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## **Connecting Peripherals to Your Integral PC**

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**Portable Computer Division**  
1000 N.E. Circle Blvd.  
Corvallis, OR 97330, U.S.A.

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## **Safety and Regulatory Information**

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For your protection this product has been tested to national and international standards assuring safe use. Regulatory testing does not address the reliability or performance of the product. The scope of regulatory testing includes electrical/mechanical safety, radio frequency interference, ergonomics, acoustics, and hazardous materials. The approvals obtained from independent test agencies are shown on the product label located on the rear panel. In addition, various regulatory agencies require some of the information under the following headings.

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### **Potential for Radio/Television Interference**

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripheral (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to the computer. Operation with non-certified peripherals is likely to result in interference to radio and television reception. All HP-IB cables must be shielded and ferrite-beaded (HP 82977A/B). All other cables except HP-IL must be shielded.

This product generates and uses radio-frequency energy, and, if not installed and used in strict accordance with the instructions in the owner's documentation, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. In the unlikely event that there

is interference to radio or television reception (which can be determined by removing all power to the product or turning it off and on), you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the product with respect to the receiver.
- Plug the product into a different ac outlet so that the computer and the receiver are on different branch circuits.

If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet, prepared by the Federal Communications Commission, helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock Number 004-000-00345-4.

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### **South African Radio Frequency Interference**

This product has been certified by S.A.B.S. to meet the RFI requirements published in the Government Gazette of December, 1979 (No. 6794) in Notice R2862 and subsequent amendments known as Rule 68B.

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### **German Radio Protection Mark**



This product has been tested together with Hewlett-Packard peripherals and complies with VFG 1046/84, VDE 0871B and similar non-interference standards.

Should you connect equipment that is not manufactured or recommended by Hewlett-Packard Company, that system configuration has to comply with the requirements of Paragraph 2 of the German Federal Gazette, Order (VFG) 1046/84, dated December 14, 1984.

## Other Safety Approvals



This product has been listed by the Underwriters' Laboratories, Inc., under UL standard UL 478.



This product has been tested and found to comply with VDE standard DIN VDE 0806 (IEC 380) by TÜV-Bayern e.V.



This product has been tested and found to comply with Norwegian safety and RFI standards by NEMKO.



This product has been tested and found to comply with the applicable Canadian data processing requirements and standards by the Canadian Standards Association (CSA 22.2 No. 154).



# Guide to Documentation

If You Are Interested In	And You Want To Do This	Read This
<b>Getting started</b>	Set up your computer Start the Tutor program Learn about operating your computer	<i>Setup Guide</i> <i>Setup Guide</i> Tutor disc or <i>Using Your Integral PC</i> (chapters 1–7)
<b>Personal Applications Manager (PAM)</b>	Learn the basics of PAM Find reference information on a particular PAM command Start an application program	Tutor disc or <i>Using Your Integral PC</i> (chapter 11) <i>Using Your Integral PC</i> Tutor disc or <i>Using Your Integral PC</i> (chapter 2)
<b>Peripheral devices</b>	Connect a printer, plotter, disc drive, memory module, or other device to your computer Use them	This manual <i>Using Your Integral PC</i> (chapter 10)
<b>HP-UX commands and utilities</b>	Find more information on them	<i>Using Your Integral PC</i> (chapter 11)
<b>Diagnostic program</b>	Test your computer	<i>Using Your Integral PC</i> (appendix A)



# 1

## Getting Started

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# Contents

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## **Chapter 1**

### **Getting Started**

- 1-1** About This Manual
- 1-2** For Experienced HP Users...
- 1-3** Special Symbols Used in This Manual

# 1

## Getting Started

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Welcome to Hewlett-Packard's family of HP-UX personal computers. Your Integral Personal Computer is a member of a family of powerful HP-UX workstations. It combines a single-user, multi-tasking operating system with Hewlett-Packard's Personal Applications Manager (PAM), to provide unparalleled ease of use with all the power of the UNIX operating system. Other members of the family include the line of HP 9000 Series 200/300/500 workstations.

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### About This Manual

This manual explains how to connect your peripherals. Your Integral PC is equipped with a built-in display, printer, and disc drive. When you feel it's time to connect other options and peripherals, turn to the appropriate chapter. As you install a peripheral, record the vital statistics in the form provided on the last page of this manual. This ensures that you and other users will have this information readily available.

**Do I need experience with the HP-UX operating system?** No! If you are new to the HP-UX operating system, don't worry! The Integral PC has a friendly command interpreter called the Personal Applications Manager (PAM) that's easy to use and easy to learn. Everything you need to know about PAM is explained in the Tutor and in *Using Your Integral PC*.

If you are a new user, skim through the remainder of this chapter; then do the following tasks:

- Set up your computer using the *Setup Guide*.
- Try the Tutor.
- Go on to *Using Your Integral PC*.
- Connect your options and peripherals using this manual.

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## For Experienced HP Users...

If you have prior experience with Hewlett-Packard computers, you may feel you already know most of the material in this manual. Deciding to skip this material is up to you, but if you do skip the set-up instructions, don't forget to observe the following precautions:

### Caution



- 
- Check the voltage select switch and fuse before turning on the computer.
  - To avoid damaging the connectors, read chapter 3 before connecting more than two HP-HIL peripherals.
  - Be sure each peripheral on the HP-IB interface has a unique address. This is especially important if you have peripheral disc drives!
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## Special Symbols Used in This Manual

Both this manual and *Using Your Integral PC* use symbols and special type fonts to help you locate and identify important information. The symbols have the following meanings:

### Warning



This symbol marks a warning that you should observe to avoid bodily injury.

### Caution



This symbol marks a caution that you should observe to avoid damage to the computer or serious loss of data.

### Note



This symbol marks a note that you should observe to avoid minor problems.

A word printed in a `dot matrix` font represents a word that has a special meaning to the computer. Usually this means it is a file name, command, error message, or a word that must be entered literally as shown in the text. Options are shown in *italics*. Words connected with an underscore character (—) form a single word—for example, *file\_name* is entered as a single word—the name of the file.





# 2

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## Connecting Printers and Plotters



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## Chapter 2

### Connecting Printers and Plotters

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- 2-2** Connecting Your LaserJet Printer
- 2-3** Connecting Your HP 2603A Printer
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- 2-5** Connecting Your HP 7440A Plotter
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- 2-17** Connecting Other Printers and Plotters

# 2

## Connecting Printers and Plotters

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This chapter explains how to connect the following printers and plotters:

- HP 2686A LaserJet Printer.
- HP 2603A Daisywheel Printer.
- HP 7440A Eight-Pen Plotter.
- HP 7470A Two-Pen Plotter.
- HP 7475A Six-Pen Plotter.

If your printer or plotter is not listed here, turn to the section “Connecting Other Printers and Plotters” at the end of this chapter. Printers and plotters available for the Integral PC are listed in chapter 6, “Planning Your System”.

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### Connecting Printers

Your Integral PC computer is equipped with a built-in ThinkJet printer featuring high-quality printing of both text and graphics. You may, however, choose to connect additional printers to your computer.

Printers are connected using either the Hewlett-Packard Interface Bus (HP-IB) or an RS-232 serial interface. The interface installed on your printer determines which one you will use. If you have an HP-IB printer, connect it to the *built-in* HP-IB interface. Don't use an optional *plug-in* HP-IB interface—these can be used only for instrumentation. If your printer

has a serial interface, first install an HP 82919A Serial Interface in an I/O port;\* then connect your printer.

After you have connected a peripheral printer, you must use the `printer_is` utility to configure the printer. This utility is described in chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*.

Each printer comes with its own set of manuals. Be sure to keep those manuals, since they provide operating information and may answer questions that are not answered here.

## Connecting Your LaserJet Printer

To connect your HP 2686A LaserJet printer, you need the following accessories:

- HP 82919A Serial Interface.
- HP 82974D Serial Printer Cable.

### To connect your LaserJet printer, do the following:

1. Unpack the printer and install the print cartridge according to the instructions in the printer owner's manual.
2. Plug the printer power cord into a grounded outlet. If the plug does not fit the outlets in your area, contact your Hewlett-Packard dealer for assistance.
3. Remove the cover from an I/O port in the back of the computer (or bus expander) and install a serial interface. For help, refer to the installation instructions provided with the interface or turn to chapter 5, "Installing Interfaces and Memory Modules."
4. Connect the male end of the serial printer cable into the connector on back of the printer and the female end into the serial interface you previously installed. Use a screwdriver to tighten the screws on the connectors.
5. Turn on the printer.
6. Press **ONLINE** to turn off the on-line indicator.

\* Two I/O ports are available on the back of the computer. If these are not enough, you can connect one or two HP 82904A Bus Expanders (each with five I/O ports) to provide up to 10 ports.

## 2-2 Connecting Printers and Plotters

7. Press **(SELF TEST)** to perform the self-test. If the printer does not produce a self-test print, or if it seems to be malfunctioning, refer to the printer owner's manual.
8. Press **(ON LINE)** again to turn on the on-line indicator.

