.

8

instr0 Device Driver

Suppose you want to add an HP-IB instrument—which uses the `instr0` driver—to the HP-IB card plugged into the CIO slot 2. The channel adapter is located in Mid-bus slot 1. Edit the `S800` file as follows:

Begin by adding an "include" statement for the driver:

```
include instr0;
```

Then, add the I/O statement as follows. Starting with the address for the CIO channel adapter, and remembering that the addresses for Mid-bus slots are equal to the Mid-bus slot number multiplied by 4, the first line of the I/O statement would be:

```
cio_ca0  address 4 {
```

The curly brace following `address 4` indicates the lines following it will describe what is located in the CIO channel adapter.

Because the HP-IB card is located in the second slot of the channel adapter, the next line would be:

```
hpib0  address 2 {
```

Then, for the HP-IB instrument itself, you would assign its HP-IB address (or bus address) to a value not already used, for example, 7. (Note that only one device using the `instr0` driver can be used on each HP-IB bus.) Therefore, the last line of the I/O statement is:

```
instr0  address 7;
```

All together, the lines described above would make up the following entry in the I/O statement:

```
io {
    cio_ca0  address 4 {
            hpib0     address 2 {
                      instr0  address 7;
            }
    }
}
```

8

instr0 on HP-PB

Suppose you are adding an HP-IB device, such as a plotter (which requires the instr0 driver), to the HP-IB card you have connected to HP-PB slot 12 of a Model 832 Computer. Edit the S800 file as follows.

Begin by adding an "include" statement for the driver:

```
include instr0;
```

Then, add the I/O statement as follows. Starting with the address for slot number 12 and remembering that the addresses on the HP-PB bus equal the slot number times four, the first line of the I/O statement would be:

```
hpib1      address 48 {
```

Then, for the HP-IB instrument itself, you would set its HP-IB address (or bus address) to a value which will not be used by any other HP-IB devices on that HP-IB bus, for example, 31. (Note that only one device using the instr0 driver can be used on each HP-IB bus.) Therefore, the last line of the I/O statement is:

```
instr0     address 31;
```

All together, the lines described above would make up the following entry in the I/O statement:

```
io {
      hpib1      address 48 {
                 instr0     address 31;
      }
}
```

8

gpio0 Device Driver

The gpio0 device driver, required for the CIO AFI Card (or GPIO card), connects to the CIO Channel Adapter. Suppose you add the AFI card to slot 6 of the channel adapter located in Mid-bus slot 1. Edit the S800 file as follows.

Begin by adding an "include" statement for the driver:

```
include gpio0;
```

Then, add the I/O statement as follows. Starting with the address for the CIO channel adapter, and remembering that the addresses for Mid-bus slots are equal to the Mid-bus slot number multiplied by 4, the first line of the I/O statement would be:

```
cio_ca0  address 4 {
```

The curly brace following **address 4** indicates the lines following it will describe what is located in the CIO channel adapter.

Because the CIO AFI card is located in the sixth slot of the channel adapter, the next line would be:

```
gpio0  address 6;
```

All together, the lines described above would make up the following entry in the I/O statement:

```
io {
     cio_ca0  address 4 {
             gpio0  address 6;
     }
}
```

gpio1 Device Driver

gpio1 is the device driver for the HP-PB General Purpose I/O Card, which connects directly to the HP-PB bus on HP-PB computers, such as Models 815 and 832. Edit the S800 file as follows.

Begin by adding an "include" statement for the driver:

```
include gpio1;
```

.

Then, add the I/O statement. Addresses on the HP-PB bus are equal to the HP-PB slot number multiplied by 4. If you connected the HP-PB GPIO card to slot 12, for example, the card would have address 48.

Therefore, the I/O statement would be:

```
io {
     gpio1   address 48;
}
```

8

pdn0 Device Driver

The X.25 communications card requires the pdn0 driver. This card connects directly to either the HP-PB bus or, in the case of CIO machines, to the Mid-bus.

Begin by adding an "include" statement for the driver:

```
include pdn0;
```

Then, add the I/O statement. Suppose you connected the card to Mid-bus slot 3 of an 835. Remembering that the addresses for Mid-bus slots are equal to the Mid-bus slot number multiplied by 4, the Mid-bus address would be 12.

The entire I/O statement would be:

```
io {
    pdn0   address 12;
}
```

For an HP-PB machine—an 832, for example, the I/O statement for an X.25 card located in slot 11, which has address 44, would be:

```
io {
    pdn0   address 44;
}
```

rti0 Device Driver

The CIO Real Time Interface card connects to the CIO Channel Adapter. Suppose you add the RTI card to slot 6 of the channel adapter located in Mid-bus slot 1.

Begin by adding an "include" statement for the driver:

```
include rti0;
```

Then, add the I/O statement as follows. Starting with the address for the CIO channel adapter, and remembering that the addresses for Mid-bus slots are equal to the Mid-bus slot number multiplied by 4, the first line of the I/O statement would be:

```
cio_ca0  address 4 {
```

The curly brace following **address 4** indicates the lines following it will describe what is located in the CIO channel adapter.

Because the RTI card is located in the sixth slot of the channel adapter, the next line would be:

```
rti0  address 6;
```

All together, the lines described above would make up the following entry in the I/O statement:

```
io {
        cio_ca0  address 4 {
                rti0  address 6;
        }
}
```

8

psi0 Device Driver

psi0 is the device driver for the Programmable Serial Interface card, which connects directly to the HP-PB bus on HP-PB computers, such as Models 815 and 832, or to the Mid-bus on a CIO machine.

Begin by adding an "include" statement for the driver:

```
include psi0;
```

Then, add the I/O statement as follows. Addresses on the HP-PB bus are equal to the HP-PB slot number multiplied by 4. If you connected the PSI card to slot 11, for example, the card would have address 44.

Therefore, the I/O statement would be:

```
io {
     psi0   address 44;
}
```

On a CIO machine, the psi0 card can connect directly to the Mid-bus. The addresses for Mid-bus slots are equal to the slot number times four; if we put the card in slot 3, the address would be 12. The I/O statement would be:

```
io {
     psi0   address 12;
}
```

8

Viewing Your System's I/O Setup Using the ioscan Command

In general, adding a piece of hardware to your system involves three steps:

1. Getting the drivers associated with the device into the kernel.

2. Configuring the drivers (that are in the kernel) to communicate with the hardware.

3. Creating device files for the device.

If you use SAM to add your peripherals, SAM will do these things for you, in most cases. If you are not using SAM to add your device, if you are troubleshooting a problem, or if you are doing some advanced planning for adding the hardware, you can use the /etc/ioscan command to:

- Identify and list the hardware connected to your system, including processors, memory and I/O devices.

- Determine whether or not a driver is *currently* in your kernel.

- Determine the hardware path for a device that is connected to your system.

- Adjust the driver binding on your system so that the drivers are correctly configured to communicate with your system's devices.

What Does the ioscan Command Do?

On HP-PA computers, there is a layered structure of system busses that forms the system processing unit (SPU). Each bus (for example, the processor bus, the mid-bus, the CIO bus, an HP-IB card) has a driver associated with it. The proper drivers must be connected in the proper order for HP-UX to be able to successfully communicate with the device. This process is called **binding**.

ioscan can do much of the driver binding by probing the hardware components on your system to determine what they are and in which order they are connected. It then configures your kernel's drivers accordingly. This capability is known as **autoconfiguration**. Autoconfiguration eliminates the need for defining the I/O structure in the io statement of your uxgen input file for most devices.

Note	For ioscan to be able to probe a hardware component in your system, that component's driver must be able to recognize and respond to ioscan's probe. Most of the drivers can do this, but a few can't. For those devices whose drivers do *not* support auto-configuration (see "Adding a Device Using Commands"), you must still define their binding information in the uxgen input file as outlined in "Adding a Device Using Commands" and "Adding Non-Automatically Configurable Devices".

