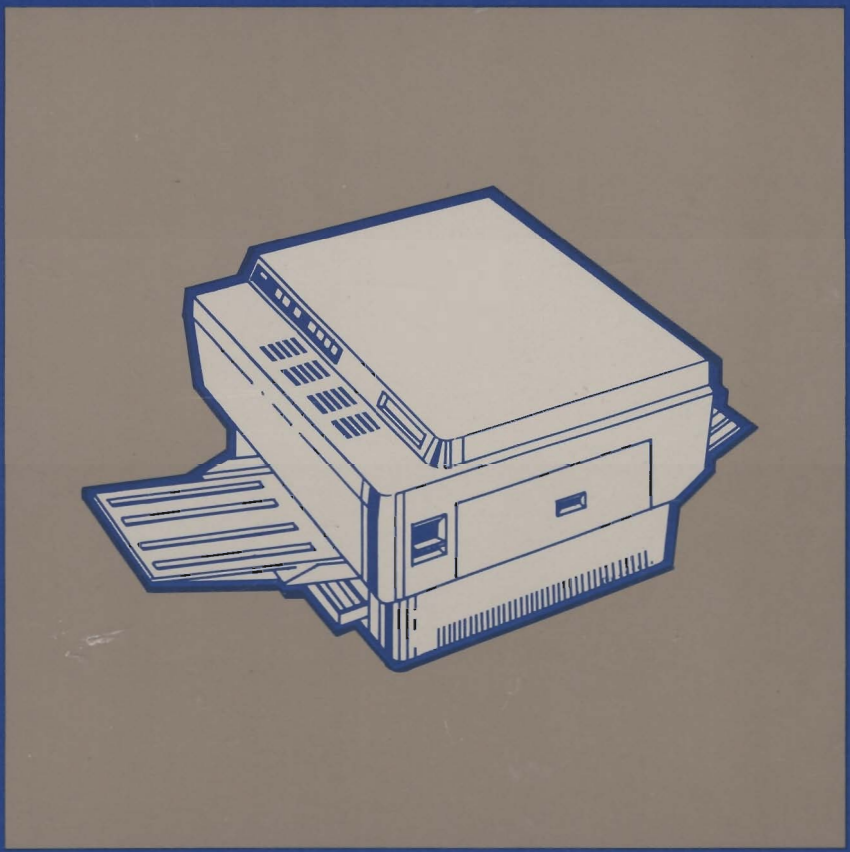
HEWLETT-PACKARD

LaserJet Printer

Operator's Reference Manual



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HEWLETT PACKARD

HP LaserJet Printer Operator's Reference Manual

Part No. 02686-90914

May 1985

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Printing History

New editions of this manual will incorporate all material since the previous edition. Update packages may be used between editions and contain replacement and additional pages to be merged into the manual by the user.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.)

First Edition - May 1985

How to Use Your Operator's Manual

Congratulations on the purchase of your new **LaserJet** professional printer from Hewlett-Packard!

Take a few minutes to read this short overview before you get started using your new printer--it is designed to introduce you to your operator's manual at a glance. After reading this overview, you will have a better idea of what there is to know about your **LaserJet** printer and where you may find this information quickly.

The **LaserJet Printer Operator's Manual** contains information on setting-up and operating your printer. Basic maintenance and troubleshooting procedures are also included to help you keep your **LaserJet** printer up and running. This manual is organized so that you can move from one chapter to the next as you require. For instance, if your printer is already set up and ready for operation, you may want to look over the printer familiarization illustrations in Chapter I and then skip directly to Chapters III and IV for operating instructions and printing applications.

In addition to this operator's manual, the **Technical Reference Manual** included with your **LaserJet** printer provides detailed information on printing features and printer operation. Refer to your Technical Reference Manual when you require additional printing instructions--explanations of more advanced printing features, such as graphics capabilities, are included there.

