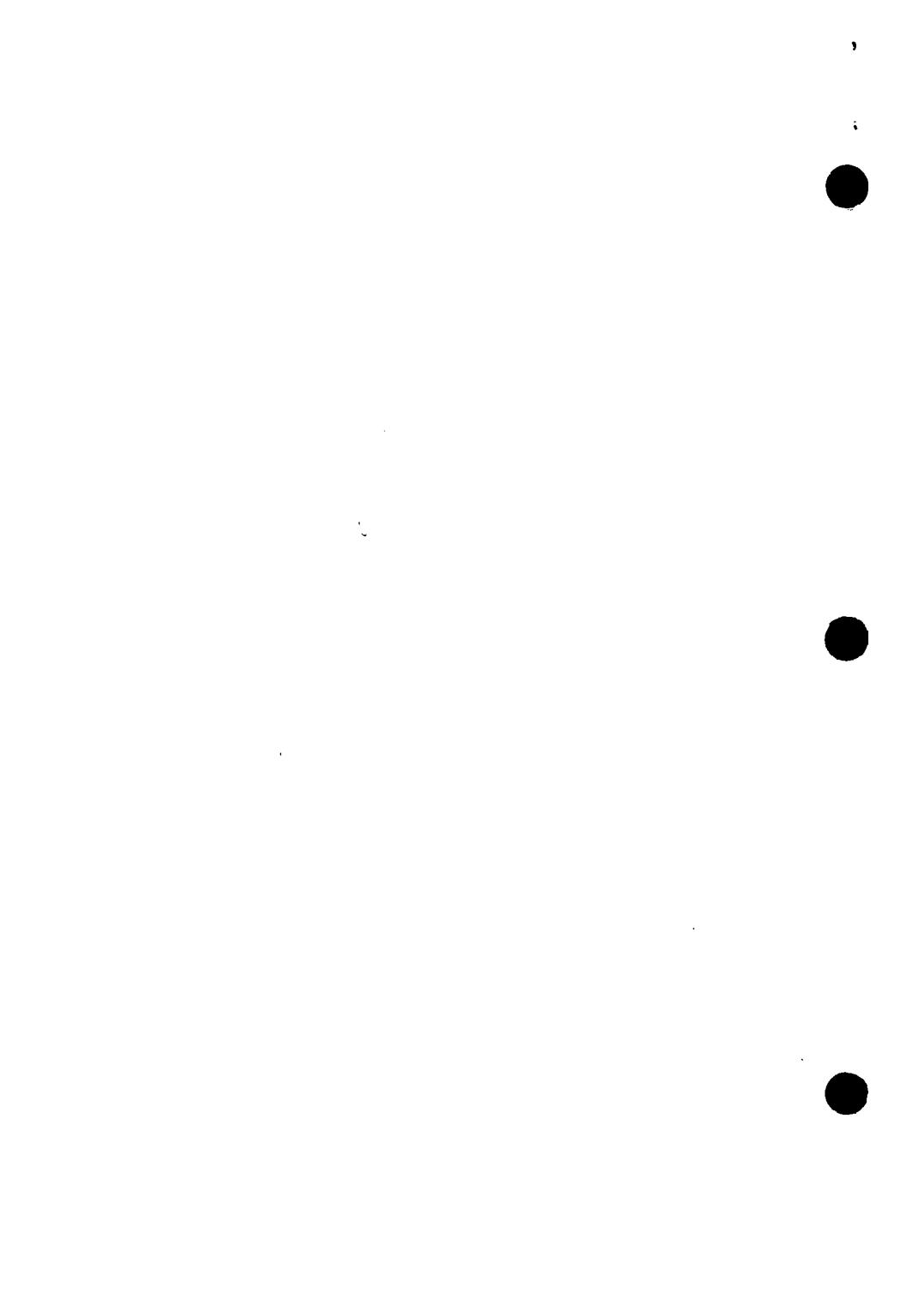


OWNER'S GUIDE TO INSTALLING AND USING THE EXTENDED INPUT/OUTPUT ACCESSORY, HP 45643A



**Manual Part No.
45643-90001**

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INTRODUCTION

Congratulations on your purchase of the Hewlett-Packard Extended Input/Output Accessory, Model HP 45643A. The accessory is designed to give you years of easy and trouble-free operation.

The accessory consists of a printed circuit board, software that operates the board, and an HP-IL cable.

What Does the Extended Input/Output Accessory Do?

The Extended Input/Output Accessory (Extended I/O Accessory) expands the capabilities of your HP 150. It allows you to connect a parallel printer or an HP 2225B ThinkJet Printer to the HP 150. It also permits you to attach your HP 150 to the HP 110 PORTABLE computer so you can transfer data between the two computers and print data on the HP 150 display or printer from the HP 110.

A parallel printer is one that uses a Centronics-style connector. For example, the HP 2225C ThinkJet Printer is a parallel printer. You can attach this printer or numerous other makes of parallel printers to your HP 150 when you have an Extended I/O Accessory installed. Your dealer or Hewlett-Packard sales representative can give you a list of the printers you can connect.

The HP 2225B ThinkJet Printer uses a Hewlett-Packard Interface Loop (HP-IL) connector to attach to your HP 150. The HP 2225B printer is referred to in this manual as an "HP-IL printer".

Restrictions

- The HP IL version of the HP 7470A Plotter and the HP 9114A Microfloppy Disc Drive cannot be connected with your HP 150 unless an HP 110 is also connected.
- Alphanumeric or graphic displays cannot be printed on a parallel or HP-IL printer by typing **|Shift-Print|**, **|Ctrl-Print|**, or **|GRAPH Copy|**.
- The HP 150 Device Control and Device Mode functions cannot be used to transfer data to your parallel or HP-IL printer.
- Your parallel or HP-IL printer cannot be used when your HP 150 is in Terminal Mode.
- You must connect your parallel printer to your HP 150 with the Hewlett-Packard HP 13242D printer cable or a cable built to the same specifications (see Appendix F).
- Because of the amount of HP 150 memory used by the Extended I/O software, applications with large memory requirements may not work after you install the Extended I/O Accessory.
- The HP 150 cannot be used with the HP 110 if the HP-IL printer software is on your **SYS_MASTER** work disc. If the software is on your disc, remove it as explained in Chapter Three.

How to Use this Manual

Before reading this manual, acquaint yourself with the *HP 150 Personal Computer Owner's Guide* (part number 45621-90001) or *Getting Started with the HP 150 Personal Computer* (part number 45621-90022).

This manual tells you what you need to know to install and use the HP 150 Extended I/O Accessory. You are urged to read all of this introduction and the chapters relevant to your needs BEFORE attempting to install or use the Extended I/O Accessory. The following information will help you decide which chapters to read.

- To install the Extended I/O board, read Chapter One.

Chapter One, *Installing the Extended I/O Board*, describes the three parts that make up the Extended I/O Accessory and tells you how to install the Extended I/O Board.

- To connect and use a parallel printer, read Chapter Two.

Chapter Two, Connecting and Using Your Parallel Printer, tells you how to connect a parallel printer, how to add the software for operating the printer to your **SYS_MASTER** work disc, how to remove the software, and how to use the printer.

- To connect and use an HP 2225B ThinkJet printer, read Chapter Three.

Chapter Three, Connecting and Using Your HP-IL Printer, tells you how to connect the HP 2225B ThinkJet Printer to your HP 150, how to add the software for operating the printer to your **SYS_MASTER** work disc, how to remove the software, and how to use the printer.

- To connect your HP 150 to an HP 110 and to use the computers together, read Chapter Four.

Chapter Four, Connecting Your HP 150 to an HP 110 and Using it with the HP 110, tells you how to connect your HP 150 to an HP 110 with an HP-IL cable, and how to install and use HPLINK for communication between the HP 150 and the HP 110.

The remainder of the manual consists of six appendices.

Appendix A is a glossary of terms used in the manual.

Appendix B tells you how to make a **SYS_MASTER** work disc.

Appendix C shows the amount of memory used by the Extended I/O software.

Appendix D explains the error messages you may encounter while using the EXTENDIO program to install the software for your printer.

Appendix E tells you how to use the EXTENDIO TEST program to check the Extended I/O board and the parallel or HP-IL connection.

Appendix F contains technical specifications for the parallel printer cable.

Other Useful Manuals

- HP 150 Personal Computer Owner's Guide, part number 45621-90001. This is the primary reference for your HP 150.
- Getting Started with the HP 150 Personal Computer, part number 45621-90022.
- The HP 110 Portable Computer Owner's Manual, part number 00090-90004.
- The manual(s) for the equipment you are going to connect to your HP 150 via the Extended I/O Accessory.

Conventions Used in this Manual

Touch selections on a menu are shown as solid black rectangles with the name of the selection inside. For example, the "Start Applic" selection is shown as .

Keys on your keyboard are shown as "hollow" rectangles with the name of the key inside. For example, the "Return" key is shown as .

CHAPTER ONE

INSTALLING THE EXTENDED I/O BOARD

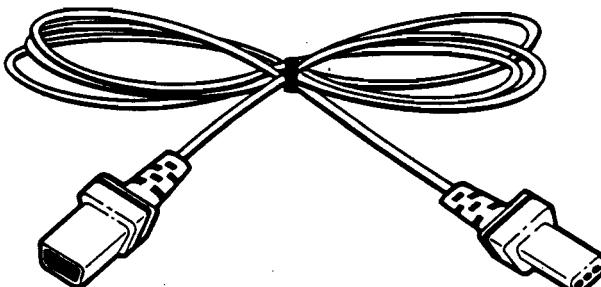
Before attempting to install the Extended I/O board, set up the HP 150 display unit, keyboard and disc drive. Refer to either *Getting Started with the HP 150 Personal Computer* or the *HP 150 Personal Computer Owner's Guide* for instructions. Also, acquaint yourself with the topic "Accessory Boards" in the *Owner's Guide*.

Now that you have set up the basic HP 150 and read about accessory boards, unpack the Extended I/O Accessory from its shipping box.

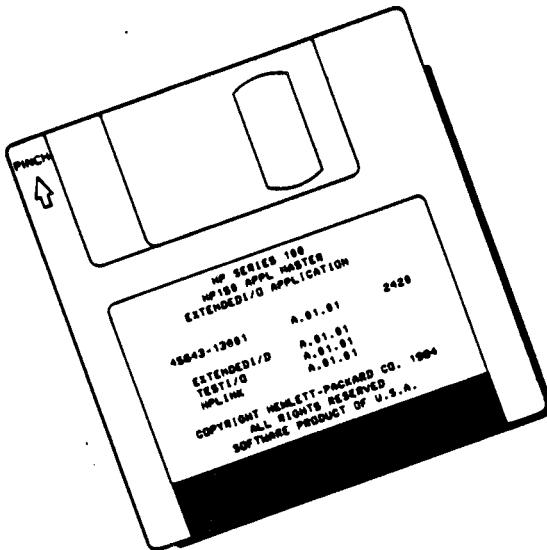
The box should contain the parts listed below. Take a moment to look at the parts before beginning installation. When you handle the printed circuit board, hold it by its edges in order to prevent static discharge.

Components of the Extended I/O Accessory

- One HP-IL cable. This is a slender black cable.

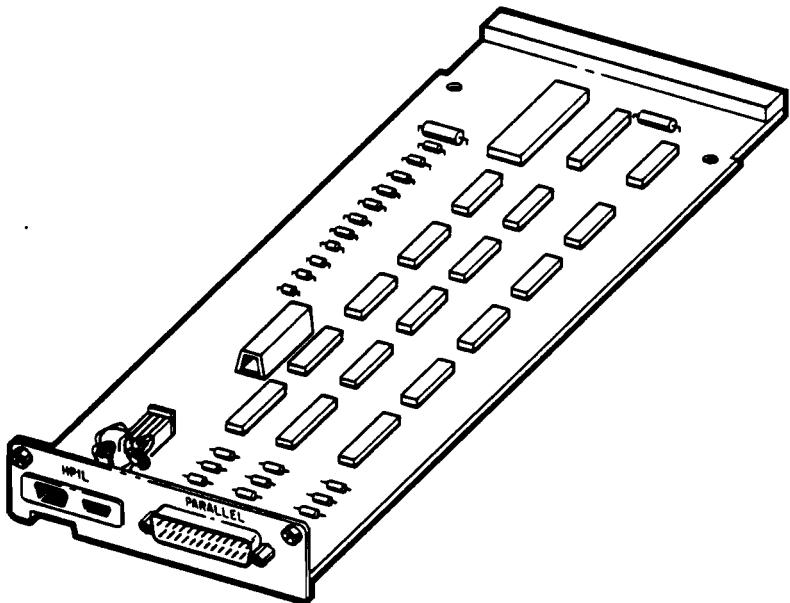


- One 3.5 inch disc labeled "HP SERIES 100, EXTENDED INPUT/OUTPUT, HP 150". This is the Extended I/O software master disc. Protect this disc as you would any other—keep it away from heat sources, direct sunlight, and magnetic fields, and don't spill liquids on it.