Before you can use your printer you must use the `Printer_is` utility to configure the printer. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*), and then configure your system later.

## Connecting Your HP 2603A Printer

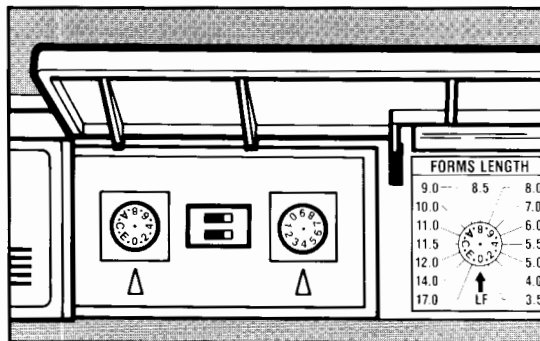
The HP 2603A Daisywheel Printer is equipped with a serial interface.

To connect your printer, you need the following accessories:

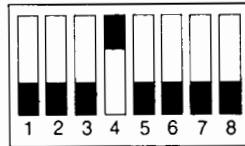
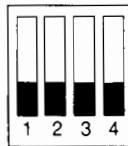
- HP 82919A Serial Interface.
- HP 82974D Serial Printer Cable.

### To connect the printer, do the following:

1. Unpack your printer, then install the fuse, ribbon cartridge, and print wheel. For help, refer to the instructions in the owner's manual for your printer.
2. Open the control access cover on the top of the machine and set the right-hand rotary knob to the self-test position (setting #4) as shown below.



3. Plug the power cord into the printer and then into the grounded outlet. If the plug doesn't fit the outlets in your area, contact your Hewlett-Packard dealer for assistance in ordering the correct power cord and fuse.
4. Insert the paper in the printer as you would in a typewriter.
5. Turn the printer on. The power switch is a toggle switch on the front of the printer at the bottom. Press the top half of the switch to turn the power on.  
The self-test pattern will be printed out. If nothing happens, refer to the printer owner's manual for help.
6. After a few lines of the test pattern have been printed, turn the printer off.
7. Set the switches at the rear of the machine near the bottom for regular operation as shown below.



8. Remove the cover from an I/O port in the back of the computer (or a bus expander) and install a serial interface. For help, refer to the installation instructions provided with the module or turn to in chapter 5, "Installing Interface and Memory Modules."
9. Connect the male end of the serial printer cable to the connector on the back of the printer and the female end into the serial interface you previously installed. Use a screwdriver to tighten the screws on the connectors.

## 2-4 Connecting Printers and Plotters

Before you can use your printer you must use the `printer_is` utility to configure the printer. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If you don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*) and then configure your system later.

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## Connecting Plotters

This section explains how to connect a Hewlett-Packard plotter to your system. Step-by-step procedures are provided for the HP 7440A, HP 7470A, and HP 7475A plotters. If you have a different plotter, refer to "Connecting Other Printers and Plotters" at the end of this chapter.

Plotters are connected using either the Hewlett-Packard Interface Bus (HP-IB) or serial interface (RS-232). The interface installed on your plotter determines which interface you will use. If you have an HP-IB plotter, connect it to the built-in HP-IB interface. Don't use an optional *plug-in* HP-IB interface—these can only be used for instrumentation. If you have a serial plotter, first install an HP 82919A Serial Interface in an I/O port;\* then connect your plotter to the serial interface.

After you have connected a plotter, use the `plotter_is` utility to configure the plotter. For more information on the `plotter_is` utility, refer to chapter 10, "Installing and Using Peripherals" in *Using Your Integral PC*.

Each plotter comes with its own set of manuals. Be sure to keep those manuals, since they provide operating information and may answer questions that are not answered here.

### Connecting Your HP 7440A Plotter

The HP 7440A Plotter comes equipped with either an HP-IB or serial interface.

\* Two I/O ports are available on the back of the computer. If this is not enough, you can connect one or two HP 82904A Bus Expanders (each with five I/O ports) to provide up to 10 ports.

To connect your plotter, you need the following accessories:

#### **HP-IB Plotter**

- Shielded and ferrited HP-IB Cable
  - HP 82977A (1 meter) or
  - HP 82977B (2 meter)

#### **Serial Plotter**

- HP 82919A Serial Interface.
- HP 82974D Serial Printer Cable.

If you need more information during the following installation procedure, refer to the plotter owner's manual.

#### **To connect your HP 7440A Plotter, do the following:**

1. Unpack your plotter.
2. Insert a plotter pen into the first pen holder in the carousel. Install the carousel.
3. Insert the small connector on the power supply cord into the power socket on the back of your plotter. Press down on the connector until it snaps into place.
4. Place the power supply on the table near your plotter.

#### **Note**



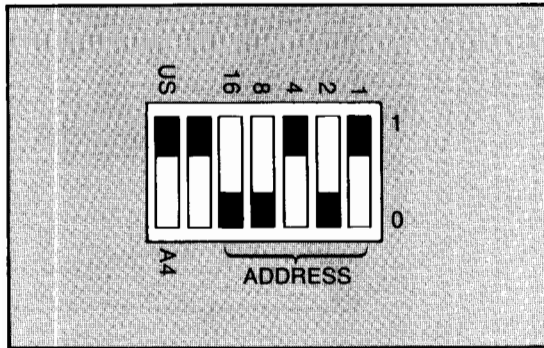
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If the power supply interferes with your disc drive, move it away from the computer.

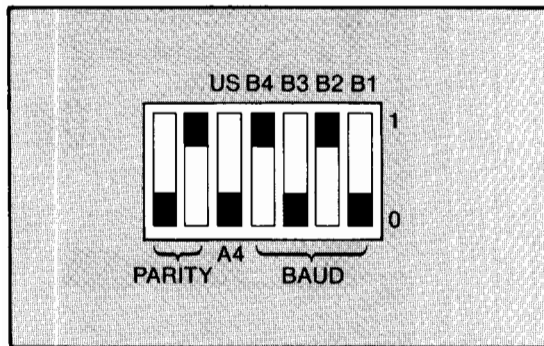
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5. Plug the power cord into a grounded outlet. If the plug doesn't fit in the outlets in your area, contact your Hewlett-Packard dealer for assistance in ordering the correct power supply module.
6. Set the switches on the back of the plotter.
  - **HP-IB Plotter.** Check the HP-IB address on the back of the plotter. Each device on the HP-IB interface

must be set to a unique address. This is especially important if you have a disc drive on the HP-IB interface because you can lose data if both the disc drive and another peripheral have the same HP-IB address. Addresses on plotters are set at the factory to 5 (shown below). If you have other devices set to the same address, turn to the instructions provided in the appropriate owner's manual and reset the address.



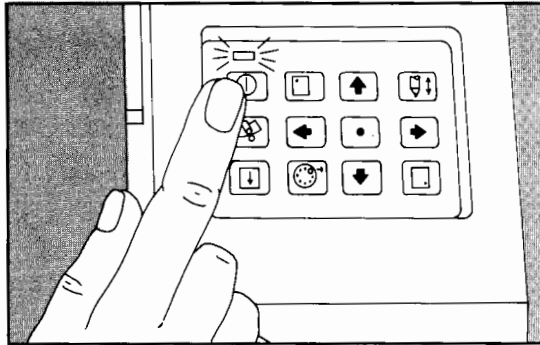
- **Serial Plotter.** Check the switch settings on the back of the plotter. The switches should be set as shown below.



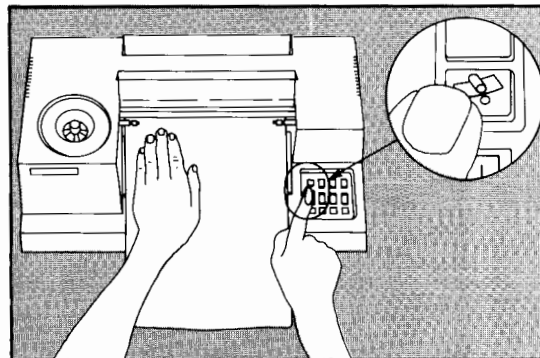
(The switch settings are for 9600 baud. For other settings, refer to the plotter owner's manual.)



- 7.** Set the appropriate paper size.
  - a.** Locate the US/A4 paper-size switch on the back panel.
  - b.** Be sure the power is off; then set the US/A4 switch to the size of paper you are using.
- 8.** Turn the power on by pressing the on/off button.

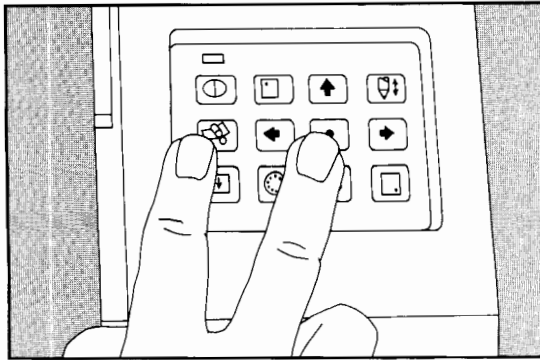


- 9.** Load the paper by inserting the paper and pressing the load button (shown below).