Chapter I General Information

Read Chapter I for a general introduction to the **LaserJet** printer. This chapter contains illustrations which point out all of the printer's important parts--the illustrations will help you to become familiar with your printer before you begin to use it.

Chapter II Getting Your Printer Ready For Operation

Read Chapter II for instructions on unpacking, choosing a site for, setting-up, configuring, and testing your printer.

Chapter III Operating Your Printer

Read Chapter III to learn how to use the printer's controls and indicators, how to fine-tune the darkness of the print, install font cartridges, and use the manual feed feature so that you may print on envelopes, odd-size paper, or print on both sides of your paper.

Chapter IV How to Use the **LaserJet** Printer

Read Chapter IV to learn how to use your printer. This chapter will introduce you to many of the **LaserJet's** printing features--detailed printing instructions are included here as well as page formatting and character font selection examples.

Chapter V Maintenance and Troubleshooting

Read Chapter V to learn basic maintenance procedures that will help to keep your printer running at top performance. This chapter also contains information on fixing minor problems, such as paper jams and print quality problems, and informs you when a problem is serious enough to require help from your HP Dealer or HP Service Representative. An explanation of the self-test function is also contained in this chapter.

Appendix A Using the **LaserJet** and Lotus 1-2-3 (Version 1A) With the IBM PC and IBM PC/XT

Read this appendix for instructions on using the **LaserJet** printer with Lotus 1-2-3 and your IBM PC or IBM PC/XT.

Appendix G Hardware Configuration Guides

Refer to this appendix for specific configuration guides--this appendix includes instructions for configuring several kinds of computer systems to the **LaserJet** printer.

Appendix H Escape Sequence Summary

Refer to this appendix for a listing of the escape sequences included in this manual.

Glossary

Refer to the glossary for an explanation of unfamiliar terms.

Index

Use the index to reference specific information quickly.

Worldwide Sales and Support Directory

Refer to this section for a list of the major worldwide Hewlett-Packard Sales and Service Offices. If you need any additional information about your printer, or in case of a problem, consult this section for the phone number of the office nearest you.

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Chapter I

GENERAL INFORMATION

This chapter will acquaint you with the **LaserJet** printer's many features and printing capabilities. Illustrations pointing out the printer's important parts are included here to help you become familiar with the printer before you begin to use it.

Contents:

Introduction

Welcome to the professional printer from Hewlett-Packard. Using the **LaserJet** printer (model no. 2686A), you can now print documents with excellent print quality at eight pages per minute on several paper sizes and types, including labels, colored paper, and overhead transparency film. The **LaserJet** printer quietly prints using a high-resolution dot matrix pattern (300 x 300 dots per inch) and occupies about the same amount of desk space as a typewriter. Many features, such as multiple character fonts and underlining, are easily selectable using the escape sequences explained in this manual.

Simple operator maintenance is all that is required to keep your printer printing high-quality documents. The electrophotographic (EP) cartridge that contains the toner (dry ink) is completely disposable and easily replaced--you don't have to pour toner or manipulate ribbons.

Additional features are also available with the **LaserJet+** (Option 200 or Option 210). These options provide more graphics memory, downloadable font capability, Operator Control Panel reset, macro capability (user defined commands), and advanced graphics functions such as shading patterns and various values of gray shading. (Your **LaserJet** may easily be upgraded to an Option 200/210.)

These are just a few of the many capabilities of the **LaserJet** printer. We hope you enjoy learning about and using its features.

Printer Familiarization

The following three illustrations point out important locations on your **LaserJet** printer. Spend a couple of minutes reviewing the illustrations so that you know where things are when you start to use the printer.