- One printed circuit board. This board comes packaged in an anti-static bag. Keep this bag in case you need to store or ship the board in the future.

Handle the board with care; avoid dropping it or stacking things on it.

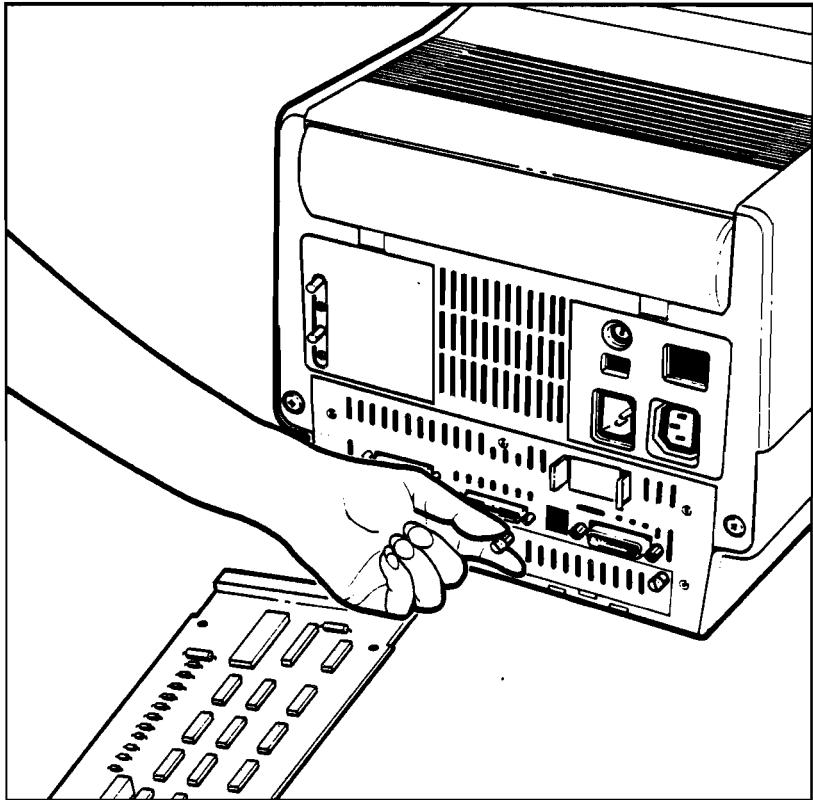


Take a moment to examine the Extended I/O board (when you pick it up, hold it by its edges). Protruding from the cover plate at one end of the board are two small black connectors for plugs and one larger connector. The black connectors are for HP-IL cables; one is labeled "OUT" and the other is labeled "IN". The larger connector is for a parallel printer cable.

Installing the Extended I/O Board

You need a medium-sized standard blade screwdriver to install the board.

1. Turn off the power to the HP 150.
2. Remove the cover plate on the rear panel of your HP 150 from the accessory slot where you want to install the board. The Extended I/O board can go in either slot. Since memory boards can only be installed in slot 1 (the slot on the left when viewed from the back), you may want to leave that slot available for memory boards.

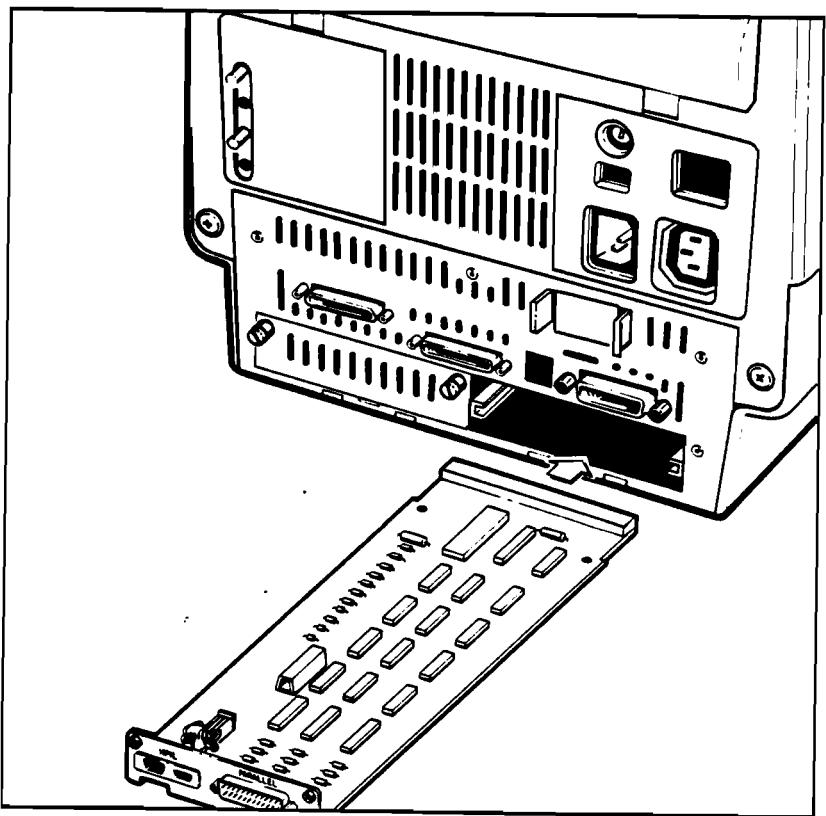


Store the cover plate in a safe place; the Extended I/O board comes with its own plate attached.

CAUTION

If you remove the accessory board later, you will need to replace the cover plate. The plate helps prevent the HP 150 from causing interference with other electrical equipment.

3. Carefully pick up the printed circuit board. Turn it so that the cover plate faces you and the print on the plate is right-side up. Slide the other end of the board between the two guide rails inside the accessory slot; this is shown in the figure below.



Press the board in all the way until the fastening screws contact the back panel of the computer. Tighten the screws with the screwdriver.

Removing the Extended I/O Board

1. Turn off power to the HP 150.
 2. Disconnect the cable(s) from the board and set them aside for safe-keeping.
 3. Loosen the fastening screws in the cover plate and gently tug on them to pull the board out of the accessory slot.
When the board is out of the slot, be sure to handle it by its edges only!
 4. Place the accessory board in the anti-static plastic bag it was shipped in and store it in a safe place along with the cables.
 5. Cover the accessory slot with the cover plate originally supplied with your HP 150.
-

CAUTION

Be sure to replace the cover plate over the accessory slot. Otherwise, electrical interference with other electrical equipment may occur.

CHAPTER TWO

CONNECTING AND USING YOUR PARALLEL PRINTER

Connecting your Parallel Printer to your HP 150

To connect your parallel printer to your HP 150 you have to attach the parallel cable and the power cord, set the MS-DOS Device Configuration, and copy the parallel printer software to your SYS_MASTER work disc. You may also have to set the printer's communication switches.

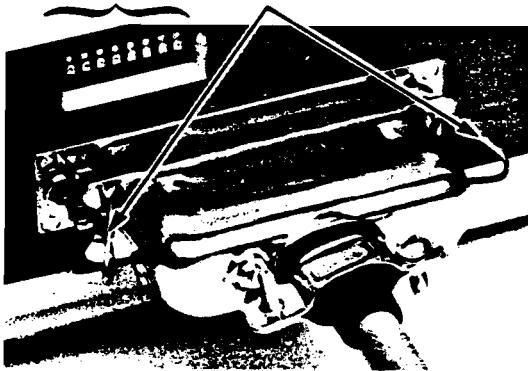
Setting the Printer's Communication Switches

You may have to tell the printer explicitly how the HP 150 is going to talk to it during the printing process. Normally you do this by setting one or more switches on the printer.

Setting the HP 2225C ThinkJet Switches

If you are connecting an HP 2225C ThinkJet, you have to set the Mode Select switches. These switches are located on the back of the printer as shown in the figure below:

SWITCHES WIRE CLIPS



Set all of the switches to the "down" position.

Setting the Switches on other Parallel Printers

If you are connecting a different printer, set its switches

- so it does a CR (Carriage Return) when it receives a CR signal from the HP 150
- so it does a LF (Line Feed) when it receives a LF signal from the HP 150

See your printer manual for the location of the printer's switches and for information on setting the switches.

Connecting the Parallel Printer Cable and Power Cord

If the Extended I/O board has not been installed yet, you need to install it first. Refer to Chapter One for instructions.

You connect your printer to your HP 150 by means of a special parallel printer cable. Use the Hewlett-Packard HP 13242D or a cable built to the same specifications.

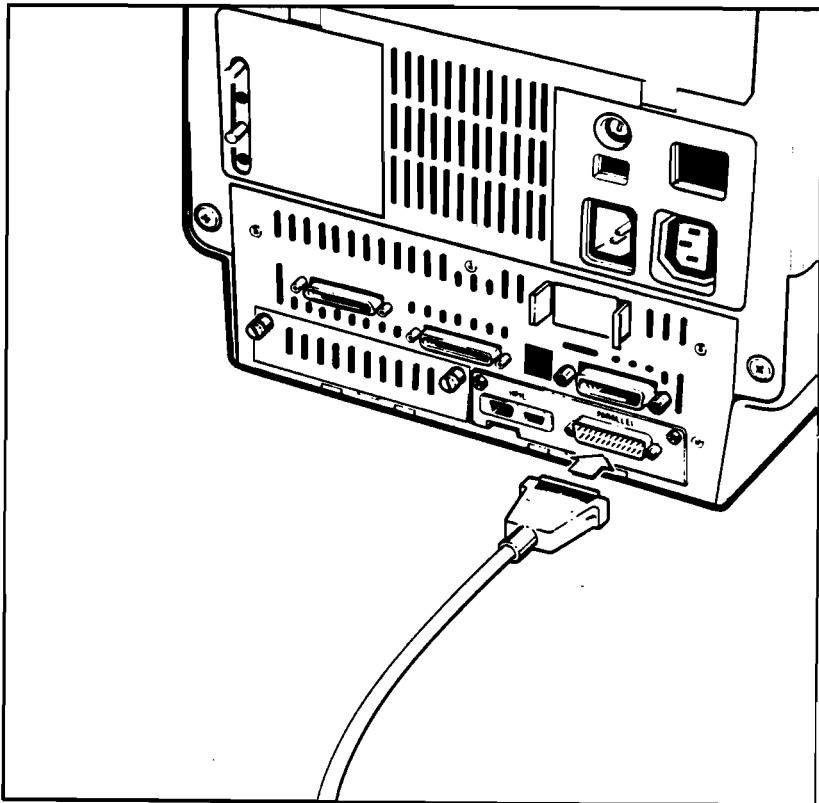
CAUTION

You must use the Hewlett-Packard cable or a cable built to the same specifications. If you attempt to use another type of cable, you could damage the HP 150 or the printer; also, the cable may not conform to FCC Class B RFI requirements.

If you are building your own cable, refer to Appendix F for connector, pinout, and insulation specifications.

You'll need a small, standard blade screwdriver for the connection.

1. Turn off the power to the HP 150.
2. Find the parallel printer connector on the back of the HP 150. It is part of the Extended I/O board and is labeled Parallel. Plug the parallel printer cable into this connector, as shown below. Tighten the screws with the screwdriver.



3. Plug the other end of the cable into the proper connector on your printer. (You may have to refer to your printer manual for the location of the connector.) Secure the plug by snapping the clips into place.
-

CAUTION

It is important to firmly anchor both ends of the cable to their respective connection points. If you fail to do this, the cable may come loose while you are in the middle of printing something. In most cases this will result in a printing error, and you will need to reprint the page you were printing.