## **2-8 Connecting Printers and Plotters**

10. Run the self-test for the plotter by simultaneously pressing the keys shown below:



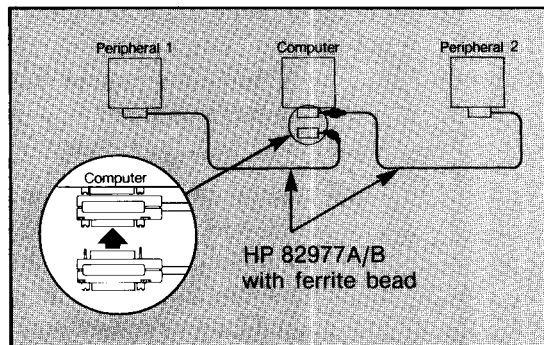
If there is no action from the plotter, refer to the plotter owner's manual.

11. Turn the power off.
12. **Serial Plotter.** Remove the cover from an I/O port in the back of the computer (or a bus expander) and install a serial interface. For help, refer to the owner's manual for the interface or to chapter 5, "Installing Interfaces and Memory Modules."
13. Connect the cable.
  - **Serial Plotter.** Connect the male end of the serial printer cable into the connector on the back of the plotter and the female end into the serial interface you previously installed. Use a screwdriver to tighten the screws on the connectors.



■ **HP-IB Plotter.** Connect the straight-angle end of the HP-IB cable into the HP-IB connector on the back of the plotter. Next, connect the right-angle end to the built-in HP-IB connector on the back of your computer. If you have already installed other HP-IB peripherals, you can stack the connector onto another HP-IB connector as shown in the diagram below. Tighten the thumb screws with your fingers—do *not* use a screwdriver.

Do not stack more than three HP-IB cables on to one connector. Doing so can result in sufficient force to damage the connector.



Before you can use your plotter you must use the `plotter_is` utility to configure the plotter. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If you don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*), and then configure your system later.

## 2-10 Connecting Printers and Plotters

## **Connecting Your HP 7470A Plotter**

The HP 7470A Plotter comes equipped with either an HP-IB or serial interface.

To connect your plotter, you need the following accessories:

### **HP-IB Plotter**

- Shielded and ferrited HP-IB Cable
  - HP 82977A (1 meter) or
  - HP 82977B (2 meter)

### **Serial Plotter**

- HP 82919A Serial Interface.
- HP 82974D Serial Printer Cable.

If you need more information during the installation procedure, refer to the plotter owner's manual.

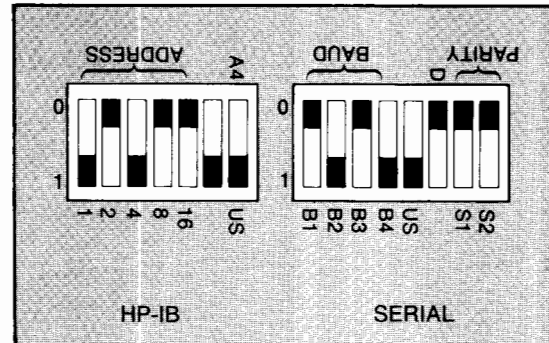
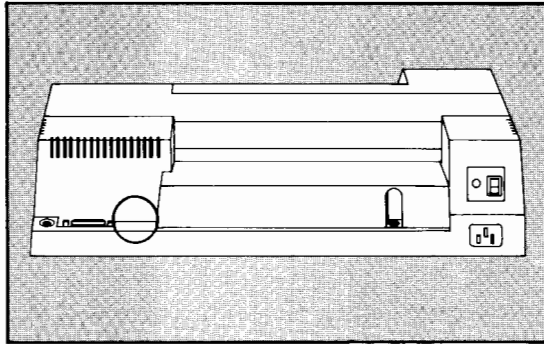
### **To connect your plotter, do the following:**

1. Unpack the plotter.
2. Insert at least one plotter pen into the pen carousel.
3. Check to be sure the power switch on the back panel of the plotter is off.



4. Set the switches.

- **HP-IB Plotter.** Check the HP-IB address on the back of the plotter. Each device on the HP-IB interface must be set to a unique address. This is especially important if you have a disc drive on the HP-IB interface because you can lose data if both the disc drive and another peripheral have the same HP-IB address. Addresses on plotters are set at the factory to 5 (shown below). If you have other devices set to the same address, turn to the instructions provided in the plotter owner's manual and reset the address.



- **Serial Plotter.** Check the switch settings on the back of the plotter. The switches should be set as shown above.
5. Plug the power cord into the plotter and then into a grounded outlet. If the plug doesn't fit the outlets in your area, contact your Hewlett-Packard dealer for assistance in ordering the correct power cord and fuse.
  6. Press the **(PEN UP)** button on the front panel *at the same time* you turn the power switch on. The plotter will perform a self-test.

A successful self-test prints asterisks down the page at long intervals (two minutes) until you turn the power switch off.

If there is no action from the plotter, refer to the plotter owner's manual.

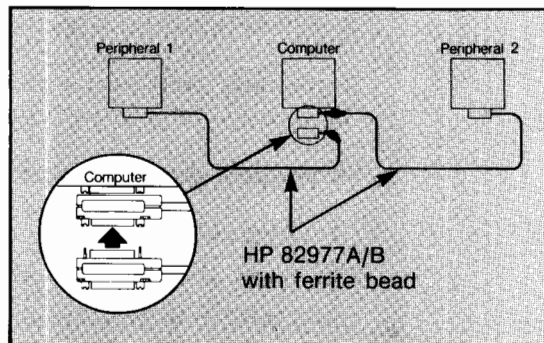
**7.** Turn the power off.

**8. Serial Plotter.** Remove the cover from an I/O port in the back of the computer (or a bus expander) and install a serial interface. For help, refer to the installation instructions provided with the interface, or turn to chapter 5, "Installing Interfaces and Memory Modules."

**9.** Connect the cable.

■ **HP-IB Plotter.** Connect the straight end of the HP-IB cable into the HP-IB connector on the back of the plotter. Next, connect the right-angle end to the *built-in* HP-IB connector on the back of your computer. If you have already installed other HP-IB peripherals, you can stack the connector onto another HP-IB connector as shown in the diagram below. Tighten the thumb screws with your fingers. Do *not* use a screwdriver.

Do not stack more than three HP-IB cables on to one connector. Doing so can result in sufficient force to damage the connector.



- **Serial Plotter.** Connect the male end of the serial printer cable into the connector on the back of the plotter and the female end into the serial interface you previously installed. Use a screwdriver to tighten the screws on the connectors.

Before you can use your plotter you need to use the `plotter_is` utility to configure your plotter. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If you don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*), and then configure your system later.

## **Connecting Your HP 7475A Plotter**

The HP 7475A Plotter comes equipped with either an HP-IB or serial interface.

To connect your plotter, you need the following accessories:

### **HP-IB Plotter**

- Shielded and ferrited HP-IB Cable
  - HP 82977A (1 meter) or
  - HP 82977B (2 meter)

### **Serial Plotter**

- HP 82919A Serial Interface.
- HP 82974D Serial Printer Cable.

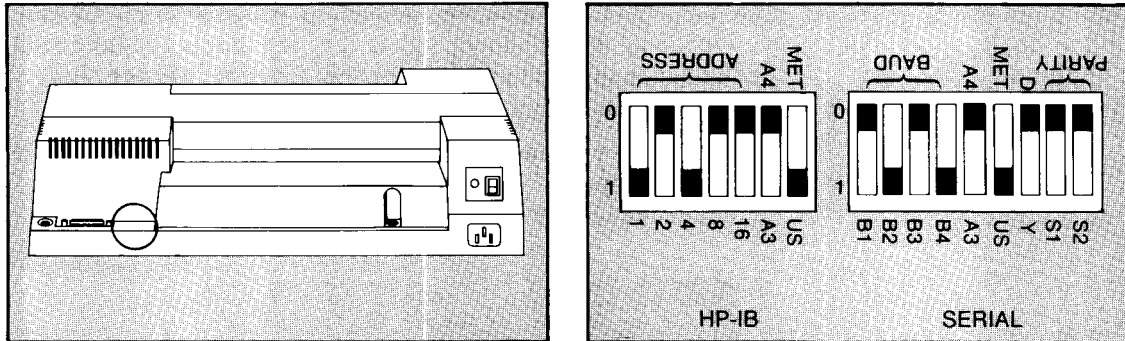
If you need more information during the installation procedure, refer to the owner's manual for the plotter.

### **To connect your plotter, do the following:**

1. Unpack the plotter.
2. Insert at least one plotter pen into the pen carousel.
3. Check to be sure the power switch on the back panel of the plotter is off.