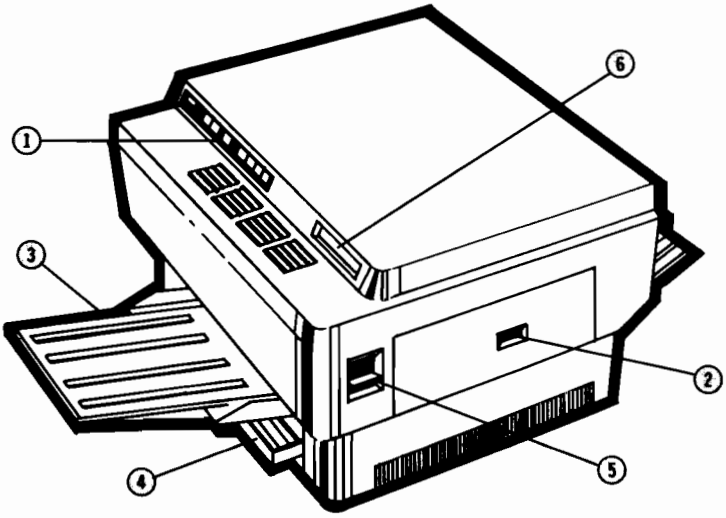

Figure 1-1. Printer Front and Right Side

1. **Operator Control Panel**--controls printer operations
2. **Right Door**--open to access **EP cartridge** (upper unit must be open)
3. **Print Tray**--collects printed paper
4. **Paper Input Cassette**--load paper in here
5. **Upper Unit Release Lever**--pull up to open upper main body of printer
6. **Font Cartridge Slot**--insert font cartridges in here

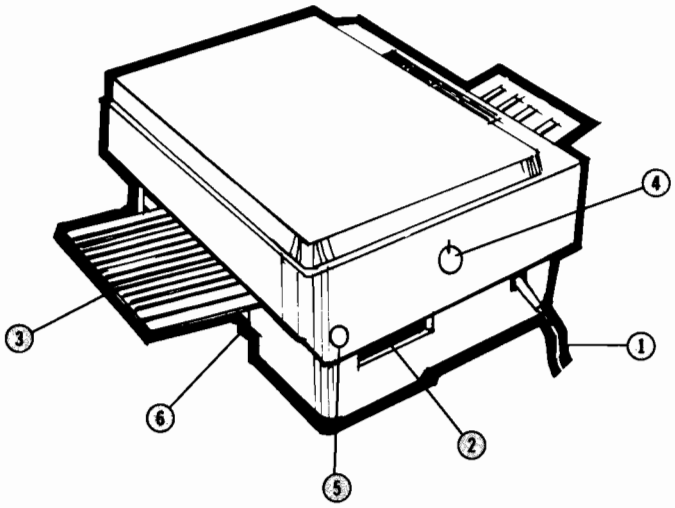

Figure 1-2. Printer Rear and Left Side

1. **AC Power Cord**
2. **Interface Connector**--plug interface cable in here
3. **Manual Feed Tray**--manually feed paper and envelopes here
4. **Print Density Dial**--adjusts lightness and darkness of print
5. **Test Print Button**--press for printer self-test
6. **Rear Door**--open to clear paper jams in the cassette feed area