4. Plug the printer's power cord into the printer and into a wall outlet.

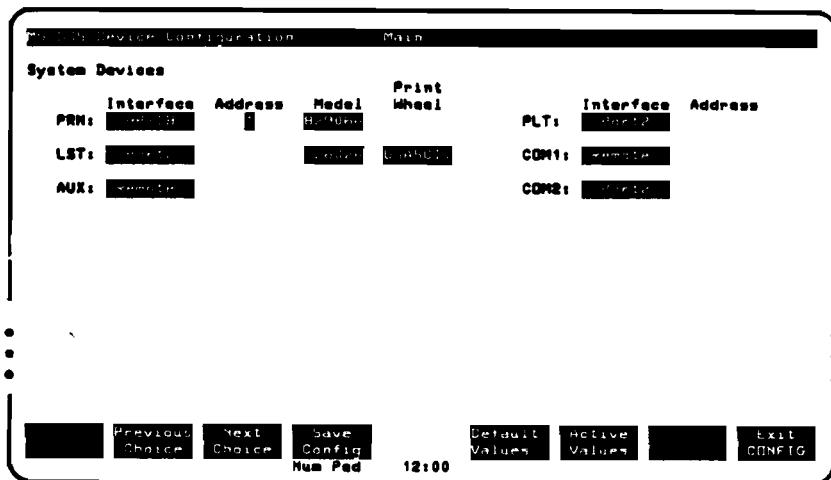
Setting the MS-DOS Device Configuration on your HP 150

The HP 150 MS-DOS Device Configuration has to reflect whether you have connected a Hewlett-Packard parallel printer, such as the HP 2225C, or one from another manufacturer. The configuration procedure is as follows.

These instructions assume the SYS_MASTER work disc is in disc drive A:.

1. Start at the P.A.M. menu..
2. Touch the box labeled **Device Config** and the **Start Setup** softkey.

This displays the MS-DOS Device Configuration menu. The figure below shows the top half of the menu, where the printers are configured.



3. Look at the line labeled PRN:. The Model box in this line has to be configured to show whether you are attaching an HP or non-HP parallel printer.

For HP printers, you can use any value except SPECIAL or OTHERS.

For non-HP printers, you MUST select SPECIAL.

Touch the Model box until it is highlighted. Touch the ~~Next Choice~~ softkey until the choice you want appears in the box.

4. You can leave the PRN: Interface, Address, and Print Wheel values as they are; Extended I/O does not use this information.

Adding the Parallel Printer Software to your SYS_MASTER Work Disc

The Extended I/O Accessory uses special software to talk to the parallel printer. This software must be added to your SYS_MASTER work disc before you can use the printer. If you don't have a SYS_MASTER work disc, see Appendix B for instructions on creating one. If your SYS_MASTER software has been installed on a fixed disc, you don't need to create a work disc; skip to Adding the Parallel Printer Software, instead.

The Extended I/O disc contains the special parallel printer software and an application, called EXTENDIO, for adding the software to your SYS_MASTER work disc. EXTENDIO can also be used to remove the parallel software from your disc, if you need to, later.

NOTE:

The parallel printer software and the HP-IL printer software cannot be present on your work disc at the same time. If the HP- IL software is on the disc when you add the parallel software, it will be removed automatically to make room for the parallel software.

Adding the Parallel Printer Software

When you add the parallel printer software to the SYS_MASTER work disc, EXTENDIO makes the parallel printer the HP 150's primary or PRN printer, overriding the current PRN Interface selection in the MS-DOS Device Configuration. If you were using an HP-IL printer, it will no longer be available to you.

You'll need your SYS_MASTER work disc and your Extended I/O disc. The SYS_MASTER work disc must not be write protected.

These instructions assume the SYS_MASTER work disc is in disc drive A: and the Extended I/O disc is in disc drive B:.

1. Start at the P.A.M. menu. If the EXTENDIO label is not on the menu, touch the **Second Disc** softkey.
2. Touch the **EXTENDIO** label and touch **Start Applic.**.

This displays the EXTENDIO menu. Take a minute to look at this menu.

Enter target disc name and press <RETURN>

TARGET DISC: []

STATUS: Parallel
HP-IL

After adding or deleting software, you must do a hard reset.

Select Target	Selects the drive for Parallel or HP-IL printer software. (Target disc must contain a copy of the system software.)
Add Parallel	Adds software to target disc for parallel printer use. Also removes HP-IL printer software, if present.
Add HP-IL	Adds software to target disc for HP-IL printer use. Also removes Parallel printer software, if present.
Delete	Removes Parallel or HP-IL software from target disc.

[Select Target] [Add Parallel] [Add HP-IL] [Delete] [Num Pad] 3 1 6:28 [Exit]

The message line at the top of the menu asks you to name the target disc. The target disc is the disc you want to add the software to, the SYS_MASTER work disc.

3. Type A and press |Return|.

This tells EXTENDIO that your SYS_MASTER work disc is drive A:. EXTENDIO writes A: in the TARGET DISC box near the top of the menu.

(If you want to change to another target disc later, you have to touch the Select Target softkey and type the name of the new target.)

4. Touch the Add Parallel softkey.

This adds the parallel printer software to the target disc and removes the HP-IL software, if it is present. The STATUS: line now reads

Parallel Present
HP-IL Not Present

5. Touch the Exit softkey.

You are returned to P.A.M.

6. Remove the Extended I/O disc and store it in a safe place.

7. Do a hard reset by holding down the |**Shift**| and |**CTRL**| keys and pressing the |**Reset**| keys. This tells the HP 150 the parallel printer is now the primary (PRN) printer.

When you start up the HP 150 from the SYS_MASTER work disc in the future, the software for the parallel printer will be started, too. As long as the software is on the disc, the previous PRN printer will not be accessible to the HP 150. If you want to use the previous PRN printer while the parallel printer is connected, you'll have to configure it as LST and send output for it to LST. (This does not apply to a previous HP-IL printer; an HP-IL printer always has to be the PRN printer.)

Checking if the Parallel Printer Software is on your Disc

You can use EXTENDIO if you ever want to check whether the parallel printer software is present on your SYS_MASTER work disc.

1. Start up EXTENDIO as described in *Adding the Parallel Printer Software*.
2. At the EXTENDIO menu type the name of the drive where the SYS_MASTER work disc is.
3. If the STATUS: line says **Parallel Present**, the software is present on the SYS_MASTER work disc.
4. If you want, you can now add or delete software by touching the appropriate softkey label.
5. Touch the **ESC** softkey to exit the application and return to P.A.M.
6. Remove the Extended I/O disc and store it in a safe place.
7. If you added or deleted software, do a hard reset of the HP 150 by holding down the |**Shift**| and |**CTRL**| keys while you press the |**Reset**| key. This tells the HP 150 you added or deleted software.

Deleting the Parallel Printer Software

If you ever permanently disconnect the parallel printer and remove the Extended I/O board, it would be a good idea to remove the parallel printer software from the SYS_MASTER work disc. Otherwise, the space taken up by the software will be wasted.

Use EXTENDIO to delete the parallel printer software from your SYS_MASTER work disc.

1. Start up EXTENDIO as described in *Adding the Parallel Printer Software*.
2. At the EXTENDIO menu type the name of the drive where the SYS_MASTER work disc is.
3. If the STATUS: line says **Parallel Present**, the software is present on the SYS_MASTER work disc.
4. Touch the **DELETE** softkey to remove the software from the disc.
The STATUS: line in the EXTENDIO menu is changed to
Parallel Not Present.
5. Touch the **QUIT** softkey to exit the application and return to P.A.M.
6. Remove the Extended I/O disc and store it in a safe place.
7. Do a hard reset by holding down the **[Shift]** and **[CTRL]** keys and pressing the **[Reset]** key. This tells the HP 150 that the parallel printer software has been removed.

If you now want to use a non-parallel printer, you may have to change the PRN: line in the MS-DOS Device Configuration.



Using the Parallel Printer with your HP 150

Now that you have connected your parallel printer, made the necessary MS-DOS Device Configuration changes, and added the parallel printer software, you can use the printer.

In most cases, using your parallel printer involves no more than turning it on, positioning the paper properly, and issuing the appropriate "print" command.

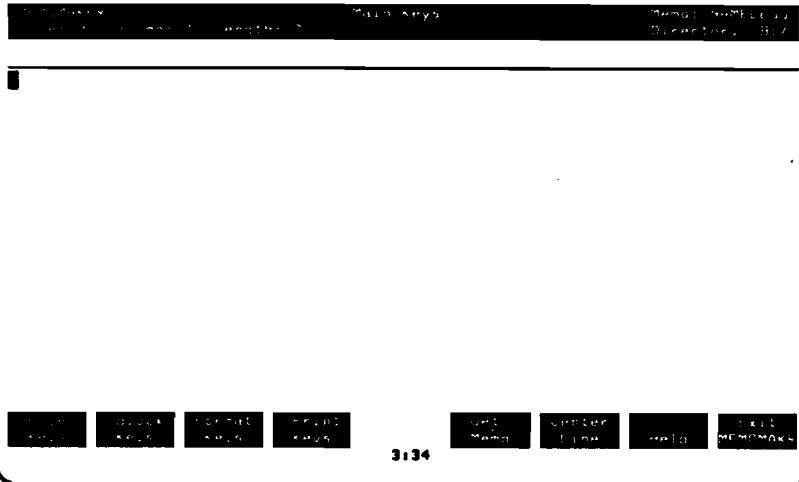
Your printer output must always be sent to the PRN printer if you want it to go to the parallel printer. Although some applications automatically assume you want your output to go to PRN, others need to be told explicitly to direct it to PRN. Also, some applications require you to tell them what kind of printer is connected to the PRN interface. Refer to the documentation for your application for further information.

Example—Printing with MemoMaker

The following example shows how to start the HP 150 Memomaker application and how to print the existing memo, PRICES, from it. The example assumes the SYS_MASTER work disc is in drive A: and the MemoMaker disc is in drive B:.

1. Turn on power to the printer.
2. Start at the P.A.M. menu. If the **MemoMaker** label is not on the menu, touch the **Second Disc** softkey.
3. Touch the **MemoMaker** label and touch **Start Applic.**.

This displays the MemoMaker Main menu.



4. Touch the **New Memo** softkey.

In the message line at the top of the menu you are prompted for the name of the memo: **Enter file name (or use File Manager).**

5. Type the name of the memo you want to get and press **[Return]**.

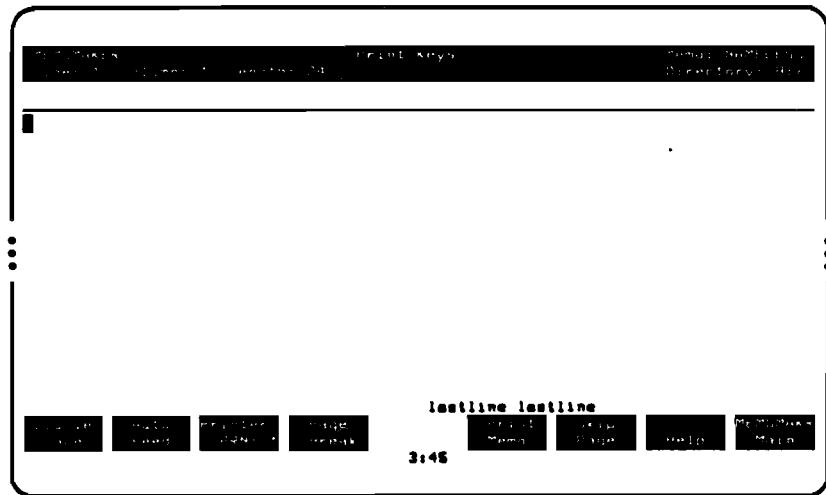
If the memo is on a drive different from drive B:, prefix the drive name to the memo name. For example, to get the memo **PRICES**, on drive C:, you would type

C:PRICES

The memo is displayed on the screen. The cursor is positioned at the beginning of the memo.

6. Touch the **Print Keys** softkey.

This displays the Print Keys menu.



7. Look at softkey label f3 located at the bottom of the menu (see the figure above). The label should say **PRINT MEMO**. If it says **PRINT PAGE** or **MEMOMAKER**, touch it once or twice until **PRINT MEMO** appears.
8. Touch the **PRINT MEMO** softkey.
MemoMaker prints your memo on the parallel printer (the current PRN printer).
9. Touch the **MEMOMAKER MEMO** softkey.
10. Touch the **EXIT MEMOMAKER** softkey.