4. Check the switch settings.

- **HP-IB Plotter.** Check the HP-IB address on the back of the plotter. Each device on the HP-IB interface must be set to a unique address. Note that you can lose data if your disc drive and another peripheral are both set to the same address. Addresses on plotters are set at the factory to address 5 (shown below). If you have other devices set to the same address, refer to the instructions in the appropriate owner's manual and reset the address.



- **Serial Plotter.** Check the switch settings on the back of the plotter. The switches should be set as shown above. (The switch settings are for 9600 baud.)
5. Plug the power cord into the plotter and then into a grounded outlet. If the plug doesn't fit the outlets in your area, contact your Hewlett-Packard dealer for assistance in ordering the correct power cord and fuse.
  6. Hold down the (P1) and (P2) buttons on the front panel *at the same time* you turn the power switch on. The plotter will draw a demonstration plot.  
If there is no action from the plotter, refer to the plotter owner's manual.
  7. Turn the power off.

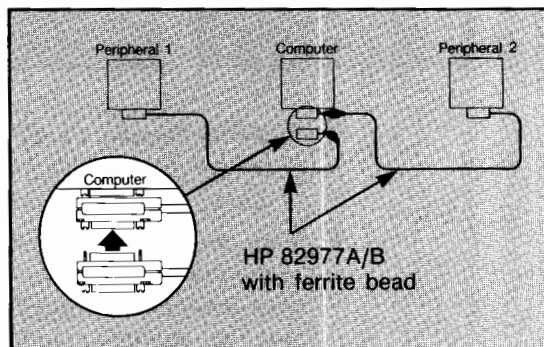


**8. Serial Plotter.** Remove the cover from an I/O port in the back of the computer (or a bus expander) and install a serial interface. For help, refer to the installation instructions provided with the interface, or turn to chapter 5, "Installing Interfaces and Memory Modules."

**9.** Install the cable.

■ **HP-IB Plotter.** Connect the straight end of the HP-IB cable into the HP-IB connector on the back of the plotter. Next, connect the right-angle end to the built-in HP-IB connector on the back of your computer. If you have already installed other HP-IB peripherals, you can stack the connector onto another HP-IB connector as shown in the diagram below. Tighten the thumb screws with your fingers. Do *not* use a screwdriver.

Do not stack more than three HP-IB cables on to one connector. Doing so can result in sufficient force to damage the connector.



■ **Serial Plotter.** Connect the male end of the serial printer cable into the connector on back of the plotter and the female end into the serial interface you previously installed. Use a screwdriver to tighten the screws on the connectors.

10. Before you can use your plotter you need to use the `plotter_is` utility to configure the plotter. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If you don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*), and then configure your system later.

---

## Connecting Other Printers and Plotters

Chapter 6, "Planning Your System," contains a list of the plotters and printers supported on the Integral PC Computer. The cables and interfaces required for each peripheral are indicated as well. All printers and plotters use either the HP-IB or serial (RS-232-C) interface. Refer to the owner's manual of your printer or plotter for connection details.

Remember that before you can use your printer or plotter you need to use the `printer_is` or `plotter_is` utility to assign the printer or plotter to a program. If you are ready, turn to chapter 10, "Installing and Using Peripherals," in *Using Your Integral PC*. If you don't feel you are ready yet, you can start the Tutor (refer to the *Setup Guide*), and then configure your system later.



# 3

## Connecting HP-HIL Accessories

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# Contents

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## Chapter 3

### Connecting HP-HIL Accessories

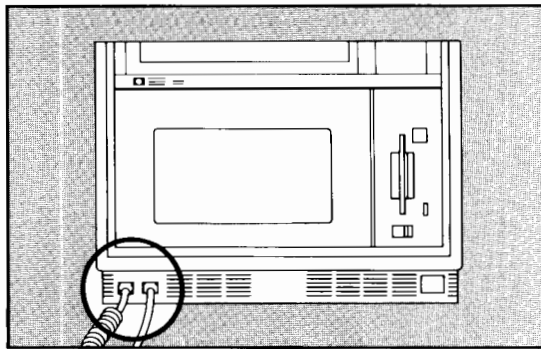
- 3-2** How To Connect HP-HIL Devices
- 3-3** Connecting the HP Mouse
- 3-3** Connecting the HP-HIL Graphics Tablet

# 3

## Connecting HP-HIL Accessories

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The Hewlett-Packard Human Interface Link (HP-HIL) is a simple, low-speed interface used to connect the keyboard, mouse, and other "human interface" accessories to your HP computer. This interface can be identified by the connector.



---

**Caution**

Do not connect HP-HIL peripheral to your phone system or your phone system to the HP-HIL jacks on your computer. Connecting the telephone to your HP-HIL connector may damage your computer.

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Available HP-HIL accessories are listed in chapter 6, "Planning Your System."

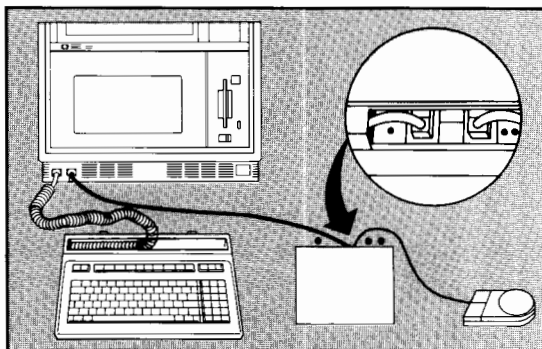
## How To Connect HP-HIL Devices

Before connecting your HP-HIL peripherals, turn off the computer. This prevents damage to your peripheral and allows the computer to scan the HP-HIL interface to identify the new peripherals. Connect the first two peripherals into the two HP-HIL ports provided on the front panel of your computer. You can connect additional HP-HIL peripherals\* to your Integral PC by forming a chain as shown below. Place the keyboard and mouse at the end of a chain (into a connector marked with two dots "••") or into the HP-HIL ports on your computer.

### Caution



When connecting HP-HIL peripherals, the number of dots on the cable must match the number of dots next to the peripheral's HP-HIL port. Insert only the keyboard connector or connectors with two dots ("••") into the computer HP-HIL ports.



\* The current drawn by all the HP-HIL accessories on your system must not exceed 600 mA. Check the current rating, printed on the nameplate of the device, before connecting the device. The keyboard draws 100 mA. In any case, connect no more than seven HP-HIL devices to your computer.

### 3-2 Connecting HP-HIL Accessories

---

## Connecting the HP Mouse

**To connect the HP 46060A Mouse Accessory, do the following:**

1. Turn the computer off.
2. Unpack the mouse and insert the ball into its housing. Follow the instructions in the *HP Mouse Owner's Guide*.

---

### Caution



To avoid damage to the HP Mouse, turn the power off on your integral PC before connecting the mouse.

- 
3. Locate the two HP-HIL connectors on the front of the computer. Insert the mouse cable into either connector or into the double dot ("••") port of another HP-HIL peripheral.
  4. Turn on the computer. Your mouse is now ready for use.

---

## Connecting the HP 46087A or HP 46088A Graphics Tablet

**To connect your graphics tablet, do the following:**

1. Unpack the graphics tablet.
2. Connect the stylus to the round, multi-pin connector on the rear of the tablet.
3. Turn off the computer.
4. Locate the end of the HP-HIL cable with one dot. Insert this end into the HP-HIL connector on the rear of tablet with a single raised dot.
5. Insert the end of the cable marked with two dots into the connector on the front of the computer. If you already have a mouse connected to the computer, disconnect the mouse and reconnect it to the connector marked with two dots on the rear of the tablet.
6. Turn on the computer. Your graphics tablet is now ready for use.







# 4

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## Connecting Disc Drives

# Contents

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## Chapter 4

### Connecting Disc Drives

- 4-1 Connecting the HP 9134H Fixed Disc Drive
- 4-4 Connecting the HP 9125S Flexible Disc Drive

# 4

## Connecting Disc Drives

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Your Integral PC is equipped with a built-in double-sided 3½-inch flexible disc drive. This chapter explains how to connect additional mass storage drives. These include fixed disc drives and flexible disc drives.

Because the set-up procedure is roughly the same for all mass storage drives using the HP-IB interface, we have provided only two step-by-step installation procedures as examples. The HP 9125S Flexible Disc Drive and the HP 9134H Fixed Disc Drive are used as examples. Be sure to use one of the shielded and ferrited HP-IB cables: HP 82977A (1 meter) or HP 82977B (2 meter).

The Integral PC supports only HP-IB mass storage devices. A list of devices supported appears in chapter 6, "Planning Your System." Note that while all mass storage drives are connected using the HP-IB interface, they don't all use the same disc drive protocol. To determine if your disc drive is compatible with the Integral PC, refer to the list in chapter 6.