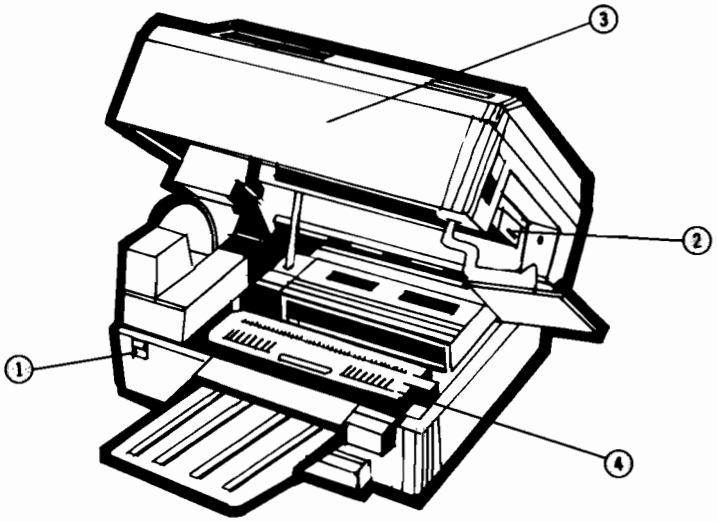

Figure 1-3. Printer Front and Right Side With Upper Main Body Open

1. **Power Switch**--switches printer ON (1) and OFF (0)
2. **EP Cartridge**--contains toner (dry ink), print drum, and **primary corona**
3. **Upper Main Body**--to access internal areas of printer
4. **Fusing Assembly Cover**--lift to replace **fusing roller cleaning pad**, clean the fusing rollers, and remove jammed paper

LaserJet+ (Option 200/210)

The **LaserJet+** (Option 200/210) printer offers features that differ from the standard **LaserJet** printer. These features are explained in this manual where they occur, but a list of the feature differences is provided below for quick reference:

- 512 K RAM memory (395 K available to user)
- Additional resident font included (16.66 pitch line printer font)
- Centronics Parallel interface available
- Font downloading capability
- Fonts available on disc (and cartridge)
- Macro capability (up to 32 at a time)
- Advanced graphics capability (patterns and gray shading)
- Automatic forms overlay capability
- Printer automatically goes on-line when the paper tray is inserted
- Reset capability from Operator Control Panel
- Flashing READY indicator indicates data transfer; flashing indicator on standard printer indicates "warming up"

Refer to your Technical Reference Manual for instructions on using any of the **LaserJet+** printer's advanced printing features not included in this manual.

Chapter II

GETTING YOUR PRINTER READY FOR OPERATION

This chapter will help you successfully choose a printer site, unpack, inspect, install, configure, and set-up your **LaserJet** printer. Follow the instructions included here to insure that your printer installation is a smooth, trouble-free process.

Contents:

Site Selection

While deciding where you want to locate your printer, take into consideration the location of power outlets, ambient temperature, traffic, ventilation and other considerations which affect its operation. The location you decide on should meet the following requirements:

- The line voltage should not vary more than +/-10% from the voltage marked on the printer nameplate, and a ground connection should be available (the printer nameplate is located on the left side of the printer, near the AC power cord). The frequency should not vary more than +/- 2%.

- The temperature should be between 10 and 32.5 degrees Celsius (50 - 90.5 degrees Fahrenheit), and the relative humidity should be between 20 and 80 percent.

- The printer should not be installed near water faucets, humidifiers, refrigerators, heaters, etc., and should not be put in a location where the temperature changes abruptly, such as near air conditioners or on top of other computer peripherals.

- The printer should not be exposed to open flames, dust, ammonia fumes, or direct sunlight. (A heavy curtain may be installed to protect the printer if it must be placed in a sunny location).

- The room should be well ventilated to prevent heat build-up.

- The printer should be installed on a sturdy, level surface and the left side of the printer should be at least 17.5 cm (7") from the wall. There should be sufficient space to permit unimpeded operation (see the diagram on the next page).