CHAPTER THREE

CONNECTING AND USING YOUR HP-IL PRINTER

Connecting your HP-IL Printer

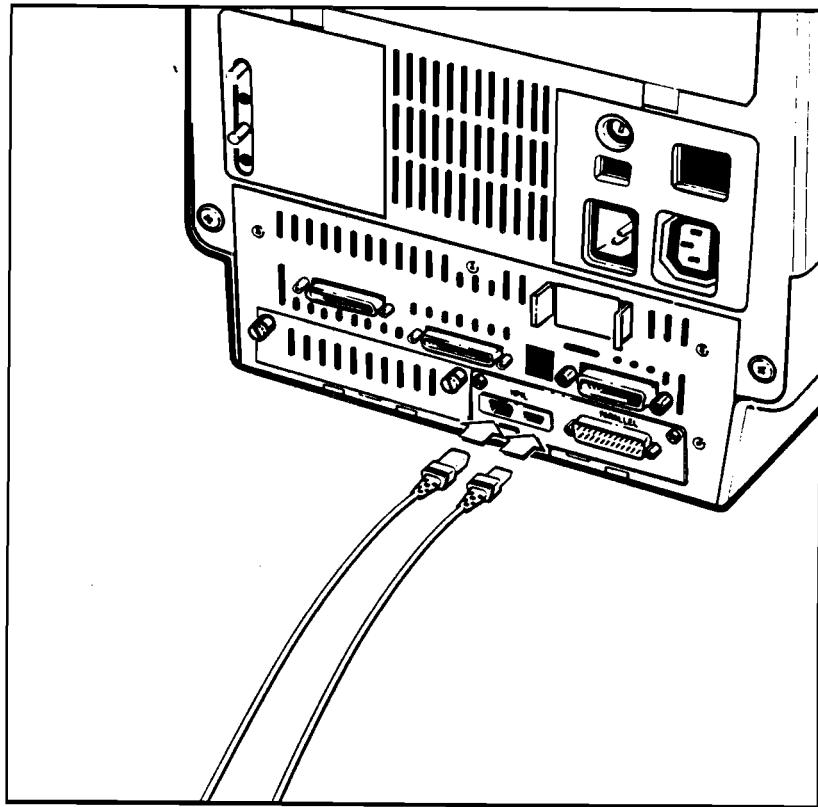
To connect an HP-IL printer to your HP 150, you have to connect the HP-IL cables and add the HP-IL printer software to your SYS_MASTER work disc.

Connecting the HP-IL Cables

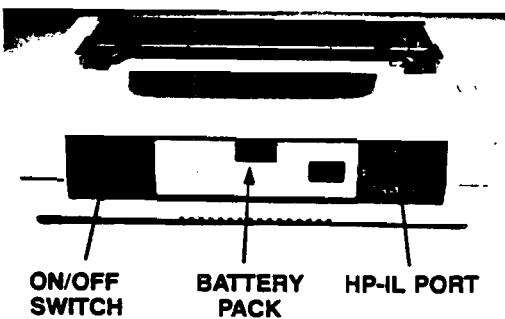
If the Extended I/O board has not been installed yet, you need to install it first. Refer to Chapter One for instructions.

Two HP-IL cables are required to connect the printer.

1. Turn off the HP 150 and the printer.
2. Plug each HP-IL cable into the HP-IL port on the HP 150 as shown on next page.



3. Plug the other end of each cable into the HP-IL port on the printer.



Adding the HP-IL Printer Software to your SYS_MASTER work Disc

The Extended I/O Accessory uses special software to talk to the HP-IL printer. This software must be added to your SYS_MASTER work disc before you can use the printer. If you don't have a SYS_MASTER work disc, see Appendix B for instructions on creating one. If your SYS_MASTER software has been installed on a fixed disc, you don't need to create a work disc; skip to Adding the Parallel Printer Software, instead.

The Extended I/O disc contains the special HP-IL printer software and an application, called EXTENDIO, for adding the software to your SYS_MASTER work disc. EXTENDIO can also be used to remove the HP-IL software from your disc, if you need to later.

NOTE:

The HP-IL printer software and the parallel printer software cannot be present on your work disc at the same time. If the parallel software is on the disc when you add the HP-IL software, it will be removed automatically to make room for the HP-IL software.

Adding the HP-IL Printer Software

When you add the HP-IL printer software to the SYS_MASTER work disc, EXTENDIO makes the HP-IL printer the HP 150's primary or PRN printer, overriding the current PRN Interface selection in the MS-DOS Device Configuration. If you were using a parallel printer, it will no longer be available to you.

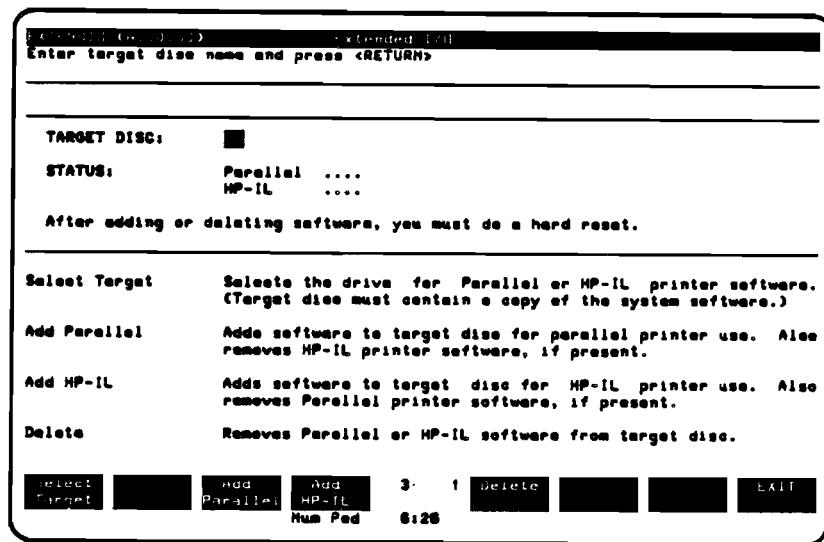
You'll need your SYS_MASTER work disc and your Extended I/O disc. The SYS_MASTER work disc must not be write protected.

These instructions assume the SYS_MASTER work disc is in disc drive A: and the Extended I/O disc is in disc drive B:.

1. Start at the P.A.M. menu. If the EXTENDIO label is not on the menu, touch the **Extend Disc** softkey.

2. Touch the **EXTENDIO** label and touch **Start Applic.**

This displays the EXTENDIO menu. Take a minute to look at this menu.



The message line at the top of the menu asks you to name the target disc. The target disc is the disc you want to add the software to, the SYS_MASTER work disc.

3. Type A and press **|Return|**.

This tells EXTENDIO that your SYS_MASTER work disc is drive A:. EXTENDIO writes A: in the TARGET DISC box near the top of the menu.

(If you want to change to another target disc later, you have to touch the **Select Target** softkey and type the name of the new target.)

4. Touch the **Add HP-IL** softkey.

This adds the HP-IL printer software to the target disc and removes the parallel software, if it is present. The STATUS: line now reads

Parallel ...Not Present
HP-IL ...Present

5. Touch the **EXIT** softkey.

You are returned to P.A.M.

6. Remove the Extended I/O disc and store it in a safe place.
7. Do a hard reset by holding down the **Shift** and **Ctrl** keys and pressing the **Reset** keys. This tells the HP 150 the HP-IL printer is now the primary (PRN) printer.

When you start up the HP 150 from the SYS_MASTER work disc in the future, the software for the HP-IL printer will be started, too. As long as the software is on the disc, the previous PRN printer will not be accessible to the HP 150. If you want to use the previous PRN printer while the HP-IL printer is connected, you'll have to configure it as LST and send output for it to LST. (This does not apply to a previous parallel printer; a parallel printer always has to be the PRN printer.)

Checking if the HP-IL Printer Software is on your Disc

You can use EXTENDIO if you ever want to check whether the HP-IL printer software is present on your SYS_MASTER work disc.

1. Start up EXTENDIO as described in **Adding the HP-IL Printer Software**.
2. At the EXTENDIO menu type the name of the drive where the SYS_MASTER work disc is.
3. If the STATUS: line says HP-IL Present, the software is present on the SYS_MASTER work disc.
4. If you want, you can now add or delete software by touching the appropriate softkey label.
5. Touch the **EXIT** softkey to exit the application and return to P.A.M.
6. Remove the Extended I/O disc and store it in a safe place.
7. If you added or deleted software, do a hard reset of the HP 150 by holding down the **Shift** and **Ctrl** keys while you press the **Reset** key. This tells the HP 150 you added or deleted software.

Deleting the HP-IL Printer Software

If you ever permanently disconnect the HP-IL printer and remove the Extended I/O board, it would be a good idea to remove the HP-IL printer software from the SYS_MASTER work disc. Otherwise, the space taken up by the software will be wasted.

Use EXTENDIO to delete the HP-IL printer software from your SYS_MASTER work disc.

1. Start up EXTENDIO as described in **Adding the HP-IL Printer Software**.
2. At the EXTENDIO menu type the name of the drive where the SYS_MASTER work disc is.
3. If the STATUS: line says HP-IL Present, the software is present on the SYS_MASTER work disc.
4. Touch the **DELETE** softkey to remove the software from the disc.

The STATUS: line in the EXTENDIO menu is changed to HP-IL Not Present.

5. Touch the **QUIT** softkey to exit the application and return to P.A.M.
6. Remove the Extended I/O disc and store it in a safe place.
7. Do a hard reset by holding down the **[Shift]** and **[Ctrl]** keys and pressing the **[Reset]** key. This tells the HP 150 that the HP-IL printer software has been removed.

Using the HP-IL Printer with your HP 150

Now that you have connected your HP-IL printer and added the HP-IL printer software, you can use the printer.

In most cases, using your HP-IL printer involves no more than turning it on, positioning the paper properly, and issuing the appropriate "print" command.

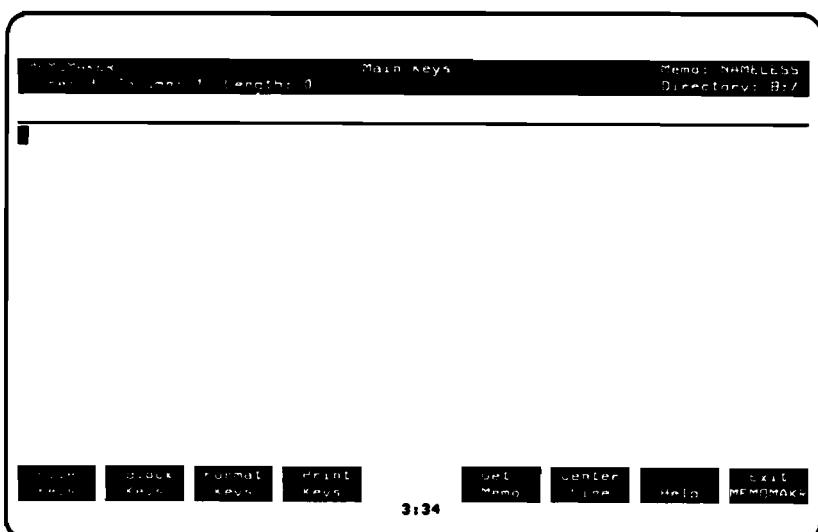
Your printer output must always be sent to the PRN printer if you want it to go to the HP-IL printer. Although some applications automatically assume you want your output to go to PRN, others need to be told explicitly to direct it to PRN. Also, some applications require you to tell them what kind of printer is connected to the PRN interface. Refer to the documentation for your application for further information.

Example—Printing with MemoMaker

The following example shows how to start the HP 150 Memomaker application and how to print the existing memo, PRICES, from it. The example assumes the SYS_MASTER work disc is in drive A: and cAe MemoMaker disc is in drive B:.

1. Turn on power to the printer.
2. Start at the P.A.M. menu. If the **MemoMaker** label is not on the menu, touch the **Rebuild Diracn** softkey.
3. Touch the **MemoMaker** label and touch **Start applic.**.

This displays the MemoMaker Main menu.



4. Touch the **Get Memo** softkey.

In the message line at the top of the menu you are prompted for the name of the memo: **Enter file name (or use File Manager)**.

- Type the name of the memo you want to get and press **[Return]**.

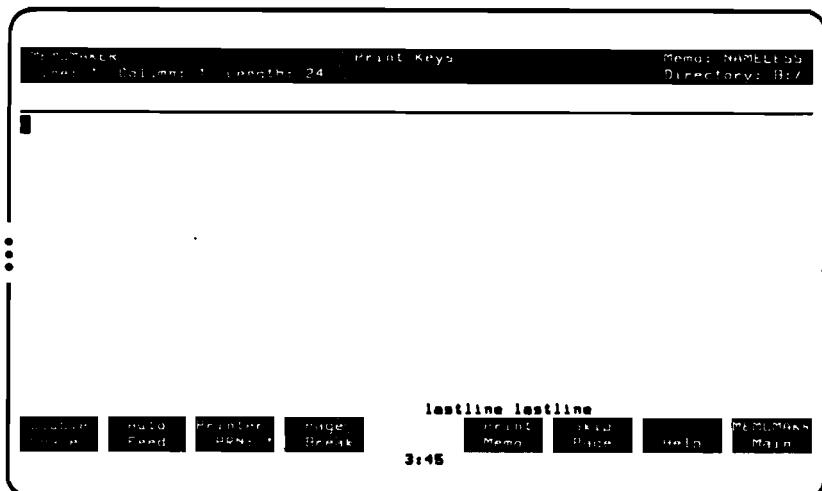
If the memo is on a drive different from drive B:, prefix the drive name to the memo name. For example, to get the memo **PRICES**, on drive C:, you would type

C:PRICES

The memo is displayed on the screen. The cursor is positioned at the beginning of the memo.