In addition to binding drivers, ioscan can list your system's current hardware configuration for you. It can also scan your system's kernel I/O data structures and report to you which drivers are currently in your kernel.

8

Using ioscan to View your Hardware Configuration

When you are planning to add new equipment to your system and when you're trying to troubleshoot a problem with one of your peripherals, it is helpful to have a list of the hardware on your system. The ioscan command can provide you with a list of the devices configured into your system and the hardware paths associated with those devices. To create this list, use the command:

```
/etc/ioscan
```

ioscan will show you the hardware path and the status of each device on your system, along with a description of the device's type (**class**). The output will look similar to this:

```
Hardware
   Path      Description      Status
==================================
0            processor        ok
4            cio              ok
4.0             hpib          ok
4.0.0              disk       ok
4.0.1              disk       ok
4.0.2              disk       ok
4.0.3              tape_drive ok
4.0.5              disk       ok
4.0.7              disk       ok
4.1          tty             ok
4.2          hpfl            ok
4.2.0              disk       ok
4.2.1              disk       ok
4.4          lan             ok
12           memory          ok
```

In the above example the status for all devices is listed as "ok." If you get values other than "ok," you can look up their meanings in the *HP-UX Reference Manual*. See the manual reference page for *ioscan*(1M).

You may restrict ioscan's output to devices associated with a specific driver or to certain classes of devices (such as lan, scsi, disk, printer). To do this, use ioscan's -d and -c options, respectively. See the manual reference page *ioscan*(1M) for details.

If you need to know how the drivers are configured for each of the devices, you can use ioscan's -f option to get more detailed information about your hardware. In addition to the driver binding information, the -f option will show you the LU number associated with each of your devices and will give you both the hardware status and the driver (software) status for each device. For example:

```
ioscan -f
```

Class	LU	H/W Path	Driver	H/W Status	S/W Status
processor	-	0	processor	ok(0x0)	ok
cio	-	4	cio_ca0	ok(0x1000)	ok
hpib	-	4.0	cio_ca0.hpib0	ok(0x2)	ok
disk	4	4.0.0	cio_ca0.hpib0.disc1	ok(0x22e)	ok
disk	6	4.0.1	cio_ca0.hpib0.disc1	ok(0x260)	ok
disk	7	4.0.2	cio_ca0.hpib0.disc1	ok(0x22e)	ok
tape_drive	0	4.0.3	cio_ca0.hpib0.tape1	ok(0x174)	ok
disk	5	4.0.5	cio_ca0.hpib0.disc1	ok(0x22e)	ok
disk	3	4.0.7	cio_ca0.hpib0.disc1	ok(0x270)	ok
tty	1	4.1	cio_ca0.mux0	ok(0x7)	ok
hpfl	-	4.2	cio_ca0.hpfl0	ok(0x8)	ok
disk	1	4.2.0	cio_ca0.hpfl0.disc2	ok(0x2)	ok
disk	2	4.2.1	cio_ca0.hpfl0.disc2	ok(0x2)	ok
lan	1	4.4	cio_ca0.lan0	ok(0x6)	ok
memory	-	12	memory	ok(0x800)	ok

Note   Some of the devices on your system (for example, the processor and the memory) aren't considered "usable devices" and therefore do not have an LU number associated with them. For those devices, ioscan will put a dash "-" in the LU column of its output.

8

Using ioscan to Determine Whether or Not a Driver is in Your Kernel

When you are adding a new device to your system, one of the first steps you need to take is to add the appropriate drivers to your kernel. If you are not sure if a driver is already in your kernel, you can use ioscan to check. To do this, use ioscan's -k and -d options. The -k option tells ioscan to scan your kernel's I/O data structures *instead of* your system's hardware.

```
ioscan -k -d disc0
```

```
ioscan: Device driver disc0 is not in the kernel
```

If ioscan finds the driver in your kernel, it will list the devices that it finds that use the driver.

If ioscan tells you that the driver is not in the kernel (as shown in the example above), you will need to regenerate your kernel to include it. You can use SAM to add the driver if you want.

For information on regenerating your kernel, see this chapter.

Using ioscan to Configure a New Device

Whenever `ioscan` scans your system's hardware, it binds and unbinds drivers as it needs to, in order to match the actual hardware in your system. This means that you can add a new device to your system and run `ioscan` to configure its drivers automatically (if the appropriate drivers are in your system's kernel and if those drivers support auto-configuration).

When you power up and reboot your system (after connecting your new device), a process called `ioinit` (run from the `inittab` file) will run `ioscan` for you.

For devices using drivers that are not auto-configurable, you will need to change the `io` statement in your uxgen input file. This can be done by editing the file directly or by using SAM to add the device driver to your system.

If you have not yet physically connected the device to your system, or if it was somehow not automatically configured (perhaps due to a faulty device not responding), an alternate form of the `ioscan` command can "force" the binding of drivers in a specific order. For example, the following command might be used to configure an hp-ib tape drive that uses the `tape0` driver:

```
ioscan -M cio_ca0.hpib0.tape0 -H 4.5.3
```

For detailed information about the S800 file and hardware addressing on your Series 800 computer, refer to Chapter 10, "System Architectures" in the *How HP-UX Works: Concepts for the System Administrator* manual and the *Installing and Updating HP-UX*, HP part number B3108-90006 manual.

8

A

Device Files and Minor Numbers

This appendix discusses the supported CIO and HP-PB drivers. The drivers
supported on CIO-based systems are listed in Table A-1.

Table A-1. I/O Drivers for Midbus/CIO-Based Systems

Driver Name	Supported I/O Devices
cio_ca0[1]	CIO channel adapter driver
hpib0[2]	HP-IB Device Adapter Manager that supports the HP 27110 HP-IB interface card.
scsi2[3]	Driver for the HP 27147A CIO SCSI Host Adapter.
cn	Pseudo-driver for system consoles.
disc1	CS/80 and SS/80 HP-IB disks and cartridge tapes.
disc2	CS/80 HP-FL disks that are connected to an HP 27111A HP-FL interface card.
disc3	SCSI disk drives such as the HP 7957S.
hpfl0	HP-FL disks that are connected to the HP 27111A CIO Fiber-Optic Link (HP-FL) Device Adapter
tape1	HP-IB tape drives such as the HP 7978, HP 7979, and the HP 7980 drives and the HP C1511 HP-IB DDS-Format Tape drive.
tape2	SCSI tape drives such as the HP C1512A SCSI DDS-Format Tape Drive.
autoch	For use with Optical Disk Library Systems.
autox0	For use with Optical Disk Library Systems.
instr0	HP-IB devices such as printers and plotters.
lpr0	HP 256X line of printers that use the HP-IB CIPER protocol
lpr1	HP 2932/2934 and 2235 line of printers that use the HP-IB Amigo
lpr3	Driver for the HP C2753A Model F100 SCSI printer protocol

1 The cio_ca0 driver is required by all CIO interface card drivers (gpio0, hpfl0, hpib0, lan0, mux0, mux0_16, scsi2)

2 The hpib0 driver is required by the disc1, instr0, lpr0, lpr1, and tape1 drivers.

3 The scsi2 driver is required by the autoch, autox0, disc3, and tape2 drivers.

A

A-2   Device Files and Minor Numbers

Table A-1.
I/O Drivers for Midbus/CIO-Based Systems (continued)

Driver Name	Supported I/O Devices
mux0	RS-232C (serial) peripherals that use the HP 98196 interface card; it includes terminals, printers, and plotters
mux0_16	Driver for the HP 98190A CIO Asynchronous 16-Channel Multiplexer Interface.
gpio0	General-purpose parallel I/O interface; it uses an HP 27114A or HP 27114B Asynchronous First In/First Out Interface card
lan0	Networking; specifically designed for the HP 5602-3313 CIO LANLINK (TurboLAN)
osi0	HP 32124A or HP 32125A OSI Express Card used with the HPA1126 bus converter to support HP MAP 3.0 networking
pty0	Pseudo-terminals (ptys)
pty1	Pseudo-terminals (ptys)

A

Device Files and Minor Numbers   A-3

The drivers supported on HP-PB-based systems are listed in Table A-2.