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### Connecting the HP 9134H Fixed Disc Drive

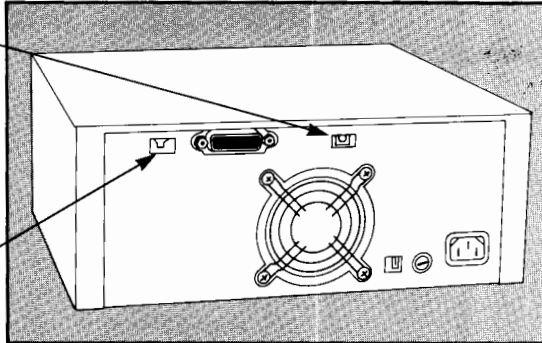
The HP 9134H Fixed Disc Drive is a single 20M-byte Winchester drive. The disc may be partitioned into multiple volumes by rotating a configuration switch on the rear panel. You do not need to decide how to partition your disc drive until you are ready to format the disc. For more information on formatting your disc, refer to chapters 5 and 10 in *Using Your Integral PC*.

**Caution**

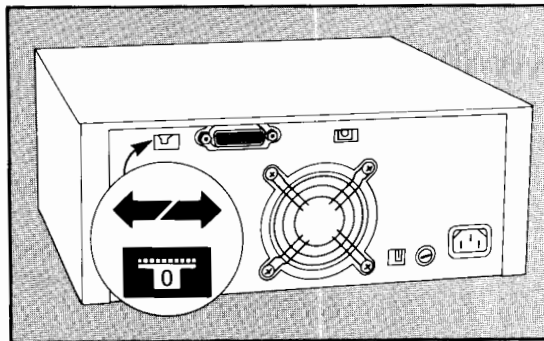
Your HP 9134H fixed disc drive is fragile. Dropping it more than one inch can cause permanent damage.

CONFIGURATION

ADDRESS

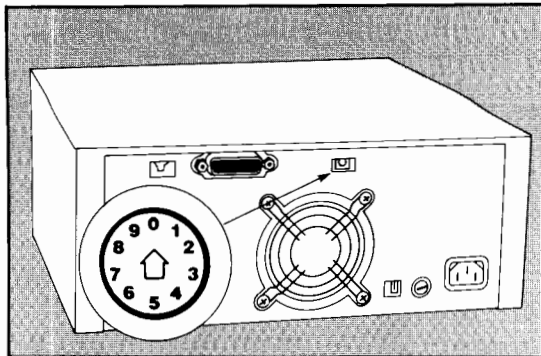
**To connect the disc drive, do the following:**

1. Turn off the disc drive.
2. Set the address switch to a unique address between 0 and 7. This is important because you may lose data if another peripheral is set to the same address as your disc drive. The switches are factory set to 0 as shown below. If you need to reset the switches, refer to the owner's manual for the disc drive.

**4-2 Connecting Disc Drives**



3. Set the configuration switch to 0. You may reset this switch when you format your disc as described in chapter 10, "Installing and Using Peripherals," of *Using Your Integral PC*.

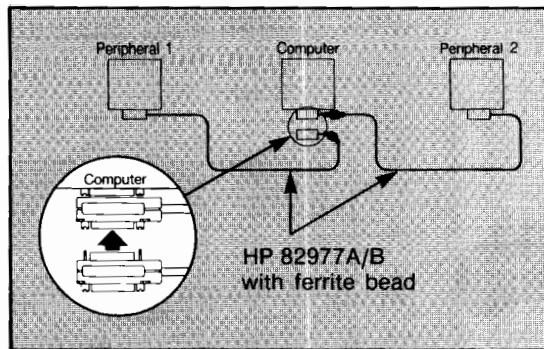


4. Make sure the voltage switch is set to the voltage in your area. To change the voltage setting, slide the switch to the right for 115 Vac, or to the left for 230 Vac.

If you do reset the voltage setting, check the voltage rating of the fuse.

5. Turn your computer off.
6. Plug the straight end of the HP-IB cable into the HP-IB connector on the back of the disc drive. Next, connect the right-angle end to the HP-IB connector on the back of your computer. If you have already installed other HP-IB peripherals, you can stack the connector onto another HP-IB connector as shown in the diagram below. Tighten the thumb screws with your fingers—do *not* use a screwdriver.

Do not stack more than three HP-IB cables on to one connector. Doing so can result in sufficient force to damage the connector.



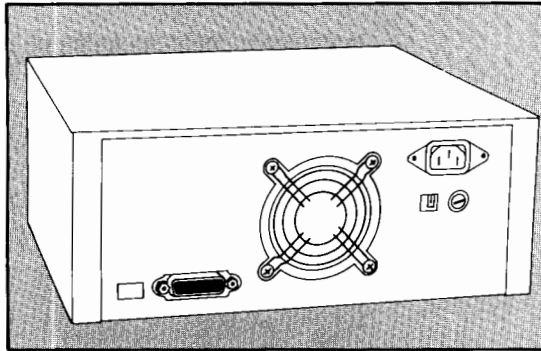
7. Connect the power cord between the power receptacle on the back panel of your disc drive and a grounded power outlet. If your power cord does not fit the outlets in your area, refer to the owner's manual for information on how to order the appropriate power cord.
8. Turn your disc drive on and wait for the fault light to turn off. Then turn your computer on. This allows the computer to identify the disc drives on the system and mount any file systems found.

For information on how to format your fixed disc, refer to chapters 5 and 10 in *Using Your Integral PC*.

## Connecting the HP 9125S Flexible Disc Drive

The HP 9125S Flexible Disc Drive is a single 5¼-inch disc drive. It can be used for file storage or to transfer files and programs to the HP Series 80 computers or the IBM PC.

The HP 9125S disc drive is shown below. Note the location of the switches and connectors.

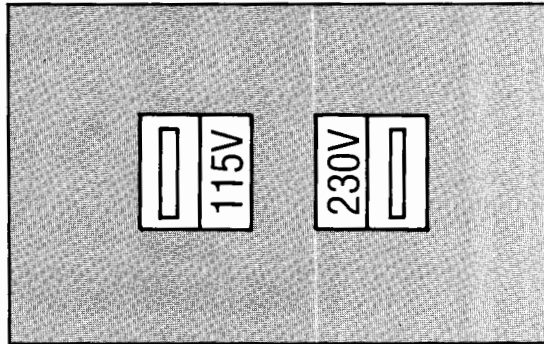


**To install your disc drive, do the following:**

1. Turn off the disc drive.
2. Make sure the address switches are set to a unique address between 0 and 7. This is important because you may lose data if another peripheral is set to the same address as your disc drive. The switches are factory set to 0 as shown below. If you need to reset the switches, refer to the owner's manual for the disc drive.



3. Make sure the voltage switch is set to the voltage in your area. To change the voltage setting, slide the switch to the left for 115 Vac, or to the right for 230 Vac.

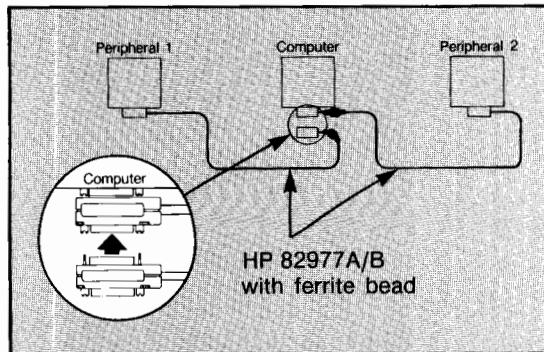


If you do reset the voltage setting, check the voltage and current ratings of the fuse.

4. Turn the computer off.
5. Plug the straight end of the HP-IB cable into the HP-IB connector on the back of the disc drive. Next, connect the other end to the HP-IB connector on the back of your computer. If you have already installed other HP-IB peripherals, you can stack the connector onto another HP-IB connector as shown in the diagram below. Tighten the thumb screws with your fingers—do *not* use a screwdriver.

#### 4-6 Connecting Disc Drives

Do not stack more than three HP-IB cables on to one connector. Doing so can result in sufficient force to damage the connector.



6. Connect the power cord between the power receptacle on the back panel of your disc drive and a grounded power outlet. If your power cord does not fit the outlets in your area, refer to the owner's manual for information on how to order the appropriate power cord.
7. Turn the disc drive on first, then the computer. This allows the computer to identify the disc drives on the system and mount any file systems found. There may be a significant delay for the computer to identify an external disc drive.



# **5**

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## **Installing Interfaces and Memory Modules**

# Contents

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## **Chapter 5**

### **Installing Interfaces and Memory Modules**

- 5-1** Installing a Bus Expander
- 5-1** Installing Interfaces
- 5-5** Installing Memory Modules
- 5-8** Selecting the Correct Cables



# 5

## Installing Interfaces and Memory Modules

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This chapter explains how to install and remove plug-in interfaces and memory modules. Available interfaces and modules are listed in chapter 6 "Planning Your System."

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### Installing a Bus Expander

The HP 82904A Bus Expander is used to provide additional I/O ports. Up to two HP 82904A Bus Expanders may be connected to the Integral PC, providing a maximum of 10 ports available for other modules. The bus expander may be plugged into either port on the rear panel, but not into another bus expander.