- Touch the **[Print Keys]** softkey.

This displays the Print Keys menu.



- Look at softkey label f3 located at the bottom of the menu (see the figure above). The label should say **[PRINT]**. If it says **[PRINT]** or **[PRINT]**, touch it once or twice until **[PRINT]** appears.

- Touch the **[Print Page]** softkey.

MemoMaker prints your memo on the HP-IL printer (the current PRN printer).

- Touch the **[MemоМaker Main]** softkey.

- Touch the **[Exit MEMOMAKER]** softkey.

CHAPTER FOUR

CONNECTING YOUR HP 150 TO AN HP 110 AND USING IT WITH THE HP 110

You can connect your HP 150 to an HP 110 and use the HP 150's disc drives, primary printer, and display from the HP 110. When you do this, the HP 150 and its devices become peripheral equipment to the HP 110.

Using your HP 150 with your HP 110 you can—

- Transfer data between the HP 150 disc drives and the HP 110 electronic disc or any HP-IL disc drives attached to the HP 110.
 - Edit HP 150 files from the HP 110 and save the results on an HP 150 disc, the HP 110 electronic disc, or an HP 9114A HP-IL disc.
 - Print to the HP 150 primary printer (PRN printer) from the HP 110. You don't need a separate printer for your HP 110.
 - Display files on the HP 150 screen. The HP 150's larger screen makes viewing of files easier.
-

NOTE:

The HP 150 cannot be used with the HP 110 if the HP-IL printer software is on your SYS_MASTER work disc. If the software is on your disc, delete it as explained in Chapter Three.

Connecting your HP 150 to an HP 110

Connecting your HP 150 to an HP 110 involves plugging in HP-IL cables and changing the HP 110 System Configuration to reflect the HP 150 peripheral equipment. You connect the HP 150 peripheral equipment to the HP 150 in the same way as when the HP 150 is not used with the HP 110.

There are two basic HP 150-HP 110 connection arrangements. In the first, the HP 150 is attached to the HP 110 as the sole HP-IL device; there are no other devices attached by means of HP-IL cables to the HP 110. This is called the "simple HP 150-HP 110 connection". In the second arrangement, there are other HP-IL devices; in addition to the HP 150 and the HP 110, there might be an HP 2225B ThinkJet Printer, an HP 9114A Microfloppy Disc Drive, and/or the HP-IL version of an HP 7470A Plotter. This arrangement is called the "multiple device connection".

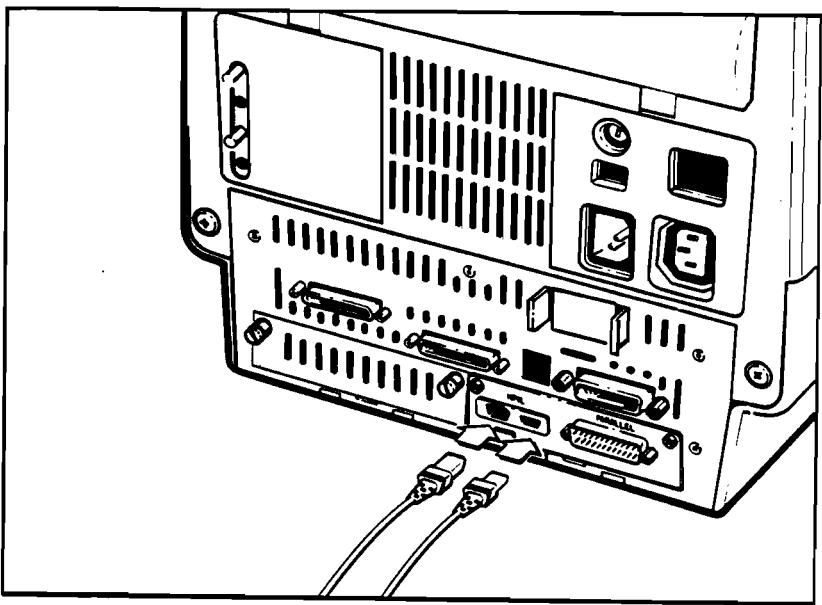
Connecting the HP-IL Cables

Simple HP 150-HP 110 Connection

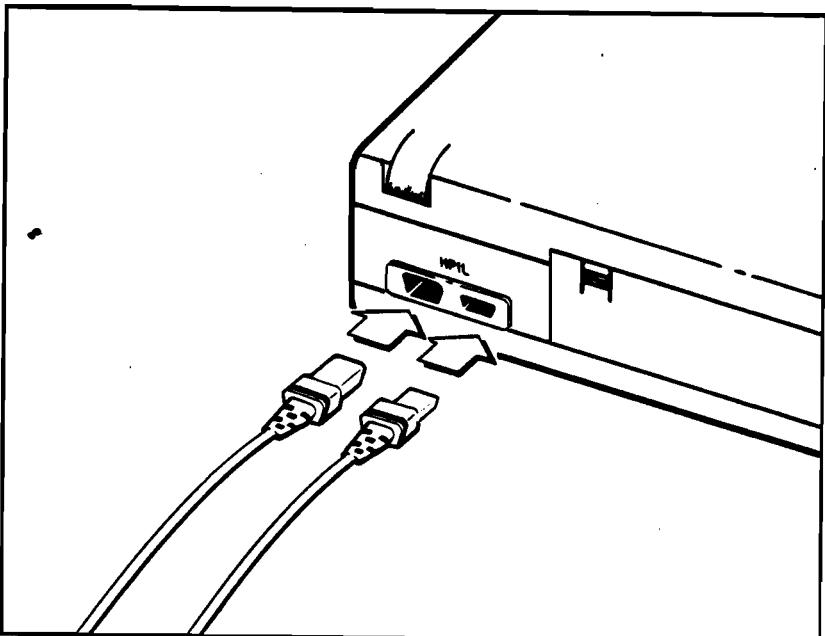
If the Extended I/O board is not installed yet, you need to install it first. Refer to Chapter One for instructions.

Two HP-IL cables are required to make this connection.

1. Turn off the HP 150 and the HP 110.
2. Plug each HP-IL cable into the HP-IL port on the HP 150 as shown on next page.



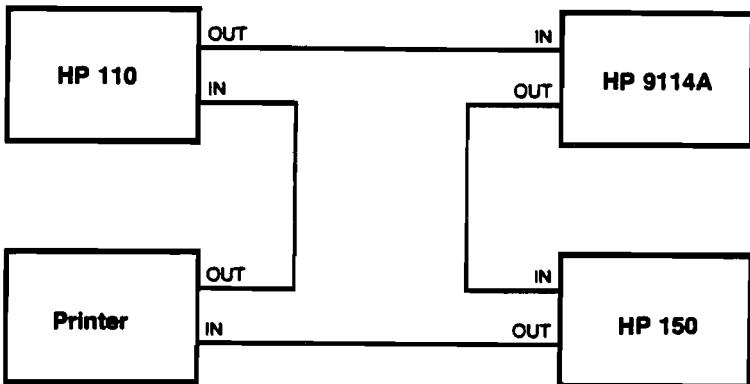
3. Plug the other end of each cable into the HP-IL port on the HP 110.



Multiple Device Connection

If the Extended I/O Board is not installed yet, you need to install it first. Refer to Chapter One for instructions.

In the multiple-device connection, the HP 150 and one or more other HP-IL device are connected together with the HP 110 in a closed "loop". A representative loop is shown below. The loop is being opened between the HP 9114A Disc Drive and the HP 2225B ThinkJet Printer so the HP 150 can be connected there.



It is important to plan where you are going to place the HP 150 in a loop because the HP 110 talks to the devices in the loop in sequence. The sequence proceeds outward from the HP-IL "OUT" connector on the HP 110. The device attached directly to this connector (the HP 9114A Disc Drive in the figure above) is first in the sequence, the next device in the loop is second, and so on.

Because of this "talking sequence", there are two things you have to consider when you connect your HP 150 in the loop. First, if the HP 150 has a PRN printer, the HP 110 will only have access to the printer if it is positioned ahead of an HP-IL printer (an HP 2225B ThinkJet) in the loop. Secondly, if there is an HP-IL disc drive (an HP 9114A) in the loop, your HP 150 has to be positioned after the drive, or the drive will not work.

To connect your HP 150 between an HP 9114A Disc Drive and an HP 2225B Printer, as shown in the illustration above—

1. Turn off the HP 150, the HP 110, and all its HP-IL peripheral devices.

2. Unplug the HP-IL cable from the IN connector on the HP 2225B and plug this cable into the HP-IL IN connector on your HP 150.
3. Plug an unused HP-IL cable into the OUT connector on the HP 150. Plug the other end of the cable into the IN connector on the HP 2225B.
4. Check that all the cables in the loop are properly plugged in. The loop will not work if it is disconnected at some point.

This completes connection of the HP 150. You can remove devices from the loop, add devices to the loop, or rearrange devices and cables whenever necessary. Be sure to remember the two ordering restrictions (the HP 9114A ahead of the HP 150 and the HP 150 ahead of the HP 2225B) and remember to turn off the power to all the devices before you plug in all the necessary cables.

Changing the HP 110 System Configuration

The HP 110's System Configuration has to reflect the HP 150's printer and disc drives, or the HP 110 will not be able to use them. The system configuration procedure is explained in the *HP 110 Portable Computer Owner's Manual*.

On the HP 110, configure

- Printer Interface: HP-IL
- External Disc Drives: Enter the number of HP-IL disc drives attached to the HP 110 plus the number of disc drives connected to the HP 150.



Using the HP 150 with the HP 110

When you use the HP 150 and HP 110 together, you do all your work at the HP 110. You run applications and enter all commands at the HP 110. The HP 150's display, its primary printer (the PRN printer), and its disc drives are accessible from the HP 110, only.

Begin by turning on all HP-IL devices connected to the HP 110, including the HP 150. Turn on any HP 150 equipment you want to use.

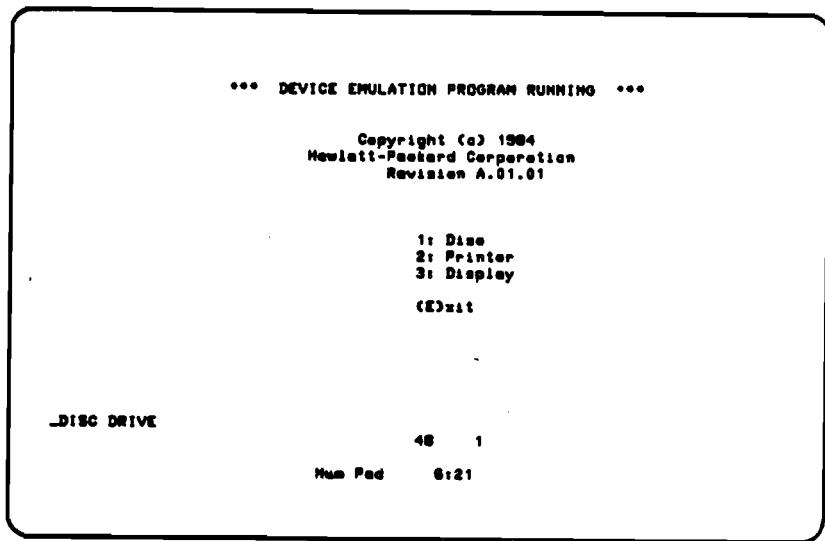
Running HPLINK

HPLINK is a program on your Extended I/O disc that places the HP 150 under the control of the HP 110. The program also turns off all keys in the HP 150 keyboard except the 1, 2, 3, and E keys. Your HP 150 remains in this state until you exit the program.

This example assumes the SYS—MASTER work disc is in disc drive A: and the Extended I/O disc is in disc drive B:.

1. Start at the P.A.M. menu. If the **HPLINK** box is not on the menu, touch the **Extended Disc** softkey.
2. Touch **HPLINK** and then touch the **Start Applic** softkey box.

This displays the HPLINK menu.



The menu remains on the screen until you exit the program.

3. To make a selection, type 1, 2, 3, or E.

Choices 1, 2, and 3 are discussed under **Using the HP 150 Disc Drives**, **Using the HP 150 Primary Printer**, and **Using the HP 150 Display**, respectively. The current selection is indicated at the lower left of the menu; whenever you start HPLINK, it is always **DISC DRIVE**. If you select 2 or 3, the message changes to reflect your choice.