Table A-2. I/O Drivers for HP-PB-Based Computers

Driver Name	Supported I/O Devices
cio_ca0[1]	HP-FL disks that are connected to the HP A1749A HP-PB Fiber-Optic Link (PBA-FL) Precision Bus Device Adapter.
hpib1[2]	HP 28650A Device Adapter driver.
hpfl0[1]	HP-FL disks that are connected to the HP A1749A HP-PB Fiber-Optic Link (PBA-FL) Precision Bus Device Adapter.
hpfl1[3]	CS/80 HP-FL disks that are connected to the HP 28615A HP-FL Adapter.
scsi1[4]	Driver for the SCSI port on the HP 28655A HP-PB SCSI/Parallel Adapter.
cn	Pseudo-driver for system consoles
diaghpib1	Diagnostic driver for the HP 28650A
disc1	CS/80 and SS/80 devices that are connected through an HP-IB device adapter card
disc2[1]	HP-FL disks that are connected to the HP A1749A HP-PB Fiber-Optic Link (PBA-FL) Precision Bus Device Adapter
disc3	SCSI disk drives such as the HP 7957S.
disc4	HP-FL disks that are connected to the HP 28615A Fiber Optic Link Adapter.
tape1	HP-IB tape drives such as the HP 7978, HP 7979, and the HP 7980 drives and the HP C1511 HP-IB DDS-Format Tape drive.

1 The disc2, hpfl0, and cio_ca0 drivers are only needed when connecting an HP-FL device to an HP-PB system that does not support the HP 28615A HP-FL Adapter.

2 The hpib1 driver is required for the disc1, tape1, and instr0 drivers.

3 The hpfl1 driver is required by the disc4 driver.

4 The scsi1 driver is required by the disc3, tape2, autoch, and autox0 drivers.

A

A-4   Device Files and Minor Numbers

Table A-2. I/O Drivers for HP-PB-Based Computers (continued)

Driver Name	Supported I/O Devices
tape2	SCSI tape drives such as the HP C1512A SCSI DDS-Format Tape Drive.
autoch	For use with the C1700A Model 20GB/A Optical Disk Library System
autox0	For use with the C1700A Model 20GB/A Optical Disk Library System
instr0	HP-IB peripherals, such as printers, plotters, and general HP-IB instruments
lpr2	Driver for the parallel port on the HP 28655A HP-PB SCSI/Parallel Adapter. Driver for parallel printers and plotters.
lpr3	Driver for the HP C2753A Model F100 SCSI printer.
mux2	RS-232C (serial) peripherals that use the HP 40299A interface adapter; it includes terminals, printers, and plotters
mux4	RS-232C (serial) peripherals connected to the built-in ports on the model 890 computer.
gpio1	General-purpose parallel I/O interface for HP-PB-based computers; it uses an HP 28651A Asynchronous First In/First Out Interface card
lan1	Networking; specifically designed for the HP 28652-6001 LANLINK for HP-PB-based systems
osi0	HP 32122A or HP 32123A OSI Express Card use to support HP MAP 3.0 networking
pty0	Pseudo-terminals (ptys)
pty1	Pseudo-terminals (ptys)
scc1	RS-232C (serial) driver for the Serial Communication Controller (SCC) found on the motherboard or CPU for Models 808S and 815S only.

A

AUTOCH Driver

The autoch driver is needed for the optical autochangers supported by HP-UX. The autoch driver requires the autox0 driver.

The autoch driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for autochangers, enter

insf -d autoch

Refer to the *insf*(1M) man page for device file naming conventions. Refer to *autochanger*(7) in section seven of the *HP-UX Reference Manual* for the minor number format.

Note	Be sure that you are in the **/dev** directory. Otherwise, the insf command automatically creates special files in your working directory.

A

AUTOX0 Driver

The autox0 driver is used to communicate with optical autochangers. The autox0 driver is required the autoch driver.

The autox0 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for optical autochangers, enter

insf -d autoch

Refer to *autochanger*(7) in section seven of the *HP-UX Reference Manual* for the minor number format.

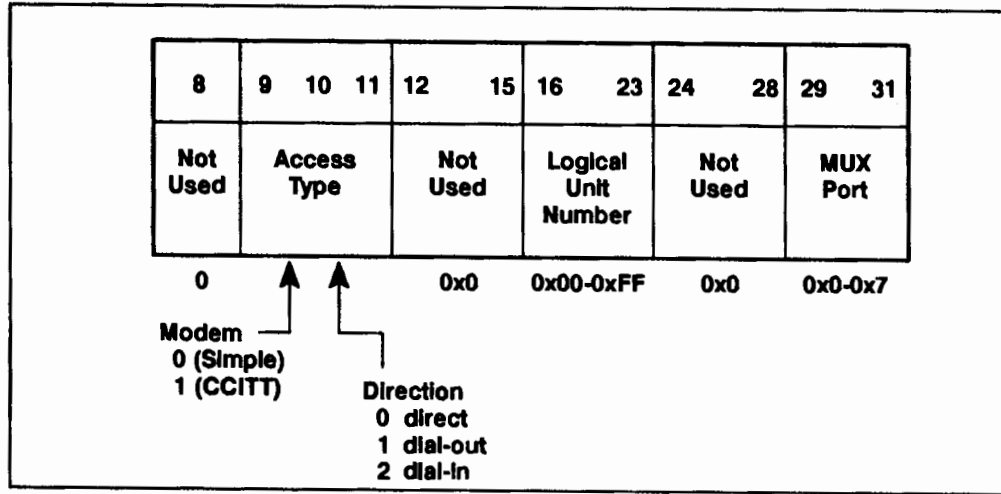| Note | Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory. |

A

CN Driver

The cn driver is a pseudo-driver. It provides a basic I/O interface to the system console through the **termio** interface.

The cn driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the cn driver, enter

insf -d cn

Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

The following special files are then created:

```
syscon rw- -w- -w-
systty rw- -w- -w-
console rw- -w- -w-
```

Minor Number Format

The minor number format is always 0.

DISC1 Driver

The disc1 driver controls a broad range of CS/80 and SS/80 disks and cartridge tape drives that connect to the HP 27110 HP-IB interface card on a CIO-based system.

The disc1 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the disc1 driver, enter

insf -d disc1 [-l lu]