To connect the bus expander, refer to the *HP 82904A Bus Expander Installation Instructions*.

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### Installing Interfaces

You can install an interface in any available I/O port, including ports in a bus expander.

To install the HP 82919A Serial Interface, follow the instructions below. They are identical to those packed with your interface. To install any other interface, follow the instructions packed with the interface.

## Unpacking and Inspection

Before you unpack the interface, note that its printed-circuit assembly is exposed. The interface is shipped enclosed in an antistatic bag to protect it against electrostatic discharge (ESD) damage.

### Caution



Observe the following precautions whenever handling, installing, or removing the interface:

- Whenever you remove your interface from the computer, store it in the original antistatic bag and shipping container.
- Always handle the interface by its metal back panel, not by the exposed circuit board.

Failure to observe these precautions may result in mechanical damage and/or electrostatic discharge (ESD) damage to the interface.

Inspect the interface carefully for any signs of shipping damage. Notify your dealer immediately and file a claim with the carriers involved if the interface is damaged or if anything is missing.

## Installing the Serial Interface

Note the following precautions before you install the interface.

### Warning



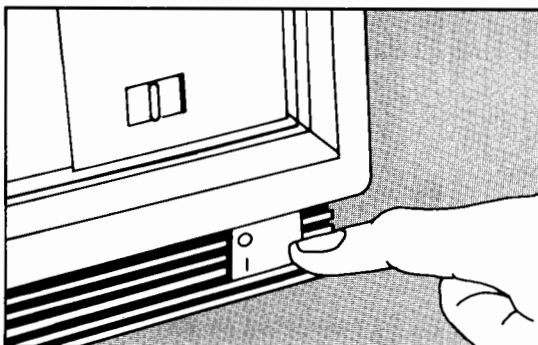
Do not place fingers, tools, or other foreign objects into the plug-in ports of your computer or the connectors of the interface. Such actions may result in minor electrical shock hazard and interference with pacemaker devices worn by some persons. Damage to the connectors and internal circuitry of the computer and/or interface may also result.

**Caution**

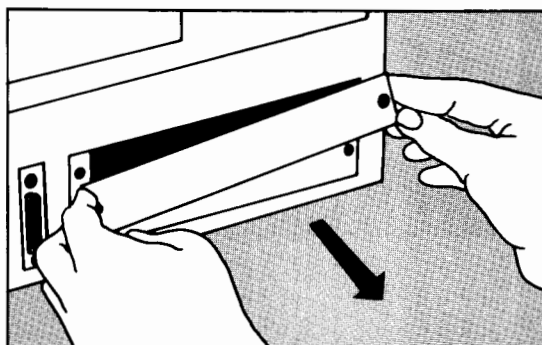
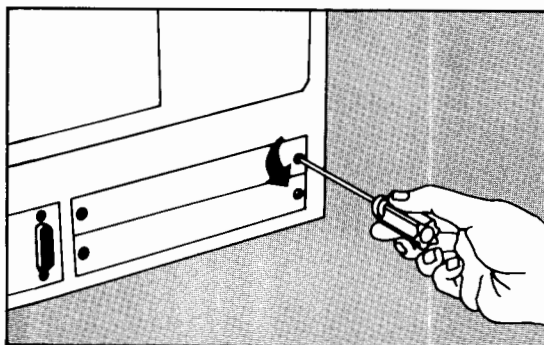
Always turn off the computer and any peripherals connected to it before installing or removing the interface. Failure to observe this procedure may result in damage to the computer, the interface, or both.

To install the interface, follow these steps:

1. Turn off the computer.

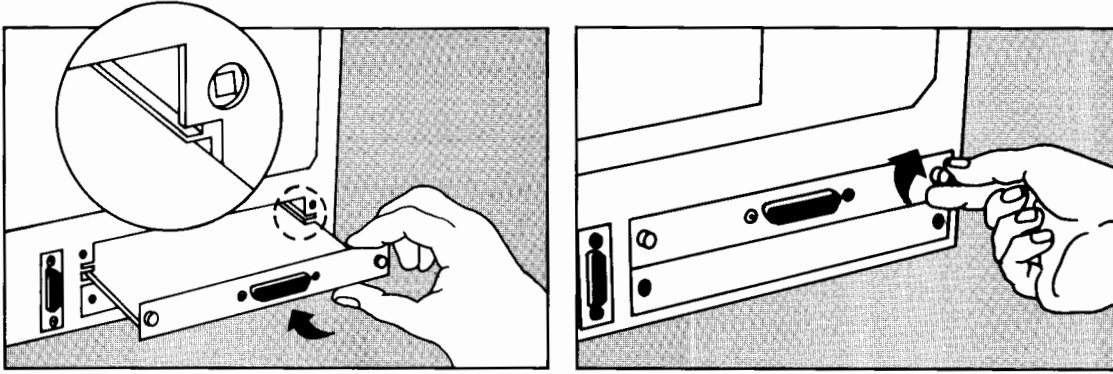


2. Uncover an I/O port (on back of computer). Save the cover and screws.





**3. Insert the interface.**

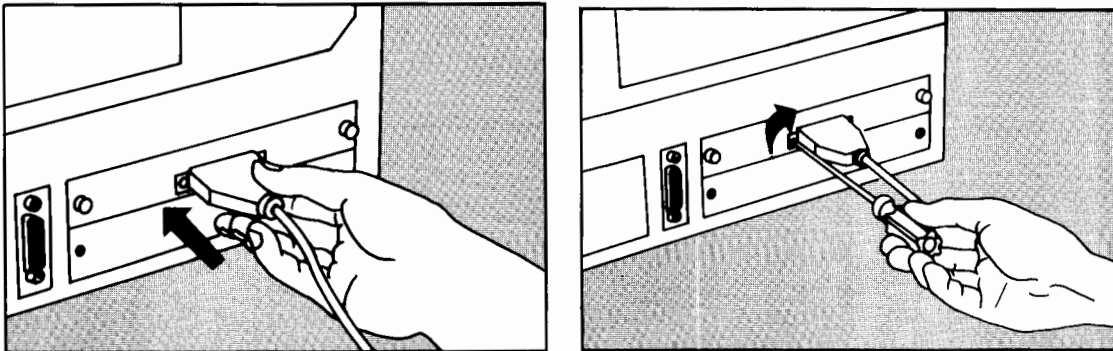


**Note**



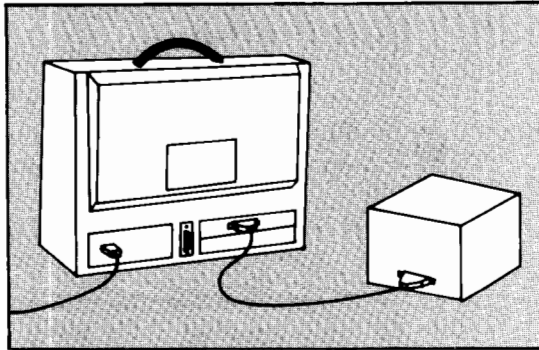
You may install the interface in any unused I/O port. Be sure that the interface is right-side up and that the circuit board is aligned in the guides.

**4. Plug in the cable connector.**



**5-4 Installing Interfaces and Memory Modules**

**5. Connect your peripheral.**



**Note**



The cable that you need depends on your peripheral device. Refer to the section "Selecting the Correct Cables" at the end of this chapter.

If you remove the interface for an extended period, replace the cover plate over the I/O port.

## Installing Memory Modules

You can install a memory module in any available I/O port, including ports in a bus expander. To install a memory module, follow the instructions below. They are identical to those packed with your memory module.



## Unpacking and Inspection

Before you unpack the memory module, note that its printed-circuit assembly is exposed. The module is shipped enclosed in an antistatic bag to protect it against electrostatic discharge (ESD) damage.

### Caution



Observe the following precautions whenever handling, installing, or removing the module:

- Whenever you remove your module from the computer, store it in the original antistatic bag and shipping container.
- Always handle the module by its metal back panel, not by the exposed circuit board.

Failure to observe these precautions may result in mechanical damage and/or electrostatic discharge (ESD) damage to the module.

Inspect the module carefully for any signs of shipping damage. Notify your dealer immediately if the module is damaged or if anything is missing.

## Installing the Memory Module

Note the following precautions before you install the module.