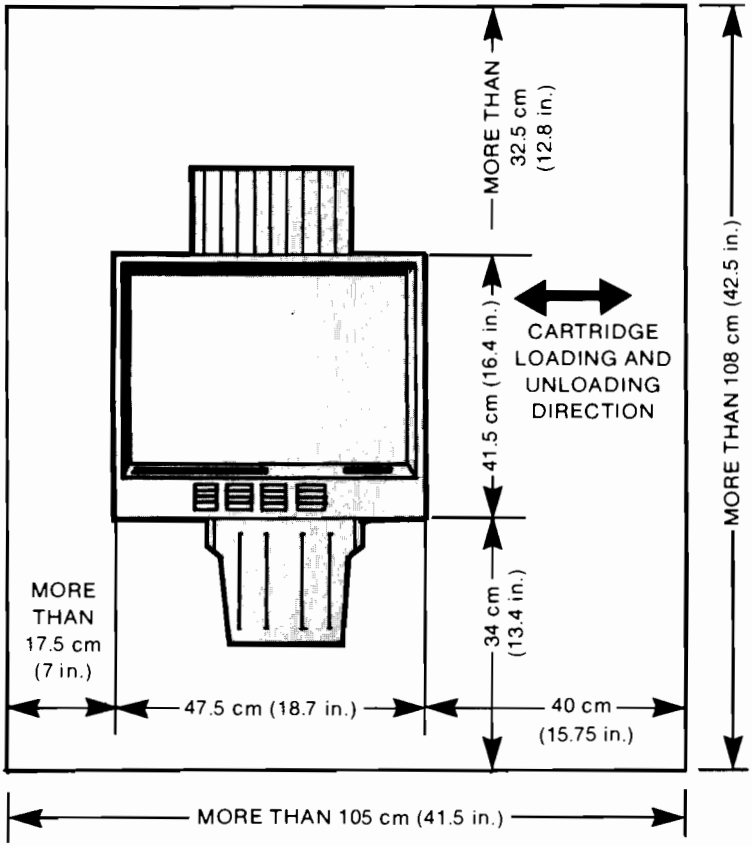

Figure 2-1. LaserJet Site Selection Dimensions

Unpacking and Inspection

After you have selected a good site for your **LaserJet** printer, unpack it as explained in the following steps:

a. When you have opened the cardboard box containing the printer and have removed the parts and literature from the foam depressions, check to see that, in addition to this Operator's Manual and the Technical Reference Manual, the following are present: a print tray with print tray extender, a manual feed tray, and a paper input cassette.

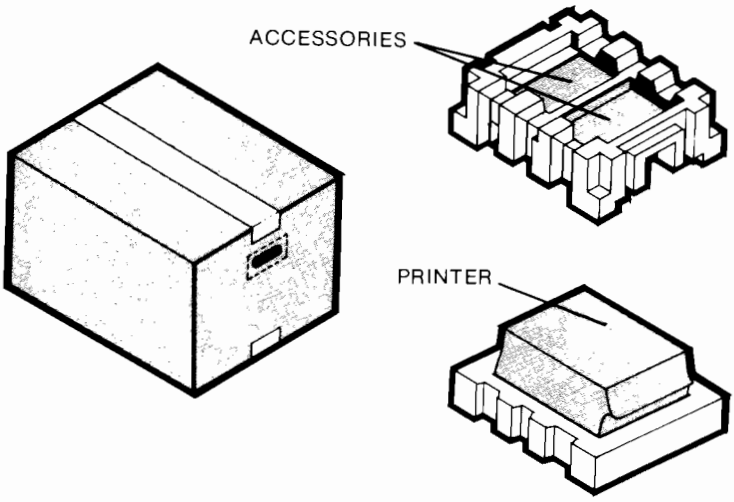

Figure 2-2. Unpacking the LaserJet Printer

b. Lift off the foam packing material and remove the printer in its sealed bag. **NOTE: Two people may be necessary--the printer weighs 71 lbs. (32 kg).**

c. Remove the bag from around the printer. Check for damage to the printer's exterior that could have occurred during transportation.

NOTE

If the printer appears to have been damaged in shipment, notify the carrier and your Hewlett-Packard Dealer or HP Sales Representative immediately.

Save the box and packing material in case you ever need to ship the printer. (Before shipping, you must remove the EP cartridge.)

d. Lift the **upper unit release lever** and open the upper half of the printer.