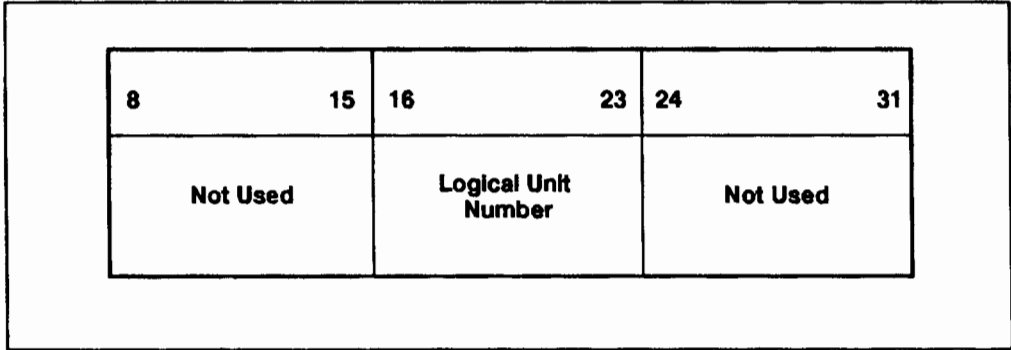| Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
dsk/c<lu>d0s<section>
  sections 0 to 15, group sys, block entry, rw- r-- ---
rdsk/c<lu>d0s<section>
  sections 0 to 15, group sys, character entry, rw- r-- ---
ct/c<lu>d<unit>s2
  units 0 and 1, block entry, rw- rw- rw-
rct/c<lu>d<unit>s2
  units 0 and 1, character entry, rw- rw- rw-
diag/dsk/c<lu>d<unit>
  units 0 and 1, character entry, rw- --- ---
```

where

lu   Assigned to each disk or cartridge in the S800 file.

unit number   Assigned to each disk or cartridge by the factory. The unit number is not an HP-IB address. Typically, the unit number is 0 unless you have more than one HP-IB device connected to the same HP-IB interface card.

A

DISC1 Driver

section
number
Disks and tapes are divided into sections or numbered parts. The *System Administration Tasks* manual has further information on this topic.

Minor Number Format

The minor number format for the disc1 driver is shown in Figure A-1.

8	9	10 15	16 23	24 26	27	28 31
Trans-parency	Cart. Tape Flag	Reserved	Logical Unit Number	Unit Number		Section Number

0 = disk
1 = Cartridge
Tape

0x00-0xff

0 = Normal
1 = Diagnostic

Reserved

LG200143_012
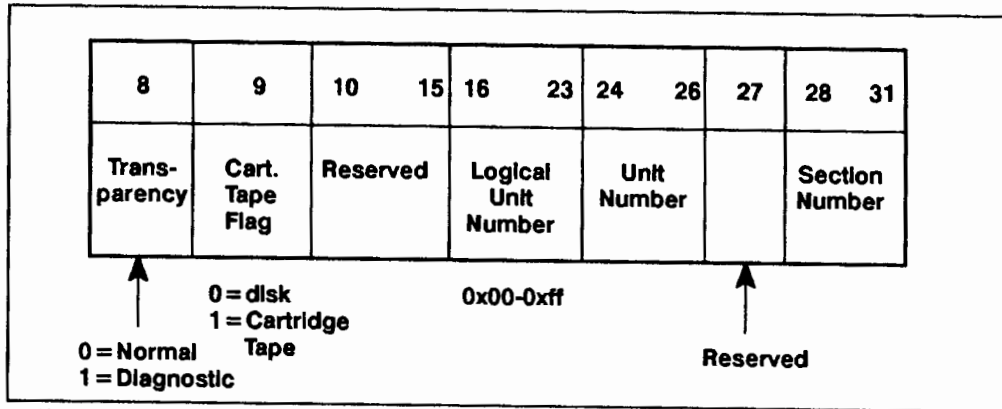
Figure A-1. Minor Number Format for disc1

where

transparent
flag
This flag is used for diagnostic purposes.

cartridge tape
flag
You can set this flag to indicate that the special file is only used for cartridge tapes. If this flag is set, reading or writing cannot be done on a disk.

A

DISC2 Driver

The disc2 driver controls a broad range of CS/80 and SS/80 disks and cartridge tape drives that connect to an HP-FL interface card.

The disc2 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the disc2 driver, enter

insf -d disc2 [-l lu]

Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed:

```
dsk/c<lu>d0s<section>
   sections 0 to 15, group sys, block entry, rw- r-- ---
rdsk/c<lu>d0s<section>
   sections 0 to 15, group sys, character entry, rw- r-- ---
diag/dsk/c<lu>d0
   character entry, rw- --- ---
```

A

DISC2 Driver

Minor Number Format

The minor number format for disc2 driver is shown in Figure A-2.
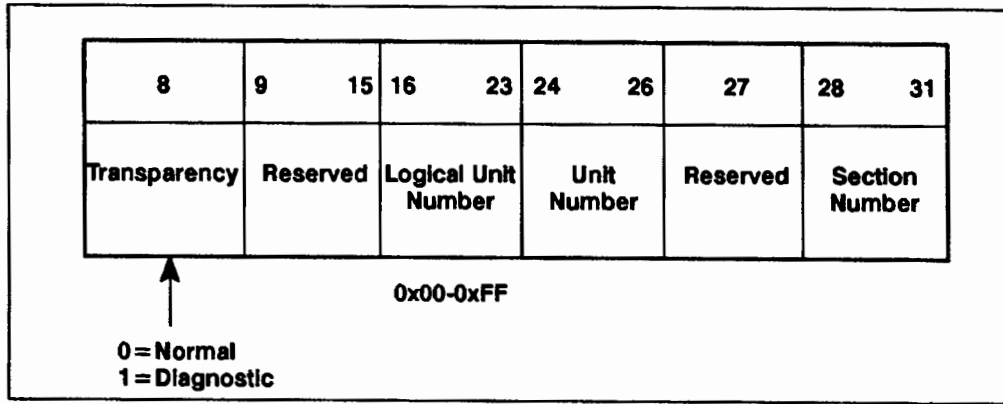
Figure A-2. Minor Number Format for disc2

where

lu	Assigned to each disk or cartridge
unit number	Is always 0
section number	Disks and tapes are divided into sections or numbered parts. The *System Administration Tasks* manual has further information on this topic.

A

DISC3 Driver

The disc3 driver controls SCSI disk drives that connect to a SCSI device adapter on an both CIO and HP-PB systems.

The disc3 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the disc3 driver, enter

insf -d disc3 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
dsk/c<lu>d0s<section>
    sections 0 to 15, group sys, block entry, rw- r-- ---
rdsk/c<lu>d0s<section>
    sections 0 to 15, group sys, character entry, rw- r-- ---
ct/c<lu>d<unit>s2
    units 0 and 1, block entry, rw- rw- rw-
rct/c<lu>d<unit>s2
    units 0 and 1, character entry, rw- rw- rw-
diag/dsk/c<lu>d<unit>
    units 0 and 1, character entry, rw- --- ---
```

A

DISC3 Driver

where

lu	Assigned to each disk or cartridge
unit number	Assigned to each disk or cartridge by the factory. The unit number is not an HP-IB address. Typically, the unit number is 0 unless you have more than one HP-IB device connected to the same HP-IB interface card.
section number	Disks and tapes are divided into sections or numbered parts. The *System Administration Tasks* manual has further information on this topic.

Minor Number Format

The minor number format for disc3 driver is shown in Figure A-3.

LG200143_012
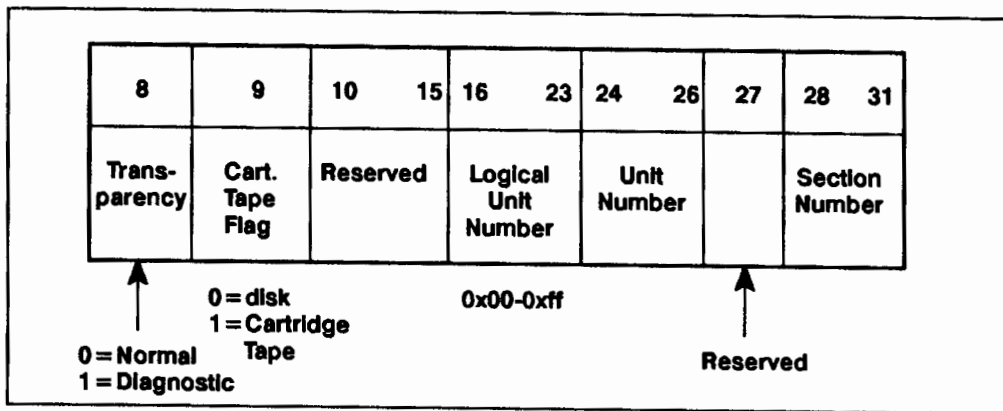
Figure A-3. Minor Number Format for disc3

where

transparent flag	This flag is used for diagnostic purposes.
cartridge tape flag	You can set this flag to indicate that the special file is only used for cartridge tapes. If this flag is set, reading or writing cannot be done on a disk.