### Warning



**Do not place fingers, tools, or other foreign objects into the plug-in ports of your computer. Such actions may result in minor electrical shock hazard and interference with pace-maker devices worn by some persons. Damage to the connectors and internal circuitry of the computer may also result.**

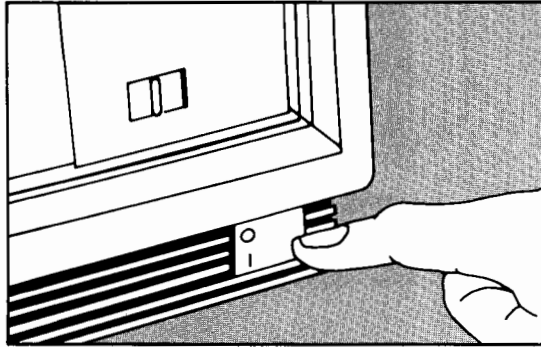
### Caution



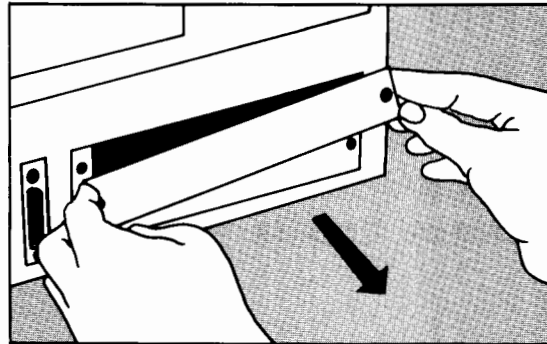
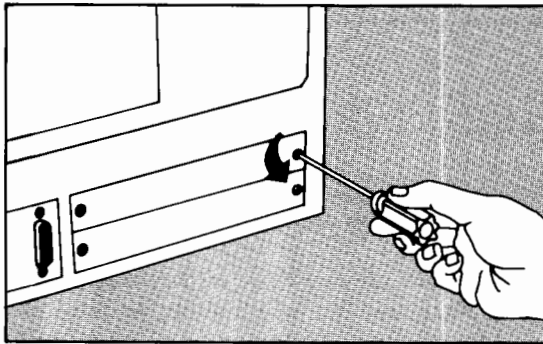
Always turn off the computer and any peripherals connected to it before installing or removing the module. Failure to observe this procedure may result in damage to the computer, the module, or both.

To install the module, follow these steps:

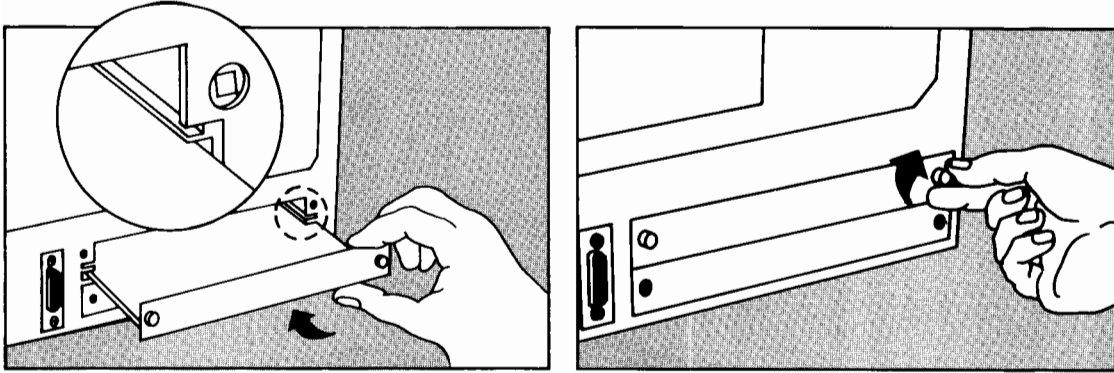
1. Turn off the computer.



2. Uncover an I/O port (on back of computer).



**3.** Insert the module.



**Note**



You may install the module in any unused I/O port. Be sure that the module is right-side up and that the printed-circuit assembly is aligned in the guides.

## Selecting the Correct Cables

To select the correct cable for your interface, refer to the owner's manual for the interface you are interested in.

The following table provides an overview of the cables that are available for each interface. For information on how to order cables, refer to the *Support Guide* or contact your local Hewlett-Packard dealer.

With This I/O Module	To Connect This Device	Use This Cable
HP 82919A Serial Interface  HP 82915A 300/1200 BPS Modem HP 82998A HP-IB Interface  HP 82923A GPIO Interface HP 82920A Current Loop Interface  HP 82922A BCD Interface HP 82924A HP-IL Interface	HP Printers HP Plotters  Non-HP Printers  Data Communication Equipment (Modems)  Instrumentation  To your phone system  Your HP-IB instrumentation  Your GPIO equipment  Your current loop equipment  Your BCD equipment  Any HP-IL Peripheral	HP 82974D Printer Cable  HP 82974C Printer Cable HP 82974A Modem Cable  See Serial Interface <i>Owner's Manual</i> Modular telephone cable* HP 10833A/B/D HP-IB Cable  HP 82976A GPIO/BCD Cable† HP 82975A Current Loop Cable‡  HP 82976A GPIO/BCD Cable† HP 82167A HP-IL Cable (0.5 meter) HP 82167B HP-IL Cable (1 meter)* HP 82167D HP-IL Cable (5 meter)§
* One cable provided with interface. † May require wiring by the customer. ‡ Must be wired by the customer. § Does not comply with German RFI requirements.		





# 6

## Planning Your System

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# Contents

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## Chapter 6

### Planning Your System

- 6-2** Printers and Plotters
- 6-3** Mass Storage Drives
- 6-5** Connecting Instrumentation
- 6-6** Internal Upgrade Kits
- 6-7** The HP-HIL Interface
- 6-8** The Built-In HP-IB Interface
- 6-10** Interfaces and Memory Modules

# 6

## Planning Your System

---

All versions of the Integral PC include the following features:

- 31 line (255 by 512 pixel) electroluminescent display of up to 85 characters per line.
- Built-in 3½-inch micro-floppy disc drive.
- Built-in thermal inkjet printer.
- Built-in HP-IB interface.
- 512K bytes RAM.
- Two I/O ports for interfaces, memory modules, or bus expanders.
- Condensed HP ITF Keyboard with numeric key pad.
- ROM-based HP-UX operating system.
- Two built-in HP-HIL ports.
- Speaker.
- Real-time clock.

If your system contains only a few peripherals, you probably don't need to plan your configuration. For large or complicated systems you may need to refer to the following sections when planning your configuration.

## Printers and Plotters

The following table lists printers and plotters available for the Integral PC.

### Hewlett-Packard Printers

Printer	Available Interfaces	
	HP-IB*	Serial†
HP 2225A/D ThinkJet Printer	yes	yes
HP 2603A Daisywheel Printer	no	yes
HP 2686A LaserJet Printer	no	yes
HP 2932A Impact Printer‡	yes	yes
HP 2934A Office Printer‡	yes	yes
HP 82905B Printer	yes	no
HP 82906A Impact Printer	yes	no
<p>* Requires one of the following HP-IB cables: HP 82977A (1 meter) HP 82977B (2 meter)</p> <p>† Requires HP 82919A Serial Interface and the following cable: HP 82974D</p> <p>‡ For information about compatibility with radio frequency interference standards outside the U.S.A., contact your Hewlett-Packard dealer.</p>		

### Hewlett-Packard Plotters

Plotter	Available Interfaces	
	HP-IB*	RS-232†
HP 7440A A size, 8-Pen Plotter	yes	yes
HP 7470A A size, 2-Pen Plotter	yes	yes
HP 7475A A/B size, 6-Pen Plotter	yes	yes
HP 7550A A/B size, 8-Pen Plotter	yes	yes
HP 7580B D size, 8-Pen Plotter	yes	yes
HP 7585B E size, 8-Pen Plotter	yes	yes
HP 7586B E size, 8-Pen Plotter	yes	yes
* Requires one of the following HP-IB cables: HP 82977A (1 meter) HP 82977B (2 meter) † Requires HP 82919A Serial Interface and the following cable: HP 82974D Printer Cable		

## Mass Storage Drives

Disc drives that use the Amigo or SS-80 disc drive protocol are compatible with the Integral PC. These include 5¼-inch and 3½-inch flexible disc drives, and fixed disc drives from 5M byte up to 55M byte. The mass storage drives are listed below.

### Mass Storage Drives

Model	Description
HP 82902M	Flexible Disc Memory (Single 5¼-inch)
HP 9125S	Single 5¼-inch IBM Compatible Drive
HP 9121S/D	Single/Dual 3½-inch Microfloppy Disc Drive (Single-Sided)
HP 9122S/D	Single/Dual 3½-inch Microfloppy Disc Drive (Double-Sided)

### Mass Storage Drives (Continued)

Model	Description
HP 9133A/V	5M Byte Winchester/3½-inch Microfloppy (Single-Sided)
HP 9133B	10M Byte Winchester/3½-inch Microfloppy (Single-Sided)
HP 9133XV	15M Byte Winchester/3½-inch Microfloppy (Single-Sided)
HP 9133D	14.8M Byte Winchester/3½-inch Microfloppy (Double-Sided)
HP 9133H	20M Byte Winchester/3½-inch Microfloppy (Double-Sided)
HP 9133L	40M Byte Winchester/3½-inch Microfloppy (Double-Sided)
HP 9134A	5M Byte Micro-Winchester Disc Drive
HP 9134B	10M Byte Micro-Winchester Disc Drive
HP 9134XV	14.5 Mbyte Winchester
HP 9134D	14.8M Byte Winchester
HP 9134H	20M Byte Winchester
HP 9134L	40M Byte Winchester
HP 9153A	10M Byte Winchester/3½-inch Microfloppy (Double-Sided)
HP 9154A	10M Byte Winchester
HP 7941	24M Byte Winchester
HP 7942	24M Byte Winchester/¼-inch Tape Cartridge Subsystem*
HP 7945	55M Byte Winchester
HP 7946	55M Byte Winchester/¼-inch Tape Cartridge Subsystem*

\* The ¼-inch tape cartridge subsystem can be used in the off-line mode only. Refer to your owner's manual for more information about using the tape back-up in this mode.