E exits the program and returns you to P.A.M.

Using the HP 150 Disc Drives

To use the HP 150 disc drives, type 1 on the HP 150 keyboard. This changes the selection label at the lower left of the HPLINK menu to DISC DRIVE and the disc drives become accessible to the HP 110. The HP 110 assigns its own names to the HP 150 disc drives as described below.

HP 110 Conventions for Naming Disc Drives

1. The HP 110's left and right internal electronic discs are A: and B:, respectively.
2. The HP-IL disc drive(s) and the disc drives attached to the HP 150 are named following the "talking" sequence described earlier.

Say, for example, an HP-IL disc drive is first in the sequence, followed by your HP 150 with its two disc drives, A: and B:. The HP 110 will name the HP-IL disc drive "C:" and disc drives A: and B: on your HP 150 will be renamed "D:" and "E:", respectively. This is shown below.

HP 110 electronic discs	A : → A :
	B : → B :
HP-IL disc drive	→ C :
HP 150 disc drives	A : → D :
	B : → E :

You need to use the HP 110's disc drive names when you tell the HP 110 where to find or where to place a file.

Disc Operations you can Perform

Working at the HP 110, you can perform a number of operations with files on the HP 150 disc drives. The operations all fall in the category of "reading" from or of "writing" to the disc drives. Examples are included at the end of this chapter.

Using the HP 150 Primary Printer

In order to use the HP 150 primary (PRN) printer, these conditions must be met:

- the HP 150 printer must be ahead of any other printer in the HP-IL talking sequence
- the file you want to print must be on disc A: or an HP-IL disc drive

The steps for printing are—

1. Turn on the printer.
2. Select the PRINT option on the HPLINK menu by typing 2.
3. At the HP 110 issue the appropriate "print" command for the application program you are running.

Using the HP 150 Display

You can display a file from the HP 110 on the HP 150 screen. The file you want to display must be on disc A: or on an HP-IL disc drive.

1. Select the SCREEN option on the HPLINK menu by typing 3.
2. Enter the appropriate Print command for the application program you are running.

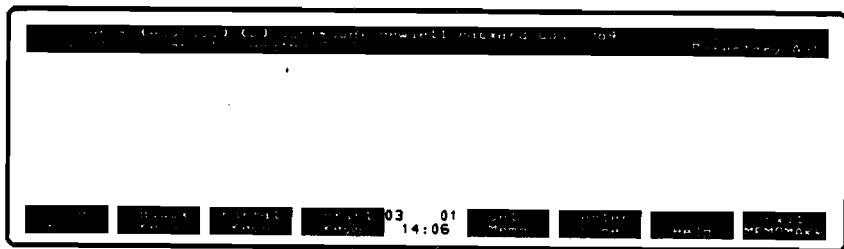
Examples with MemoMaker

Example One—Copying a Memo from the HP 150 to the HP 110

The following example shows how to start MemoMaker on the HP 110 and copy a memo named PRICES from the HP 150 to the HP 110. PRICES is on a disc you will insert in HP 150 disc drive B:. The HP 110 knows this disc drive as "E:".

At the HP 110— 1. On the HP 110 P.A.M. menu, select MemoMaker and then Start Applic..

This displays the main MemoMaker menu.



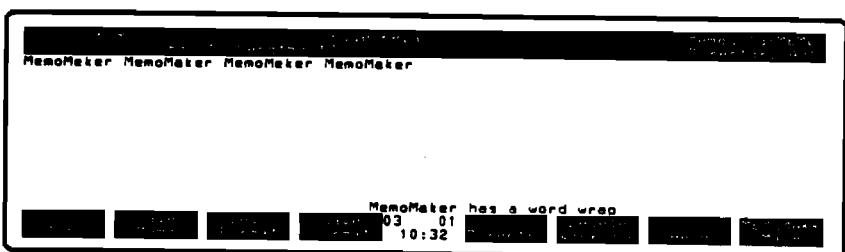
- At the HP 150—
2. Start at the P.A.M. menu.
 3. Insert the Extended I/O disc in the HP 150's disc drive B:.
 4. Touch the **Extended Disc** softkey.
 5. Touch the **DISC** box.

This displays the HPLINK menu. The selection message at the lower left indicates **DISC DRIVE**.
 6. Remove the Extended I/O disc.
 7. Insert the your data disc (the one with memo PRICES on it) in the HP 150's disc drive B:.
- At the HP 110—
8. On the HP 110 MemoMaker main menu, select **Enter Memo** by pressing f5.

This displays the message **Enter file name**.
 9. Type **E:PRICES** and press **|Return|**.

This transfers the memo to the HP 110. If you want to save the memo, continue with the next step.
 10. Press softkey f1 to select **File Keys**.

This displays the File Keys menu.



11. Press f2 **Save Memo**.

This displays the message **Enter file name**.

12. Type PRICES and press **|Return|**.

PRICES is now on the HP 110's disc A:.

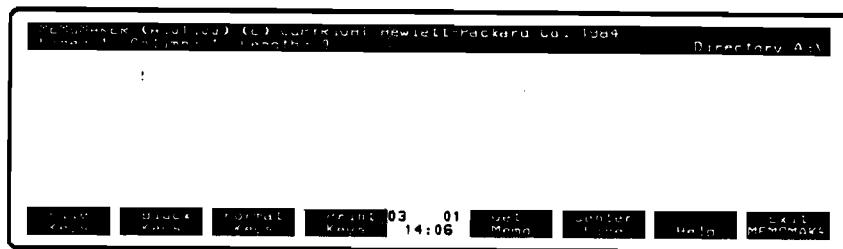
Example Two—Copying a Memo from the HP 110 to the HP 150

In this example, the memo PLANS is copied from the HP 110 to a disc in the HP 150's disc drive A:. Disc drive A: is known to the HP 110 as disc drive "D:".

At the HP 110— 1. On the HP 110 P.A.M. menu, select

MemoMaker and then **Start Applic.**

This displays the main MemoMaker menu.



At the HP 150— 2. Start at the P.A.M. menu.

3. Insert the Extended I/O disc in the HP 150's disc drive B:.

4. Touch the **Reread Discs** softkey.

5. Touch the **HPLINK** box.

This displays the HPLINK menu. The selection message at the lower left indicates **DISC DRIVE**.

6. Remove the Extended I/O disc.

At the HP 110— 7. On the HP 110 MemoMaker main menu, select **Get Memo** by pressing f5.

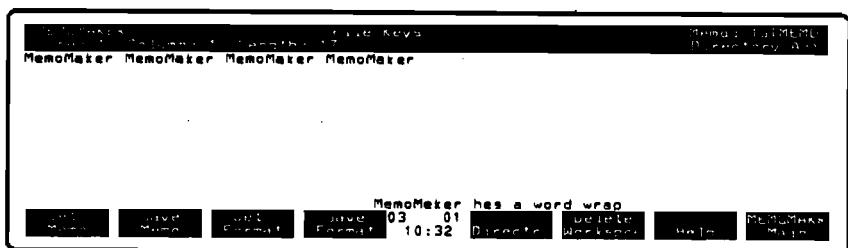
This displays the message **Enter file name**.

8. Type **PLANS** and press |Return|.

This displays the memo on the HP 110.

9. Press softkey **f1** to select **File keys**.

This displays the File Keys menu.



10. Press **f2** to select **Save Memo**.

This displays the message **Enter file name**.

11. Type **D:PLANS** and press |Return|.

The memo is copied to the HP 150 disc.

Example Three—Printing an HP 110 Memo on the HP 150's Printer

In this example the memo FORECAST, which exists on HP 110 disc A:, is printed on the HP 150 PRN printer. The HP 150 printer is connected ahead of any other printer in the HP-IL loop.

At the HP 110— 1. On the HP 110 P.A.M. menu, select

MemоМaker and then **Start Applc**.

This displays the main MemоМaker menu.



At the HP 150— 2. Start at the P.A.M. menu.

3. Insert the Extended I/O disc in the HP 150's disc drive B:.

4. Touch the **Reread Discs** softkey.

5. Touch the **HPLINK** box.

This displays the HPLINK menu. The selection message at the lower left indicates **DISC DRIVE**.

6. Remove the Extended I/O disc.

7. Type **2** to select the printer option.

The selection message now indicates **PRINTER**.

8. Turn on the power to the printer.

At the HP 110— 9. On the HP 110 MemoMaker main menu, select **Get Memo** by pressing **f5**.

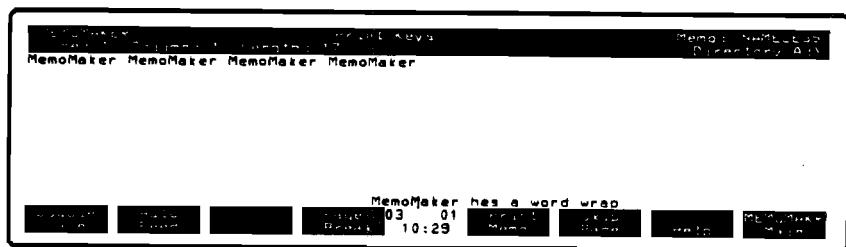
This displays the message **Enter file name**.

10. Type **FORECAST** and press **[Return]**.

The memo is displayed on the HP 110 screen.

11. Select **Print Keys** by pressing **f4**.

The Print Keys menu is displayed.



12. Press **f5** to select **Print Memo**.

The memo **FORECAST** is now printed on the HP 150 printer.

APPENDIX A

GLOSSARY

Board	A printed circuit board. A thin, rectangular piece of plastic with electronic components (pieces) on one side. The main part of the Extended Input/Output Accessory is a board.
Cable	A bundle of wires covered by plastic insulation and having a plug at each end. A cable is used to connect two devices; you plug one end into one device and the other end into the other device.
Configuration	Information recorded in the HP 150 or the HP 110 that tells it what kinds of devices are connected to it and by what names they are referred to. For example, the printer connected to the Extended Input/Output board is always referred to as "PRN".
Configure	To tell the HP 150 or HP 110 what kind of configuration you want it to have.
Connector	A plug or a receptacle for a plug.
Device	A piece of equipment, a machine. Examples are the HP 150, the HP 110, a printer, a plotter. Cables and boards, although they are equipment, are not considered devices.

Disc	A magnetic medium for storing software and information.
Hard Reset	An action that returns the HP 150 to its "power-on" state. You do a hard reset by holding down the [Shift] and [CTRL] keys and pressing the [Reset] key.
HP-IL	Hewlett-Packard Interface Loop. Is a standard for connecting Hewlett-Packard devices together in a loop. The devices all have HP-IL ports and are hooked together by means of special HP-IL cables which are plugged into the HP-IL ports. HP-IL also refers to the loop formed by hooking these devices together.
HP-IL Device	A device that has an HP-IL port. HP-IL devices can be hooked together in an HP-IL.
Loop	A closed circle. A series of cables and equipment hooked together in such a way that they form a complete circuit. For example, the HP 150, the printer, and the HP 110 shown below are connected in a loop—
	HP 110
	printer HP 150
LST	The configuration name for the HP 150's secondary printer. Any output sent to the secondary printer has to be sent to "LST".
Parallel Printer	A type of printer that can be connected to the HP 150 by means of a cable with a Centronics-style plug.

Peripheral Device	A device that is connected to a computer and used from the computer. For example, printers and disc drives are peripheral devices. Equivalent terms are "peripheral equipment" and "peripheral".
Port	A receptacle, usually on the back of a device, that you plug a cable into. A port is an entry and exit point for information being passed to and from a device (analogous to a port through which goods are shipped to and from a country).
Printed Circuit Board	See Board.
PRN	The configuration name for the HP 150's primary printer. Any output for the primary printer has to be sent to "PRN". (Most applications automatically send their output to PRN.)
Software	The instructions recorded on a disc that tell the computer and other devices what to do and how to do it. Your computer will not run without software. All programs are software.
Talking Sequence	The order in which the HP 110 communicates with devices connected to it on an HP-IL loop. The sequence progresses outward from the OUT HP-IL port on the HP 110.
Target Disc	Term used in conjunction with the EXTENDIO program. The target disc is the SYS_MASTER work disc you are adding the software to.



APPENDIX B

PREPARING YOUR SYS_MASTER WORK DISC

A SYS_MASTER work disc is a disc with a copy of your operating system on it. It is a good idea to create a work disc for routine use and keep the original SYS_MASTER as a backup.

The procedure described in this appendix is for use with flexible discs. Under only one condition should it be used with fixed discs—if you want to erase all the data currently on the fixed disc.