A

DISC4 Driver

The disc4 driver controls HP-FL disk drives that connect to the HP 28615A Fiber Optic Link Adapter on HP-PB systems.

The disc4 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

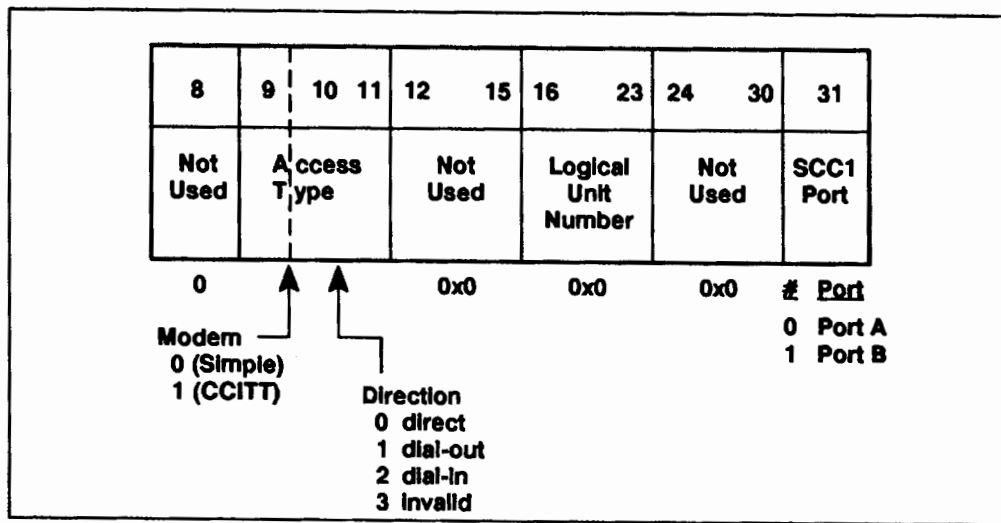To make special files for the disc4 driver, enter

insf -d disc4 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
dsk/c<lu>d0s<section>
    sections 0 to 15, group sys, block entry, rw- r-- ---
rdsk/c<lu>d0s<section>
    sections 0 to 15, group sys, character entry, rw- r-- ---
ct/c<lu>d<unit>s2
    units 0 and 1, block entry, rw- rw- rw-
rct/c<lu>d<unit>s2
    units 0 and 1, character entry, rw- rw- rw-
diag/dsk/c<lu>d<unit>
    units 0 and 1, character entry, rw- --- ---
```

A

DISC4 Driver

where

lu   Assigned to each disk

unit number   Assigned to each disk or cartridge by the factory. The unit
                    number is not an HP-FL address. Typically, the unit number is
                    0 unless you have more than one HP-FL device connected to
                    the same HP-FL interface card.

section   Disks and tapes are divided into sections or numbered
number   parts. The *System Administration Tasks* manual has further
                    information on this topic.

Minor Number Format

The minor number format for disc4 driver is shown in Figure A-3.

8	9	10 15	16 23	24 26	27	28 31
Trans-parency	Cart. Tape Flag	Reserved	Logical Unit Number	Unit Number		Section Number

```
            ↑        0 = disk                    0x00-0xff                          ↑
            |        1 = Cartridge                                                  |
        0 = Normal      Tape                                                  Reserved
        1 = Diagnostic
```

LG200143_012
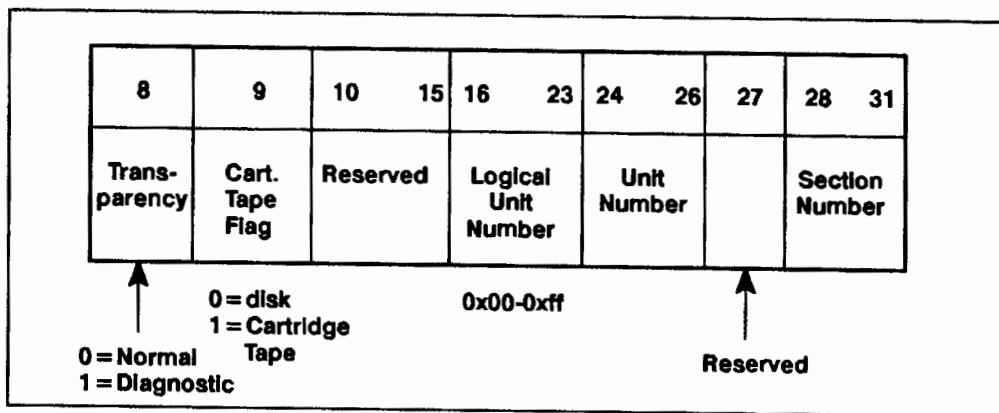
Figure A-4. Minor Number Format for disc4

where

transparent   This flag is used for diagnostic purposes.
flag

cartridge tape   You can set this flag to indicate that the special file is only
flag   used for cartridge tapes. If this flag is set, reading or writing
                    cannot be done on a disk.

GPIO0 Driver

The gpio0 driver controls the general-purpose I/O device adapters (HP 27114A or HP 27114B); it is often referred to as the Asynchronous First In/First Out Interface or AFI card. It supports high-speed parallel communication. This driver is only supported on CIO-based systems.

The gpio0 driver is not supported by the autoconfiguration utility. Therefore, you must add an I/O statement to the S800 file. Go to Chapter 8, "Setting Up Devices Using HP-UX Commands" for instructions on how to add an I/O statement. If SAM is resident on your hard disk, use SAM to add the gpio0 driver to the S800 file.

Syntax and Special Files

To make special files for the gpio0 driver, enter

insf -d gpio0 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
gpio<lu> rw- rw- rw-
diag/gpio<lu> rw- --- ---
```

where

logical unit number (LU)   Assigned to each device I/O adapter

A

GPIO0 Driver

Minor Number Format

The minor number format for the gpio0 driver is shown in Figure A-5.

8	9 15	16 23	24 31
	Reserved	Logical Unit Number	Not Used

Transparency

0x00-0xFF

LG200143_009
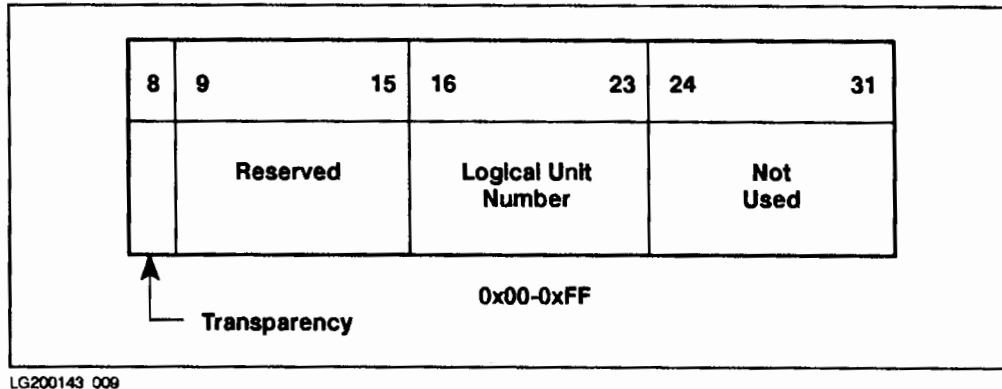
Figure A-5. Minor Number Format for gpio0

GPIO1 Driver

The gpio1 driver controls the general-purpose I/O device adapter (HP 28651A). It supports high-speed parallel communication. This driver is only supported on HP-PB-based systems.

The gpio1 driver is not supported by the autoconfiguration utility. Therefore, you must add an I/O statement to the S800 file. Go to Chapter 8, "Setting Up Devices Using HP-UX Commands" for instructions on how to add an I/O statement. If SAM is resident on your hard disk, use SAM to add the gpio1 driver to the S800 file.