## 6-4 Planning Your System

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## Connecting Instrumentation

Your Integral PC may be used as a system controller in a test, measurement, or control application with most Hewlett-Packard instruments equipped with the HP-IB interface.

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### Caution



Use of instruments on the same HB-IB interface as peripherals (For example, discs, printers, and plotters) may cause performance problems or other undesirable results. If you are connecting instruments to your Integral PC in addition to HP-IB peripherals, you *must* connect the peripherals to the HB-IB interface built into the computer. The instruments *must* then be connected to one or more plug-in HB-IB interfaces (HP 82998A).

---

### Note



We recommend that you obtain assistance from Hewlett-Packard if you are planning to use your Integral PC with instrumentation. Assistance may be obtained in two ways:

- If you are planning to purchase Hewlett-Packard instrumentation, contact the local Hewlett-Packard Sales office for assistance.
- If you already have instruments that you want to connect to your Integral PC, you can obtain service by calling HP HelpLine. A charge is made for this service. For more information, refer to the *Support Guide* provided with your computer.

Instruments connected using the HP-IB interface may be programmed using either the HP-UX C programming language or HP-UX Technical BASIC. Since each instrument has its own set of messages and commands, you will need to refer to the owner's manual for specific information about device-specific messages. For information about programming I/O devices, refer to one of the following references:

- For programming in HP-UX C: *Integral Personal Computer Programmer's Guide*, part of the Programmer's Documentation (HP 82865J)
- For programming in HP-UX Technical BASIC: *HP-UX Technical BASIC I/O Programming Guide*, part of Technical Basic (HP 82860J).

If you require information on HP training programs, technical assistance, application notes, or information on how to order the above references, refer to the *Support Guide* or contact your authorized Hewlett-Packard dealer.

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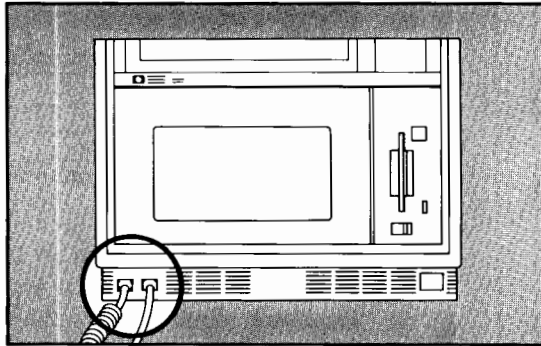
## **Internal Upgrade Kits**

Your computer supports user-installable software ROM upgrades. One of those, HP-UX/RO Release 5.0 (HP 82991A or HP 82995A), is already installed in your computer. Contact your authorized Hewlett-Packard dealer regarding availability of additional software modules.

## The HP-HIL Interface



The standard HP Human Interface Link (HP-HIL) interface, located on the front panel of the Integral PC, is used to connect your keyboard, mouse, and other peripherals to your system. Because the power for each peripheral is supplied by the computer, the maximum number of HP-HIL peripherals that may be connected to the computer is limited to a total electrical load of 600 mA. The current required by each peripheral is printed on the nameplate on the bottom of the peripheral. The current draw of your Integral PC keyboard is 100 mA.



The following HP-HIL accessories are available:

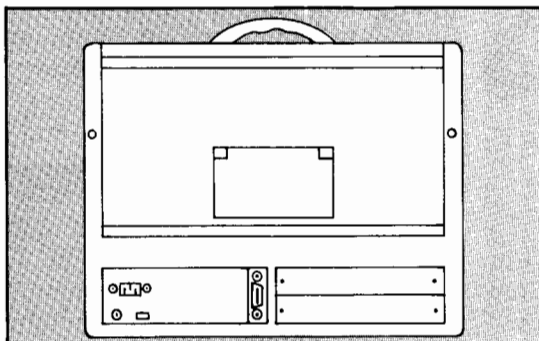
- HP 46060A Mouse Accessory
- HP 92961A Bar Code Reader
- HP 46083A Rotary Knob
- HP 46086A 32-Button Box
- HP 46085A 9-Rotary Knob Box
- HP 46087A Graphics Tablet, A-size
- HP 46088A Graphics Tablet, B-size



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## The Built-In HP-IB Interface

The Hewlett-Packard Interface Bus implements the IEEE-488-1978 interface standard, also known as the General Purpose Interface Bus. The HP-IB interface can be used to connect up to 15 devices. Devices include printers, plotters, mass storage drives, and a wide range of HP instruments\*.



**The Maximum Number of Devices.** The maximum number of devices depends on the type of device and the system performance requirements. The total number of addressed devices is limited to 15. The number of devices is summarized in the table on the next page for various categories of peripherals.

\* We recommend using a plug-in HP-IB interface for instruments if you have a peripheral disc.



Device	Number of Devices Permitted on the HP-IB Interface
Disc Drives* †	Up to eight disc drives may be addressed using the HP-IB interface, however only eight file systems may be mounted at any one time. For more information on mounting and unmounting discs, refer to <i>Using Your Integral PC</i> .
Printers†	Only one active printer may be assigned to each process, although several programs may be running simultaneously, each with its own printer.
Plotters†	<p>Only one active plotter may be assigned to each process, although several programs may be running simultaneously, each with its own plotter.</p> <p>Several plotters on the HP-IB bus may be set in the "listen only" mode to obtain multiple copies of the same graphics.</p> <p>Most HP plotters, when assigned an HP-IB address between 0 and 7, may also be used to digitize.</p>
Instruments‡	Up to 15 instruments may be connected using the HP-IB bus.
<p>* Disc drives must have addresses set in the 0 to 7 range.</p> <p>† Only eight devices that require the parallel polling function may be addressed. Addresses must be set in the 0 to 7 range.</p> <p>‡ We recommend using a plug-in HP-IB interface dedicated to instruments if you have a disc drive.</p>	

**Addressing Restrictions.** All HP-IB addresses fall in the range from 0 to 30. Peripherals may be set to any address, with the following restrictions:

- Each peripheral must be set to a unique address.
- The maximum number of peripherals addressed is 15.
- Disc drives and other peripherals which require the parallel polling function must be set to addresses between 0 and 7. This means only eight such devices may be serviced on one HP-IB interface.

**Cable Length Restrictions.** The maximum cable length between any two devices is the lesser of:

1. 2 meters times the number of devices on the system, and
2. 20 meters.

**Number of Active Devices.** For optimum performance, turn on at least half of all the peripherals on the HP-IB interface.

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## Interfaces and Memory Modules

The Integral PC has two I/O ports on the rear panel. The number of ports may be expanded to 10 by using two HP 82904A Bus Expanders. Thus up to 10 interfaces and memory modules can be used on your computer. If you are programming the modules in HP-UX Technical BASIC, note that only eight select codes are available for devices on the serial, HP-IL, BCD, GPIO, current loop, and HP-IB interfaces. The following modules may be plugged in:

- **HP 82919A Serial Interface.**
- **HP 82915A 300/1200 BPS Modem.** The maximum number of modems that may be used will be limited by the amount of memory available to run the Datacomm program.

- **HP 82922A BCD Interface, HP 82923A GPIO Interface, HP 82920A Current Loop Interface.**
- **HP 82925A 256KB Memory Module, HP 82927A 512KB Memory Module, HP 82916A 1MB Memory Module.** The maximum amount of internal and plug-in RAM is 7.5M bytes.
- **HP 82904A Bus Expander.** A total of two 5-port bus expanders may be connected to the Integral PC. Each bus expander has an interface card that plugs into one of the two ports on the computer. With two bus expanders a total of 10 I/O ports are available on the Integral PC.
- **HP 82924A HP-IL Interface.** For more information about HP-IL peripheral and software support, contact your authorized Hewlett-Packard dealer.
- **HP 82998A HP-IB Interface.**

**Your Integral PC-V's Vital Statistics**

	<b>Peripheral or Interface</b>	<b>Data Cable</b>	<b>Address Setting</b>	<b>HP-UX Device File</b>	<b>Port</b>
<b>Disc Drives</b>					
<b>Printers</b>					
<b>Plotters</b>					
<b>I/O Modules</b>					
<b>Memory Modules</b>					
<b>Other</b>					