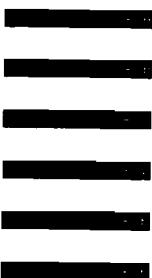
CAUTION

The following process involves formatting the disc you want to use as the work disc; this erases the contents of the disc. If the contents are important, copy them to another disc before formatting, or use another disc.

This example assumes the original SYS_MASTER disc is in drive A:, and your work disc is in drive B:.

1. At the P.A.M. menu touch the **Format A** box and touch **Start Apply**. This displays the FORMAT menu.

Select and insert disc(s) and press Start Format or Start Clear.

DISC LABEL - DISC DRIVE

Press Next/Prev to see more discs

HP Format*	IBM 3/4G Format	Copy System Num Pad	3	1	Start Format	Start Clear			EXIT FORMAT
------------	-----------------	---------------------	---	---	--------------	-------------	--	--	-------------

10:05

2. Touch the **Copy System** label until an asterisk (*) appears.

3. Touch the label for DISC DRIVE B.

This highlights the label.

4. Type the words **SYSTEM work** in the label.

5. Touch the softkey label **Start Format**.

The FORMAT application reads the system files. When it is done, at the top of the menu it displays the message **All system files have been read. Insert disc(s) to be formatted. Press <Return> to continue.**

6. Press **|Return|**.

When the work disc has been created, the message **Operation complete. Press Start Over to re-select disc(s)** appears at the top of the screen.

7. Touch the **Exit Format** softkey label.

8. Do not write protect the work disc.

APPENDIX C

MEMORY USAGE BY THE EXTENDED I/O SOFTWARE

Parallel Printer Software

The parallel printer software occupies approximately 2000 bytes of space on your SYS_MASTER work disc; this means the free space on the disc is reduced by 2000 bytes when you add the software.

When you start up the HP 150 with the work disc, the 2000 bytes of parallel printer software are copied into user memory on the HP 150. This means available memory space is reduced by this number of bytes.



HP-IL Printer Software

The HP-IL printer software occupies approximately 10,000 bytes of space on your SYS_MASTER work disc; this means the free space on the disc is reduced by 10,000 bytes when you add the software.

When you start up the HP 150 with the work disc, the 10,000 bytes of HP-IL printer software are copied into user memory on the HP 150. This means available memory space is reduced by this number of bytes.



APPENDIX D

ERROR MESSAGES

ASSOCIATED WITH EXTENDIO

Cannot access target disc properly.

Probable cause: Dirt or dust in disc, or disc drive is not working right.

Correction: Try again.
Try with a different disc.
Try disc in a different drive.
If none of these steps work, contact your Hewlett-Packard representative.

Insufficient space on the target disc.

Probable cause: There is not enough room on your target disc for the HP-IL or parallel printer software.

Correction: Delete some files from the disc or try another SYS_MASTER work disc.

Invalid target disc name.

Probable cause: You typed a disc name other than A: through L: or a: through l:.

Correction: Type a valid disc name.

Must select a target disc.

Probable cause: You have not indicated a target disc.

Correction: Type the target disc drive name and press **[Return]**.

Target disc is not a SYS_MASTER disc.

Probable cause: The disc in the target drive does not have the operating system software on it.

Correction: Insert a SYS_MASTER disc and try again.

Target disc drive is not ready.

Probable cause: There is no disc in the target drive.

Correction: Insert a disc and try again.

Target disc is write protected.

Probable cause: The write protect tab on the disc is in the protected position.

Correction: Slide tab to unprotected position (away from edge of disc) and try again.

Too many entries in CONFIG.SYS file.

Probable cause: Too many entries in the CONFIG.SYS file.

Correction: Delete some entries from your HP 150 configuration(s). Try again.

Re-configure your HP 150 using your original SYS_MASTER disc. Create a new SYS_MASTER work disc. Try EXTENDIO again.

APPENDIX E

EXTENDIO TEST

Included with the Extended I/O Accessory is a simple troubleshooting application called EXTENDIO TEST. This application allows you to test your Extended I/O board and the printer connection. Test failures are reported with messages identifying the specific problem(s) discovered.

There are two tests that can be performed by the user, HP-IL Test, and Parallel Printer Test. A third test, Parallel Loopback Test, appears on the EXTENDIO TEST menu. This test is for use by Hewlett-Packard service personnel.

Using The Extendio Test

You should complete installation of the Extended I/O board and connection of your printer before running this test.

1. Insert the Extended I/O disc in a drive.
2. On the P.A.M. menu touch **Reread Discs**. Then touch **EXTENDIO TEST** and **Start Applic.**.

This displays the EXTENDIO TEST menu—

Select the test to perform.



3. To test the Extended I/O board and the HP-IL connection, touch **HP-IL**. To test the Extended I/O board and the parallel printer connection, touch **Parallel Printer**. The Parallel Loopback option is for trained service personnel.
4. EXTENDIO TEST runs its tests and displays its results on the screen. The results are explained under **TEST RESULTS**.
5. To exit the application, touch **EXIT**.

Test Results

HP-IL

- HP-IL loop is OK.

Number of devices in HP-IL loop: —

EXTENDIO TEST found no problem with the board or the HP-IL loop. It counted — devices in the loop.

- HP-IL loop is broken. (Are all devices powered on?)

EXTENDIO TEST found a break in the loop. Check that all devices are powered on and that the cables are all plugged in properly. The cables and devices must be connected together in a complete loop (in a closed circuit). Run the test again.

If this message appears again, loop the HP 150 HP-IL port back on itself by plugging the same cable into the IN and OUT connectors. Run the test again.

- The Extended I/O board is not working properly.

The Extended I/O board failed the test. Make sure the board has been installed properly. If the board has been properly installed and it still fails, contact your dealer or your Hewlett-Packard service representative.

Parallel Printer

- Parallel Printer Test passed.

EXTENDIO TEST found no problem with the board or the parallel printer connection. Also, the printer reported no problem.

- The printer cable is not connected properly.

Make sure both ends of the cable are firmly connected to the proper connectors at the HP 150 and printer. If the test still fails, the cause may be an incorrect or damaged cable or a damaged connector.

- The printer is not turned on.

Turn on the printer and try again.

- The printer is out of paper.

Add paper to the printer. If it has paper, this error may be due to the paper being loaded improperly.

- **The printer is off-line.**

Set the printer on-line by pushing its "on-line" button or switching its "on-line" switch.

- **The printer has reported an error. Check printer.**

Check printer's error indicator lights. Turn printer off and on again, or reset printer. Run the test again.

- **The Extended I/O board is not working properly.**

The Extended I/O board failed the test. Make sure the board has been installed properly. If the board has been properly installed and it still fails, contact your dealer or your Hewlett-Packard service representative.

APPENDIX F

PARALLEL PRINTER CABLE SPECIFICATIONS

Connector Specifications

The Centronics connector must be a 36-pin blue ribbon male.

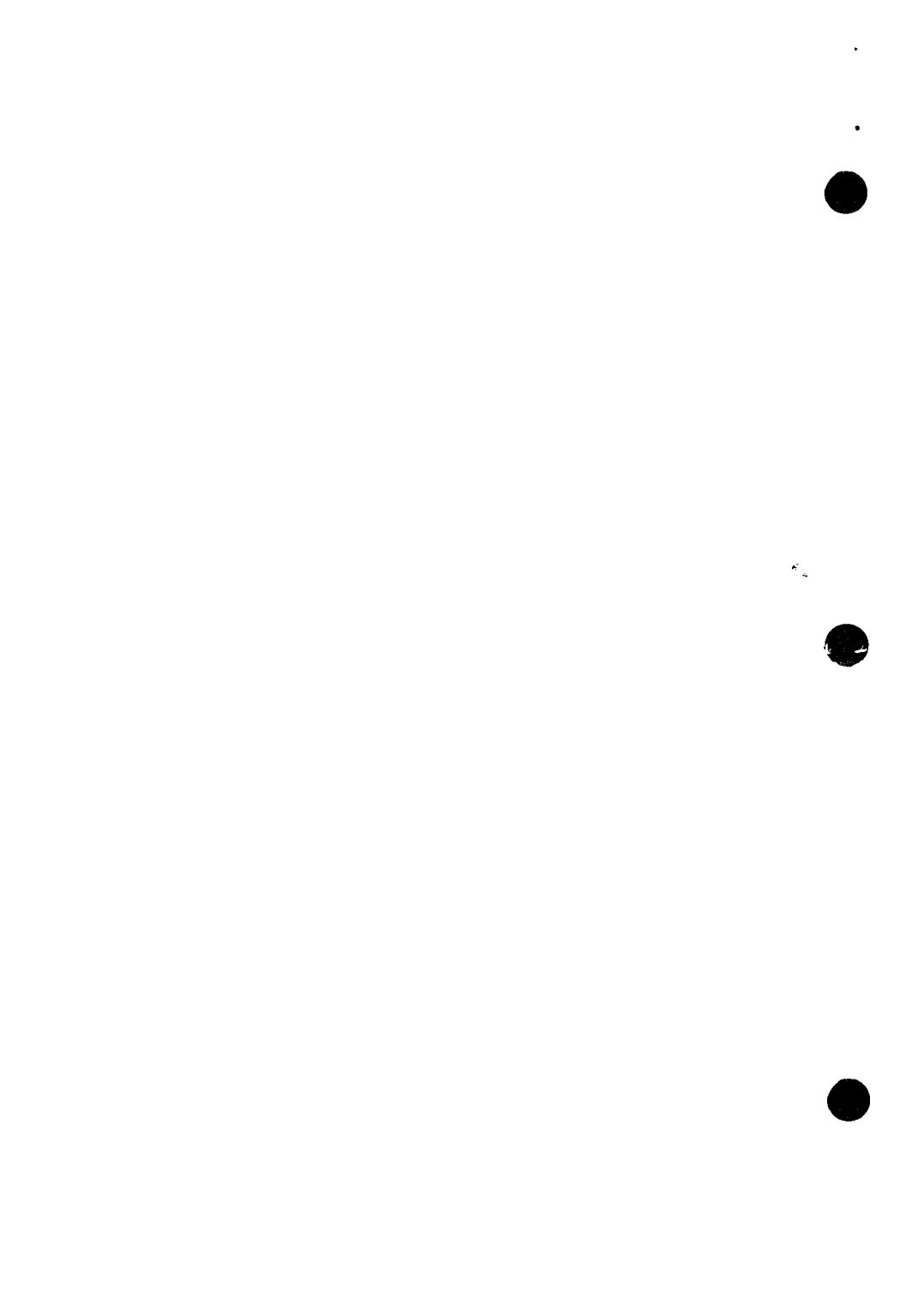
The HP 150 connector must be a 25-pin D-sub female.

Pinouts

Pin Number 25 Pin	36 Pin	Signal Name	Source	Description of Signal
1	13	SELECT	Printer	When High, printer is selected, or on-line.
2	12	PAPER EMPTY	Printer	When High, printer is out of paper.
3	11	BUSY	Printer	When High, printer cannot receive data.
4	10	-ACKNLG	Printer	Low pulse indicates data has been received by the printer.
5	9	DATA 8	HP 150	DATA 8 through DATA 1 are input data lines. High represents binary one, Low binary zero.
6	8	DATA 7	HP 150	
7	7	DATA 6	HP 150	
8	6	DATA 5	HP 150	
9	5	DATA 4	HP 150	
10	4	DATA 3	HP 150	
11	3	DATA 2	HP 150	
12	2	DATA 1	HP 150	
13	1	-DATA STROBE	HP 150	Low pulse is used to clock data from HP 150 to printer.
14	30	PRT_GND	Printer	Used by HP 150 to determine if printer is connected.
15	29	GND	Printer	HP 150 pins 15 through 21 have been defined as the data line twisted pair grounds.
16	27	GND	Printer	
17	25	GND	Printer	
18	23	GND	Printer	
19	21	GND	Printer	
20	19	GND	Printer	
21	33	GND	Printer	Epson and IBM tie to ground.
22	36	-SLCT IN	HP 150	Epson and IBM define as -SLCT_IN. (Low level selects printer).
23	31	-INPUT PRIME (-INIT)	HP 150	Low level clears printer buffer and sets printer to power-on state.
24	32	-ERROR	Printer	Low level indicates a fault condition, such as printer out of paper.
25	14	-AUTO FEED	HP 150	Centronics defines as ground. Epson and IBM define as AUTO FEED XT; Low level causes printer to advance one line.

Insulation Requirements

The HP 13242D parallel printer cable conforms to FCC Class B RFI requirements. We recommend insulating your cable to meet these requirements.