Syntax and Special Files

To make special files for the gpio1 driver, enter

insf -d gpio1 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
gpio<lu> rw- rw- rw-
diag/gpio<lu> rw- --- ---
```

where

logical unit   Assigned to each device I/O adapter
number (LU)

A

GPIO1 Driver

Minor Number Format

The minor number format for the gpio1 driver is shown in Figure A-6.

8	9 18	19 23	24 31
	Reserved	Logical Unit Number	Reserved

↑
└── Diagnostics   0x00–0xFF
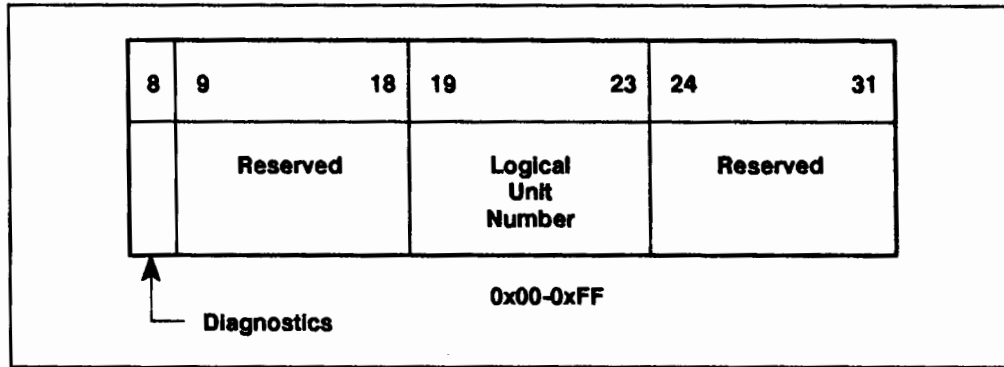
LG200143_008

Figure A-6. Minor Number Format for gpio1

INSTR0 Driver

The instr0 driver controls general-purpose HP-IB instruments and supports the Device I/O library (DIL). Typically, plotters and digitizers that have an HP-IB interface use the instr0 driver.

The instr0 driver is not supported by the autoconfiguration utility. Therefore, you must add an I/O statement to the S800 file. Go to the Chapter 8, "Setting Up Devices Using HP-UX Commands" for further information on how to add an I/O statement. If SAM is resident on your hard disk, use SAM to add the instr0 driver to the S800 file.

Syntax and Special Files

To make special files for the instr0 driver, enter

insf -d instr0 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
hpib/<lu> rw- rw- rw-
hpib/<lu>a<addr>
        addrs 0 to 30, rw- rw- rw-
diag/hpib/<lu> rw- --- ---
```

Computer
Museum

A

INSTR0 Driver

Minor Number Format

The minor number format for the instr0 driver is shown in Figure A-7.

8	9 15	16 23	24 26	27 31
Transparency	Reserved	Logical Unit Number	Reserved	Instrument Address

0 = Normal   0x00-0xFF
1 = Diagnostic
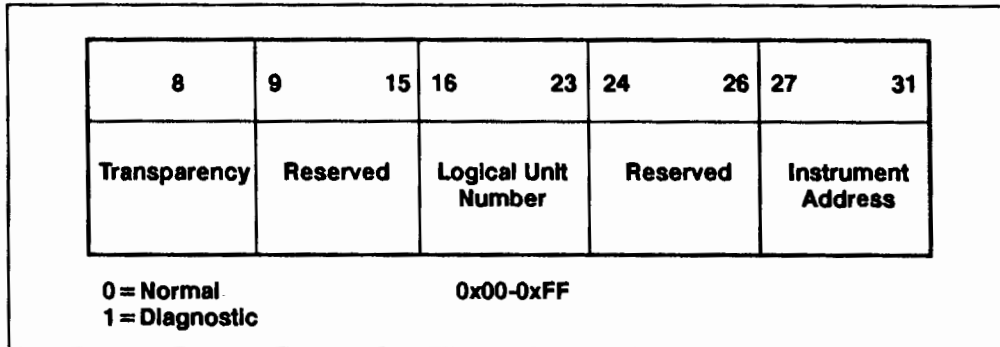
LG200143_010

Figure A-7. Minor Number Format for instr0

LAN0, LAN1 Drivers

The lan0 driver supports the HP 5062-3313 LANLINK for CIO-based systems; the lan1 driver supports the HP 28652-60001 LANLINK for HP-PB-based systems.

The lan0 and lan1 drivers are supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the lan0 or lan1 drivers, enter

insf -d lan0 [-l lu]

or

insf -d lan1 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed:

```
lan<lu> rw- rw- rw-
ether<lu> rw- rw- rw-
diag/lan<lu> rw- --- ---
```

A

Minor Number Format

The minor number formats for the lan0 and lan1 drivers are shown in
Figure A-8.

8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23	24 25 26 27 28 29 30	31
Not Used	Logical Unit Number	Not Used	Set If Interface supports Ethernet protocol
0x0	0x00–0x09	0x0	0x1 0 supports Ethernet 1 does not support Ethernet

LG200143_018

Figure A-8. Minor Number Format for lan0 and lan1

A

LPR0, LPR1, LPR2, LPR3 Drivers

The lpr0 driver supports HP-IB line printers that use the CIPER control; the lpr1 driver supports HP-IB line printers that support the AMIGO control. The lpr2 driver supports devices, mainly printers, that have a parallel (Centronics) interface. The lpr3 driver supports SCSI printers.

The HP-UX operating system automatically adds the lpr0 and lpr1, lpr2 and lpr3 drivers when you install a peripheral device that requires one of these drivers.

Syntax and Special Files

To make special files for the lpr0, lpr1, lpr2 and lpr3 driver, enter

insf -d lpr0 [-l lu]

or

insf -d lpr1 [-l lu]

or

insf -d lpr2 [-l lu]

or

insf -d lpr3 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

A

LPR0, LPR1, LPR2, LPR3 Drivers

For each logical unit, the following special files are then installed:

```
lp<lu> owner lp, rw- --- ---
diag/lp<lu> rw- --- ---
```

Minor Number Format

The minor number format for the lpr0, lpr1, lpr2 and lpr3 drives is shown in Figure A-9.

8	9	10	11	12	13	14	15	16 23	24 31
Trans-parency	Auto Form Feed	Case Fold	Mode	No Wait	Paper-Out Behavior	Eject Page During Paper-Out Recovery	Not Used	Logical Unit Number	Not Used

0 = Off
1 = On   0 = Buffered   0 = New   0 = No
1 = Raw   1 = Old   1 = Yes

0 = Normal   0 = Off
1 = Diagnostic   1 = Caps Lock

LG200143_015

Figure A-9. Minor Number Format for lpr0, lpr1, lpr2, and lpr3

A

A-26 Device Files and Minor Numbers

MUX0 and MUX0_16 Drivers

The mux0 driver supports peripherals with an RS-232C interface on CIO-based systems. Many terminals, printers, and modems have RS-232C interfaces. The mux0 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

The mux0 driver is the only driver for all CIO Multiplexers. The mux0_16 name is used only for configuration purposes and to denote the different harware to insf, mksf, and uxgen. Use mux0_16 for the 16-channel Multiplexer interface on CIO-based systems. Use mux0 for the six-channel Multiplexer interface.

Syntax and Special Files

To make special files for the mux0 driver, enter:

insf -d mux0 [-l lu]

Similarly, to make special files for mux0_16, enter:

insf -d mux0_16 [-l lu]

Note   Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit for mux0, the following special files are then installed:

```
tty<lu>p<port>
      ports 0 to 5, direct connect, rw- -w- -w-
mux<lu> rw- --- ---
diag/mux<lu> rw- --- ---
```

For each logical unit for mux0_16, the following special files are then installed:

```
tty<lu>p<port>
      ports 0 to 15, direct connect, rw- -w- -w-
mux<lu> rw- --- ---
diag/mux<lu> rw- --- ---
```

Minor Number Format

The minor number format for the mux0 and mux0_16 drivers is shown in Figure A-10.