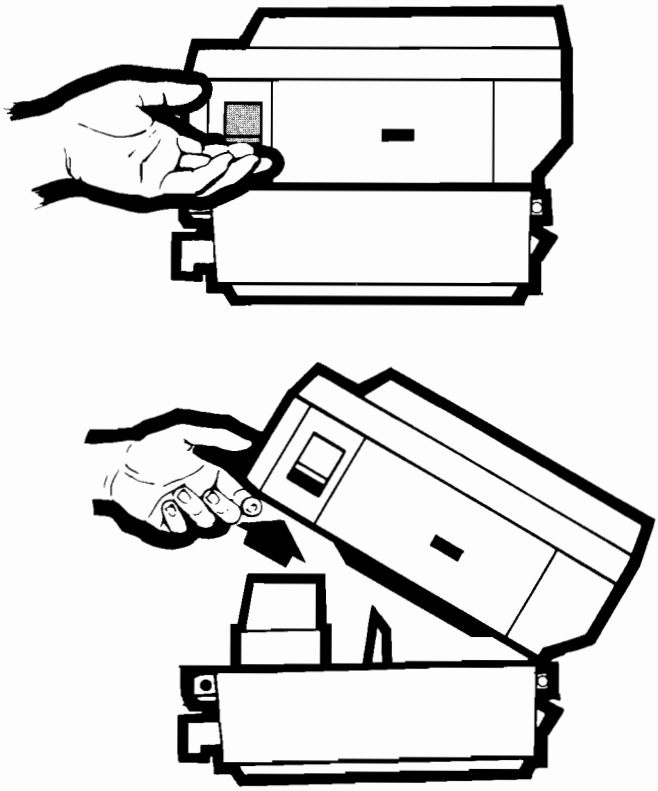

Figure 2-3. Opening Printer's Main Body

e. Lift the green insulating cover of the fusing assembly and remove the two spacers (left side and right side) as shown below:

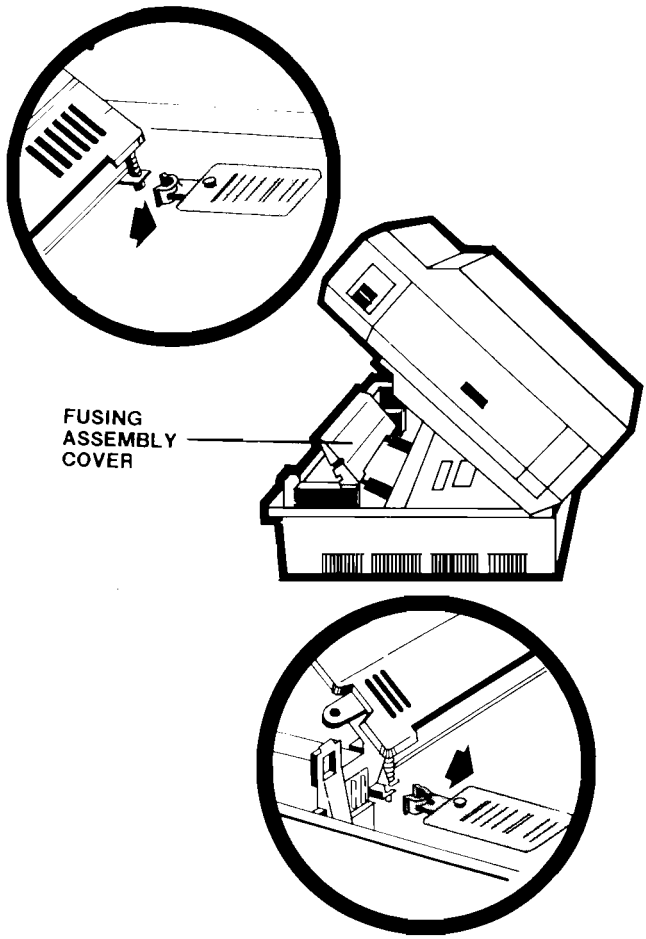

Figure 2-4. Removing Packing Spacers

f. Peel off the tape securing the green **wire cleaner** (located on the right side of the printer). The **wire cleaner** is the tool you will use periodically to clean the **primary corona wire. NOTE: You will not need the wire cleaner at this time. Reposition the wire cleaner on its locating pins.**