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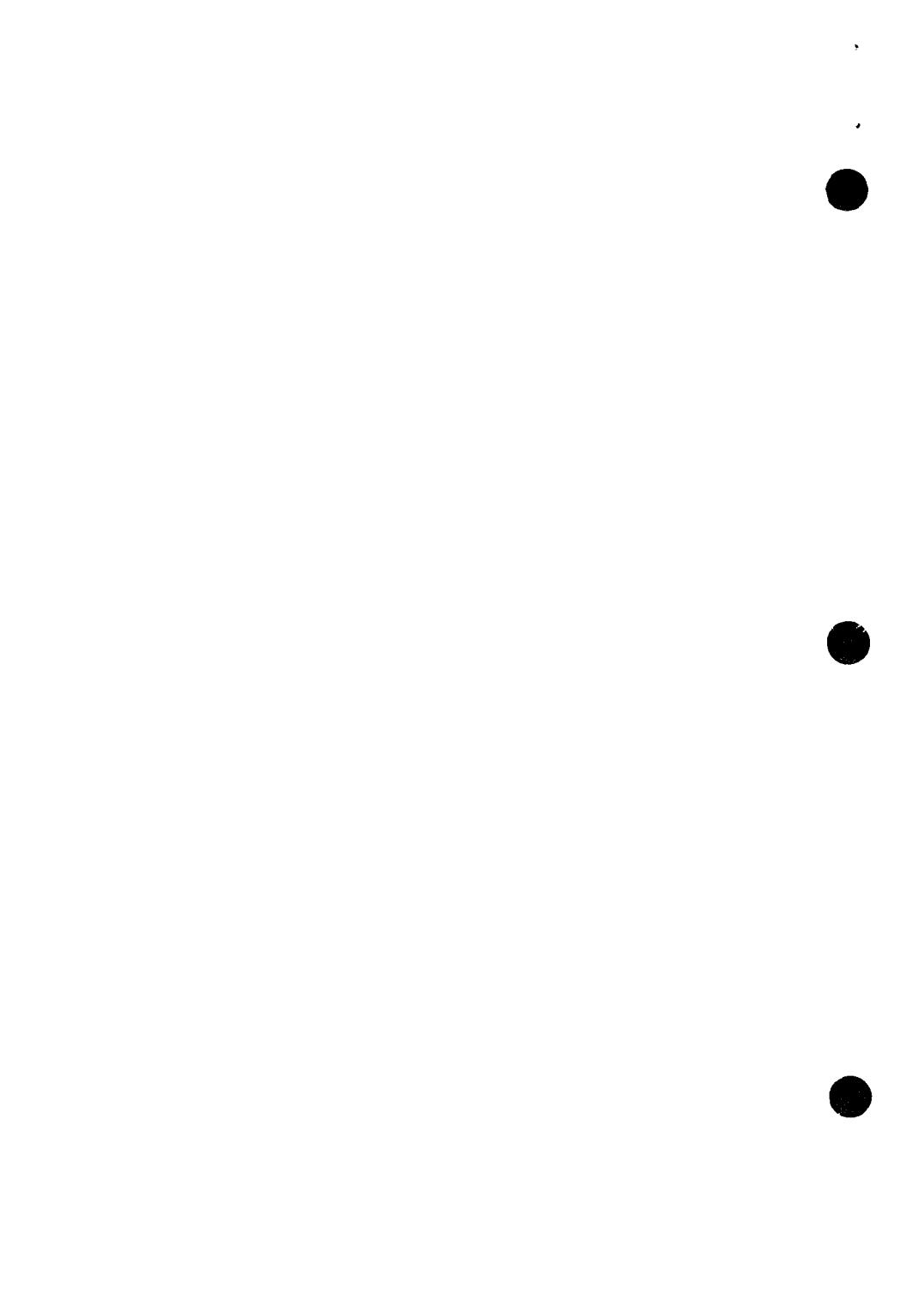
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CENTRONICS PARALLEL

The Hewlett-Packard Extended Input/Output Accessory, Model HP 45643A, permits Centronics and HP-IL input/output capabilities. This application brief is intended to be a general overview of interfacing and configuring a Centronics printer to an HP 150. This brief also contains summarized information on how to customize WordStar® for the Hewlett-Packard HP 2225C ThinkJet printer and selected non-Hewlett-Packard printers.

INSTALLATION

Refer to the Extended Input/Output manual in order to perform the following:

1. Installation of the Extended Input/Output (Centronics parallel/HP-IL) board.
2. Installation of the parallel printer software to the SYS_MASTER disc.

INTERFACING

When interfacing a Centronics parallel printer to the HP 150, the Hewlett-Packard HP 13242D cable or a cable built to the same specifications must be used. Appendix F in the HP 45643A Extended Input/Output manual shows the pin-outs and connector types for the cable. This cable should be plugged into the parallel printer connector. This connector, on the rear of the HP 150, is labeled "parallel".

*** NOTE *** You must use the Hewlett-Packard cable, HP 13242D, or a cable built to the same specifications. If you attempt to use another type of cable, damage could result to the HP 150 and/or the printer.

CONFIGURATION

Configuring the printer. When configuring a Centronics parallel printer, set the dip switches so that the printer performs the following:

1. When the printer receives a CR (Carriage Return) from the HP 150, the printer should perform a CR only.
2. When the printer receives a LF (Line Feed) from the HP 150, the printer should perform a LF only.

Refer to the printer manual for the specific location of these switches and their descriptions. For most Centronics parallel printers, it is not necessary to set any data communications dip switches. The Hewlett-Packard HP 2225C ThinkJet printer dip switches should be set as follows:

SWITCHES	SETTING	DESCRIPTION
1	down	CR performs CR only
2	down	LF performs LF only
3	down	Perforation skip disabled
4	down	11 inch page length
5	down	HP control sequence mode
6	down	United States ASCII
7	down	" "
8	down	" "

Configuring the HP 150 The HP 150 MS-DOS Device Configuration has to reflect whether you have a Hewlett-Packard parallel printer connected, such as the ThinkJet, or a printer from another manufacturer. Refer to the HP 150 Owner's Guide for the instructions on how to access MS-DOS Device Configuration. To reflect the type of printer that is being used, the "PRN:" configuration should be set as follows:

1. HEWLETT-PACKARD printers

Interface - Any value; your choice is overridden when the parallel printer software is installed.

Address - Any value; your choice is overridden when the parallel printer software is installed.

Model - Select the appropriate HP model. If the model is not in the list, choose any HP model. DO NOT CHOOSE "SPECIAL" OR "OTHER".

2. NON-HEWLETT-PACKARD printers

Interface - Any value; your choice is overridden when the parallel printer software is installed.

Address - Any value; your choice is overridden when the parallel printer software is installed.

Model - "SPECIAL"

APPLICATION SOFTWARE

The following pages summarize the procedure necessary to customize WordStar®/150, version 3.30, for the Hewlett-Packard ThinkJet printer and other non-Hewlett-Packard printers: Diablo 630 API, Epson FX-80, Epson RX-80, and Okidata 92.

Hewlett-Packard ThinkJet with WordStar/150

The information below summarizes the procedure necessary to customize WordStar/150 for the ThinkJet printer. See the WINSTALL/150 section of the WordStar/150 manual for the complete procedure. This customization process is performed using the software utility WINSTALL/150, which is part of the WordStar/150 package:

In WINSTALL/150:

1. Select Menu of Printers
 - a). Select 82906A: A
2. Select Custom Installation of Printers: B
 - a). Select Printer name: C
Change Printer name to: ThinkJet
 - b). Select Boldfacing: F
Change Boldfacing to: 1
 - c). Select Return/Line Feed: L
Change return and line feed function code sequence to: Dh Ah
which should be typed in as: ,D <return>
 ,A <return>
 , <return>
Change return and half line feed function code sequence to: Dh 1Bh 3Dh
which should be typed in as: ,D <return>
 ,1B <return>
 ,3D <return>
 , <return>
 - d). Exit to Installation: X
3. Select Menu of WordStar Features: C
 - a). Select Page offset: N
Change Page offset to: 2
 - b). Select Form feeds: O
Change Form feed toggle to: OFF
 - c). Exit to Installation: X
4. Save Changes: A

Diablo 630 API with WordStar/150

The information below summarizes the procedure necessary to customize WordStar/150 for the Diablo 630 API. See the WINSTALL/150 section of the WordStar/150 manual for the complete procedure. This customization process is performed using the software utility WINSTALL/150, which is part of the WordStar/150 package:

In WINSTALL/150:

1. Select Diablo 630 from menu of printers (menu #2)
2. Select Customization of Printers
 - a). Select vertical motion: H
 - b). Change Reverse Linefeed to: 1Bh Ah
which should be typed in as: ,1B <return>
 ,A <return>
 , <return>
 - c). Exit to Installation: X
3. Exit from Install: X
4. Save Changes: A

Epson FX-80 with WordStar/150

The information below summarizes the procedure necessary to customize WordStar/150 for the Epson FX-80. See the WINSTALL/150 section of the WordStar/150 manual for the complete procedure. This customization process is performed using the software utility WINSTALL/150, which is part of the WordStar/150 package:

In WINSTALL/150:

1. Select Backspacing Standard printer from menu of printers (menu #3)
2. Select Custom Installation of Printers
 - a). Select printer name: C
change to: Epson FX-80
 - b). Select Initialization: D
change init. sequence to: 1Bh 40h
which should be typed as: ,1B <return>
,40 <return>
. <return>
change de-init. sequence to: 1Bh 40h
which should be typed as: ,1B <return>
,40 <return>
. <return>
 - c). Select Overprinting: E
change to backspacing std.: B
change backspace sequence to: 8h
which should be typed as: ,8 <return>
. <return>
 - d). Select Vertical Motion: H
change linefeed to: Ah
which should be typed as: ,A <return>
. <return>
change reverse linefeed to : 1Bh 6Ah 24h
which should be typed as: ,1B <return>
,6A <return>
,24 <return>
. <return>
 - e). Select Horizontal Motion: I
change space to: 20h
which should be typed as: ,20 <return>
. <return>
change backspace to: 8h
which should be typed as: ,8 <return>
. <return>
 - f). Select Carriage Roll: N
change roll up to: 1Bh 6Ah 12h
which should be typed as: ,1B <return>
,6A <return>
,12 <return>
. <return>
change roll down to: 1Bh 4Ah 12h
which should be typed as: ,1B <return>
,4A <return>
,12 <return>
. <return>
 - g). Select Character Pitch: 0 (letter "0")
change alt. pitch to: 1Bh 4Dh
which should be typed as: ,1B <return>
,4D <return>
. <return>

change std. pitch to: 12h
which should be typed as: ,12 <return>
<return>
h). Exit from Installation Menu: X

3. Exit from Install: X
4. Save Changes: A

Epson RX-80 with WordStar/150

The information below summarizes the procedure necessary to customize WordStar/150 for the Epson RX-80. See the WINSTALL/150 section of the WordStar/150 manual for the complete procedure. This customization process is performed using the software utility WINSTALL/150, which is part of the WordStar/150 package:

In WINSTALL/150:

1. Select Backspacing Standard printer from menu of printers (menu #3)
2. Select Custom Installation of Printers
 - a). Select printer name: C
change to: Epson RX-80
 - b). Select Initialization: D
change init. sequence to: 1Bh 40h
which should be typed as: ,1B <return>
,40 <return>

change de-init. sequence to: 1Bh 40h
which should be typed as: ,1B <return>
,40 <return>
. <return>
 - c). Select Overprinting: E
change to backspacing std.: B
change backspace sequence to: 8h
which should be typed as: ,8 <return>
. <return>
 - d). Select Vertical Motion: H
change linefeed to: Ah
which should be typed as: ,A <return>
. <return>
 - e). Select Horizontal Motion: I
change space to: 20h
which should be typed as: ,20 <return>
. <return>
change backspace to: 8h
which should be typed as: ,8 <return>
 - f). Select Character Pitch: O (letter "O")
change alt. pitch to: 1Bh 4Dh
which should be typed as: ,1B <return>
,4D <return>

change std. pitch to: 1Bh 50h
which should be typed as: ,1B <return>
,50 <return>
. <return>
 - g). Exit from Installation Menu: X
3. Exit from Install: X
4. Save Changes: A

Okidata 92 with WordStar/150

The information below summarizes the procedure necessary to customize WordStar/150 for the Okidata 92. See the WINSTALL/150 section of the WordStar/150 manual for the complete procedure. This customization process is performed using the software utility WINSTALL/150, which is part of the WordStar/150 package:

In WINSTALL/150:

1. Select Okidata ML92 from menu of printers (menu #2)
2. Exit from installation: X
3. Save Changes: A