8	9 10 11	12 15	16 23	24 28	29 31
Not Used	Access Type	Not Used	Logical Unit Number	Not Used	MUX Port
0		0x0	0x00-0xFF	0x0	0x0-0x7

Modem
0 (Simple)
1 (CCITT)

Direction
0 direct
1 dial-out
2 dial-in
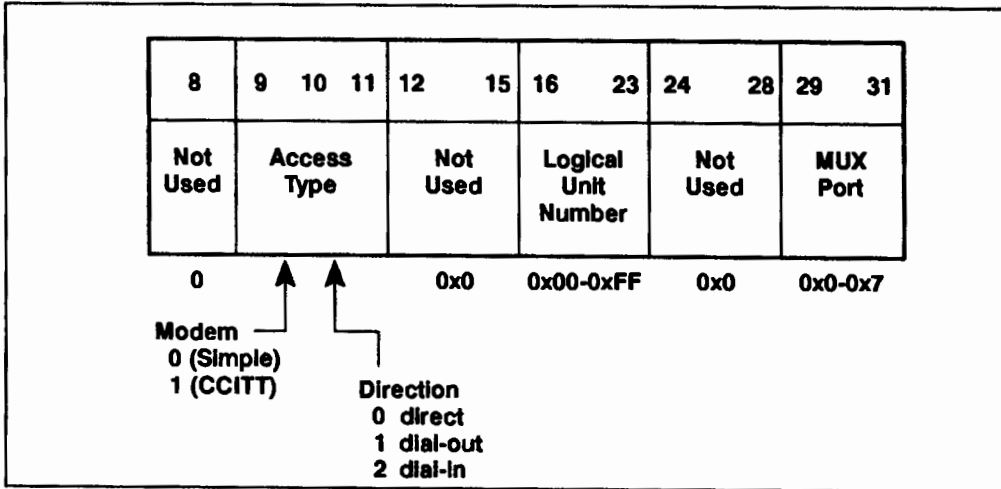
LG200143_017

Figure A-10. Minor Number Format for mux0 and mux0_16

where

logical unit number	bits 16 to 23. Each multiplexer is assigned a logical unit number (LU).
MUX port number	bits 28 to 31. The port number (0 to 5 for mux0 or 0 to 16 for mux0_16 is specified in the special file.
access type	bits 10 to 11 for port type. A port can be direct or hardwired (0), dial-out or call-out (1) or call-in (2).

bit 9 for modem. Setting bit 9 to one causes the port to follow the CCITT protocol (Europe) recommendations. Setting bit 9 to zero causes the port to follow the Simple protocol (U.S.). |

A

MUX2 Driver

The mux2 driver supports peripherals with an RS-232C interface on HP-PB-based systems. Many terminals, printers, and modems have RS-232C interfaces. The mux2 driver supports both eigth and 16-port HP-PB Multiplexers. The mux2 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the mux2 driver, enter

insf -d mux2 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed; mux2 supports ports 0 to 7 for an eight-port MUX and ports 0 to 15 for a 16-port MUX:

```
tty<lu>p<port>
      ports 0 to 15, direct connect, rw- -w- -w-
mux<lu> rw- --- ---
diag/mux<lu> rw- --- ---
```

A

Device Files and Minor Numbers   A-29

MUX2 Driver

Minor Number Format

The minor number format for the mux2 driver is shown in Figure A-11 **with a noted exception** described following the diagram.

8	9 10 11	12 15	16 23	24 28	29 31
Not Used	Access Type	Not Used	Logical Unit Number	Not Used	MUX Port
0		0x0	0x00-0xFF	0x0	0x0-0x7

Modem ———
0 (Simple)
1 (CCITT)

Direction
0 direct
1 dial-out
2 dial-in
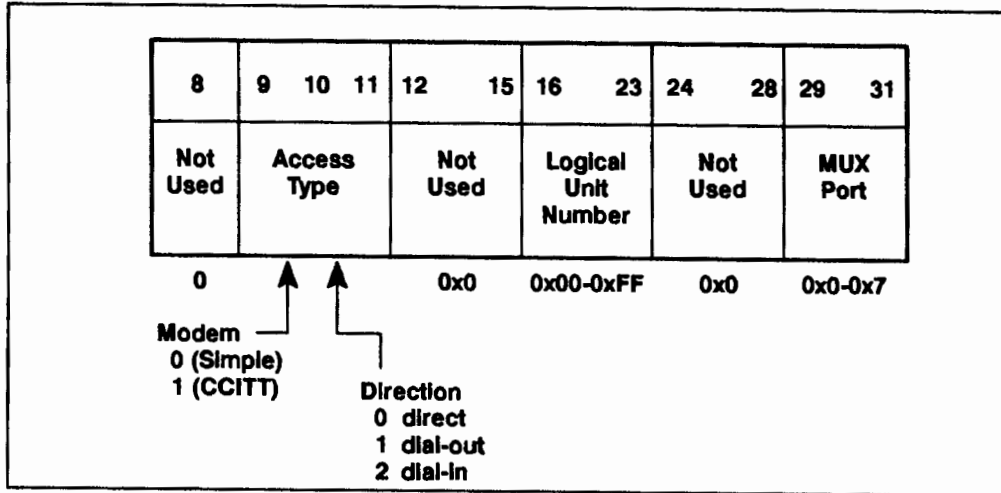
LG200143_017

Figure A-11. Minor Number Format for mux2

where

logical unit number	bits 16 to 23. Each multiplexer is assigned a logical unit number (LU).
MUX port number	bits 28 to 31. The port number (0 - 7 for an eight-port MUX and 0 - 15 for a 16-port MUX) is specified in the special file.
HWFC flag	bit 13. This is an exception from the format depicted in this table. This flag is the RTS/CTS hardware flow control enable flag and is applicable to HP-PB Multiplexers supporting hardware flow control. If set to zero, hardware flow control is disabled. If set to one, hardware flow control is enabled.
access type	bits 10 to 11 for port type. A port can be direct or hardwired (0), dial-out or call-out (1) or dial-in or call-in (2).

A

bit 9 for modem. Setting bit 9 to one causes the port to follow the CCITT protocol (Europe) recommendations. Setting bit 9 to zero causes the port to follow the Simple protocol (U.S.).

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A

MUX4 Driver

The mux4 driver supports peripherals with an RS-232C interface on HP-PB-based systems. Many terminals, printers, and modems have RS-232C interfaces. The mux4 driver supports two serial ports on the Model 890 computer. The mux4 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the mux4 driver, enter

insf -d mux4 [-l lu]

Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed; mux4 supports ports 0 to 1:

```
tty<lu>p<port>
      ports 0 to 1, direct connect, rw- -w- -w-
mux<lu> rw- --- ---
diag/mux<lu> rw- --- ---
```

A

Minor Number Format

The minor number format for the mux4 driver is shown in Figure A-12.

8	9 10 11	12 15	16 23	24 28	29 31
Not Used	Access Type	Not Used	Logical Unit Number	Not Used	MUX Port
0		0x0	0x00-0xFF	0x0	0x0-0x7

Modem
0 (Simple)
1 (CCITT)

Direction
0 direct
1 dial-out
2 dial-in

LG200143_017

Figure A-12. Minor Number Format for mux4

where

logical unit number bits 16 to 23. Each multiplexer is assigned a logical unit number (LU).

MUX port number bit 31. The port number (0 - 1) is specified in the special file.

access type bits 10 to 11 for port type. A port can be direct or hardwired (0), dial-out or call-out (1) or dial-in or call-in (2).

bit 9 for modem. Setting bit 9 to one causes the port to follow the CCITT protocol (Europe) recommendations. Setting bit 9 to zero causes the port to follow the Simple protocol (U.S.).