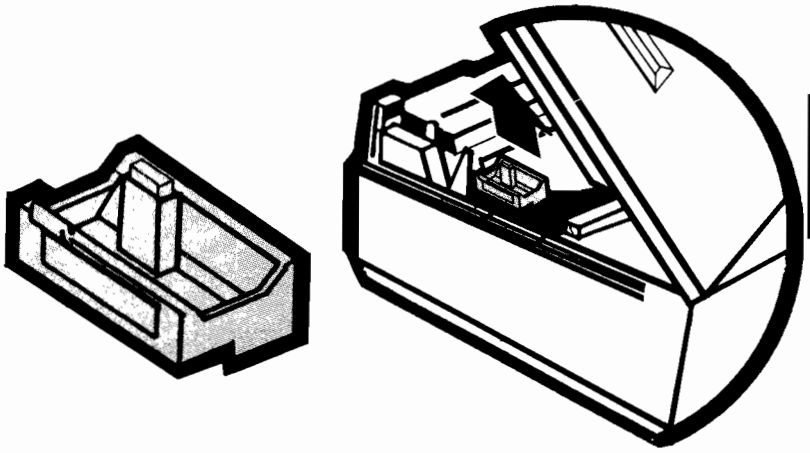

Figure 2-5. Wire Cleaner Location

Printer Set-Up

Printer set-up involves installing the **EP cartridge**, **fusing roller cleaning pad**, **paper trays**, and **loading paper**. With the upper main body of the printer open, perform these procedures to get your printer ready for operation.

INSTALLING THE ELECTROPHOTOGRAPHIC (EP) CARTRIDGE

Perform the following steps to install the **EP cartridge**:

NOTE

EP cartridges should be stored according to the instructions included with each cartridge. Following the storing procedure will help you get longer life from your **EP Cartridges**.

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a. With the printer's upper unit open, open the right door.

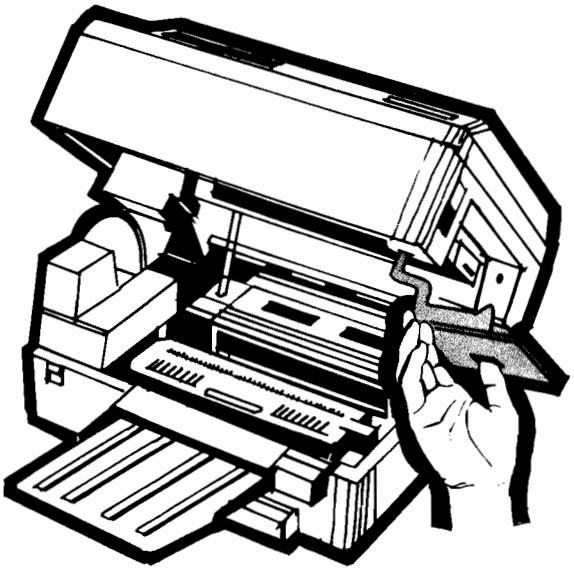


Figure 2-6. Opening the Printer's Right Door

b. Open the box containing the **EP cartridge** and the **fusing roller cleaning pad**, and remove the large metallic bag.

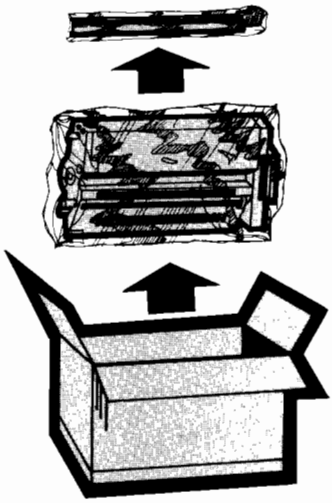


Figure 2-7. Unpacking the EP Cartridge

c. Remove the **EP cartridge** from the sealed metallic bag.

d. Hold the cartridge horizontally and shake it about five times (as shown below) to distribute the toner evenly.