A

Device Files and Minor Numbers   A-33

OSI0 Driver

The osi0 driver supports the HP 32124A or HP 32125A OSI Express Card on a CIO-based system that has an HP A1126 bus converter, which in turn supports HP MAP 3.0 networking. It also supports the HP 32122A or HP 32123A OSI Express Card, which in turn supports HP MAP 3.0 networking.

The osi0 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the osi0 driver, enter

insf -d osi0 [-l lu]

Note   Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
osi<lu> rw- rw- rw-
diag/osi<lu> rw- --- ---
```

A

Minor Number Format

The minor number format for the osi0 driver is shown in Figure A-13.

8 15	16 23	24 31
Not Used	Logical Unit Number	Not Used

LG200143_021

Figure A-13. Minor Number Format for osi0

PTY0 Driver

The pty0 driver is a pseudo-driver for pseudo terminals. It is the driver for the master side.

The pty0 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the pty0 driver, enter

insf -d pty0

Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

For each logical unit, the following special files are installed:

```
pty<index><number>
  indices 'p' to 'r', numbers 0 to f (hex), rw- rw- rw-
ptym/pty<index><number>
  indices 'a' to 'c' and 'e' to 'z',
          numbers 0 to f (hex), rw- rw- rw-
ptym/pty<index><number>
  indices 'a' to 'c' and 'e' to 'z',
          numbers 00 to 99, rw- rw- rw-
```

The special files pty* are linked to ptym/pty*.

A

Minor Number Format

The minor number format for the pty0 driver is shown in Figure A-14.

8	11	12	15	16	19	20	23	24	27	28	31
0		0		Y		Y		Y		Y	
Not Used				Unique Hexadecimal Value							

LG200143_020

Figure A-14. Minor Number Format for pty0

A

PTY1 Driver

The pty1 driver is a pseudo-driver for pseudo terminals. It is the driver for the slave side.

The pty1 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the pty1 driver, enter

insf -d pty1

Note	Be sure that you are in the **/dev** directory. Otherwise, the **insf** command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed:

```
tty<index><number>
    indices 'p' to 'r', numbers 0 to f (hex), rw- rw- rw-
pty/tty<index><number>
 indices 'a' to 'c' and 'e' to 'z',
 numbers 0 to f (hexadecimal), rw- rw- rw-
pty/tty<index><number>
    indices 'a' to 'c' and 'e' to 'z',
    numbers 00 to 99, rw- rw- rw-
```

The special files tty[pqr][0-f] are linked to the special files of the same name in the pty directory.

A

Minor Number Format

The minor number format for the pty1 driver is shown in Figure A-15.

8 11	12 15	16 19	20 23	24 27	28 31
0	0	Y	Y	Y	Y
Not Used		Unique Hexadecimal Value			

LG200143_020

Figure A-15. Minor Number Format for pty1

A

SCC1 Driver

The scc1 driver supports the RS-232C interface on an onboard port located on an HP-PB-based system.

The scc1 driver is supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Note	There are limitations for the two onboard serial ports on Model 815. You must connect your system console, printers, and modems to one of the two serial ports on the CPU board instead of the onboard ports. Only use the two onboard ports to connect terminals.

The onboard ports cannot reliably accept continuous input at line speeds greater than 4800 bits per second (bps). This should not be a problem for terminal use. The onboard ports can run at 9600 bps when you send data.

Caution	If one of the onboard ports is continuously sending data at 9600 bps, data loss will occur if more than 5 mux ports are continuously receiving data at 19,200 bps. Therefore, limit the continuous sending of data from the two onboard serial ports to 2400 bps whenever you have more than five mux ports running at the maximum line speed of 19,200 bps.

A

Syntax and Special Files

To make special files for the scc1 driver, by enter

insf -d scc1

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed:

```
tty<port>
     ports 'a' and 'b', direct connect, rw- -w- -w-
```

Minor Number Format

The minor number format for the scc1 driver is shown in Figure A-16.

LG200143_016

Figure A-16. Minor Number Format for scc1

TAPE1, TAPE2 Driver

The tape1 driver supports tape drives that use an HP-IB interface. The tape2 driver supports tape drives that use a SCSI interface.

The tape1 and tape2 drivers are supported by the autoconfiguration utility discussed in Chapter 2, "Guidelines for Installing Devices".

Syntax and Special Files

To make special files for the tape1 and tape2 drivers, enter

insf -d tape1 [-l lu] or insf -d tape2 [-l lu]

Note	Be sure that you are in the /dev directory. Otherwise, the insf command automatically creates special files in your working directory.

For each logical unit, the following special files are then installed:

```
rmt/<lu>l[b] -- lb if Berkely style
     800 bpi, character entry, rw- rw- rw-
rmt/<lu>m
     1600 bpi, character entry, rw- rw- rw-
rmt/<lu>h
     6250 bpi, character entry, rw- rw- rw-
rmt/<lu>hc
     6250 bpi, compressed, character entry, rw- rw- rw-
rmt/<lu>ln
     no rewind, 800 bpi, character entry, rw- rw- rw-
rmt/<lu>mn
     no rewind, 1600 bpi, character entry, rw- rw- rw-
rmt/<lu>hn
     no rewind, 6250 bpi, character entry, rw- rw- rw-
     diag/mt/<lu>character entry, rw- --- ---
```

A

A-42   Device Files and Minor Numbers

Minor Number Format

The minor number format for the tape1 and tape2 drivers is shown in Figure A-17.

8	9	10	11	12	13 14	15	16 20	21 23	24 - 31
Trans-parency	RTE Mode	IR inh.	UCB Mode	Rewind on Close	Density	Data Com-pression	Not Used	Logical Unit Number	Not Used

```
0 = Normal        0 = No              0 = Yes           0 = Off           0 - 7
1 = Diagnostic    1 = Yes             1 = No            1 = On
        0 = Off           0 = Off           00 = 800                      0
        1 = On            1 = On            01 = 1600
                                            10 = 6250
```

LG200143_014

Figure A-17. Minor Number Format for tape1

Embedded "QIC" devices are an exception to this format; bits 28 to 31 can be used to select specific QIC formats as shown in the table that follows.

QIC Formats—Bits 28 to 31 Settings

QIC Format Type	Bit 31	Bit 30	Bit 29	Bit 28	Hex. Equivalent
QIC-120	0	1	0	1	5
QIC-150	0	1	1	0	6
QIC-525	0	1	1	1	7

Refer to Chapter 9, "Backing Up and Restoring Your Data", in the *System Administration Tasks* manual for more information on QIC devices.

A

Copy these work sheets as many times as you need for the devices on your system.

A

Mass Storage Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Bus Address	Slot Nbr

Printers

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Copy these work sheets as many times as you need for the devices on your system.

Plotters

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Terminals and Modems

Device Name	Path Name	Port Number	Minor Number

HP-HIL Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Power Req.	Bus Address

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Copy these work sheets as many times as you need for the devices on your system.

Mass Storage Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Bus Address	Slot Nbr

Printers

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Copy these work sheets as many times as you need for the devices on your
system.

Plotters

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Terminals and Modems

Device Name	Path Name	Port Number	Minor Number

HP-HIL Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Power Req.	Bus Address

Copy these work sheets as many times as you need for the devices on your system.

Mass Storage Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Bus Address	Slot Nbr

Printers

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Copy these work sheets as many times as you need for the devices on your system.

Plotters

Device Name	Path Name	File Type	Major Number	Minor Number	Port #/ Bus Address

Terminals and Modems

Device Name	Path Name	Port Number	Minor Number

HP-HIL Devices

Device Name	Path Name	File Type	Major Number	Minor Number	Power Req.	Bus Address

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