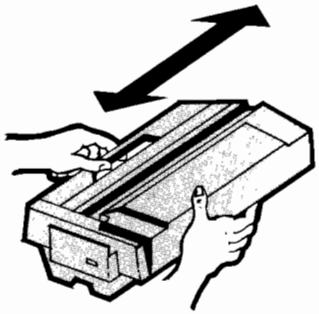


Figure 2-8. Toner Distribution

e. Install the **EP cartridge** by sliding it completely into the printer.

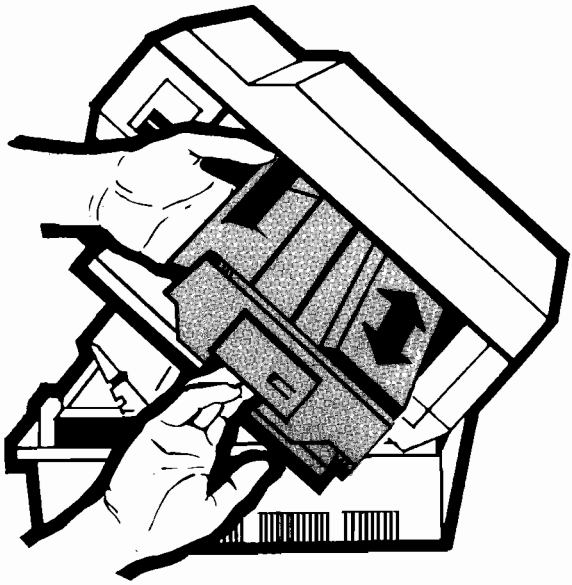


Figure 2-9. Inserting the EP Cartridge

f. Flex the black tab on the side of the **EP cartridge** *until it breaks loose* (hold the cartridge steadily). Pull the tab out completely to remove the attached sealing tape. Dispose of the sealing tape. **NOTE: If the sealing tape separates from the black tab, grasp the sealing tape and pull it completely out of the cartridge.**

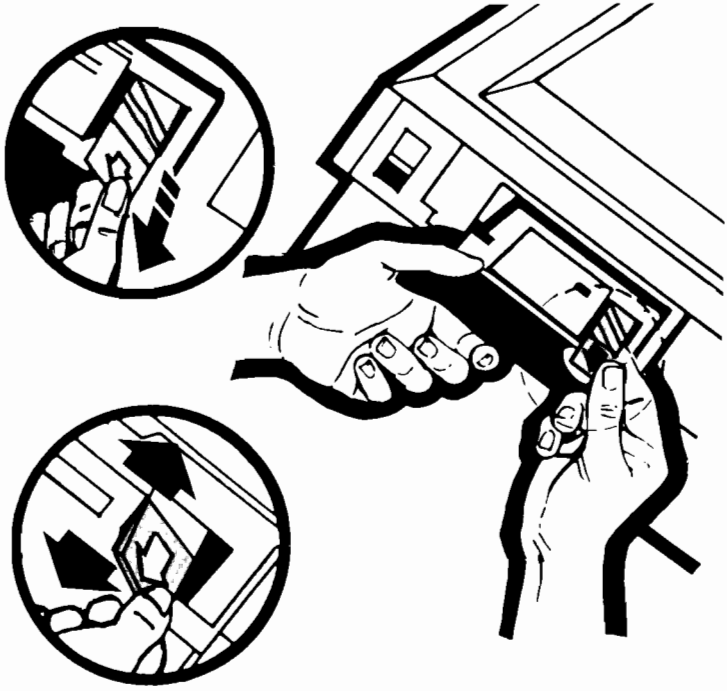


Figure 2-10. Removing the EP Cartridge Tab

g. Close the **right door** of the printer.

INSTALLING THE FUSING ROLLER CLEANING PAD

a. Open the green **fusing assembly cover.**

b. Remove the **fusing roller cleaning pad** from the box that contained the **EP cartridge**. Insert the cleaning pad firmly into the groove in the top part of the fusing assembly. **NOTE: If a fusing roller cleaning pad is already installed in the printer, discard it and replace it with the new pad.**

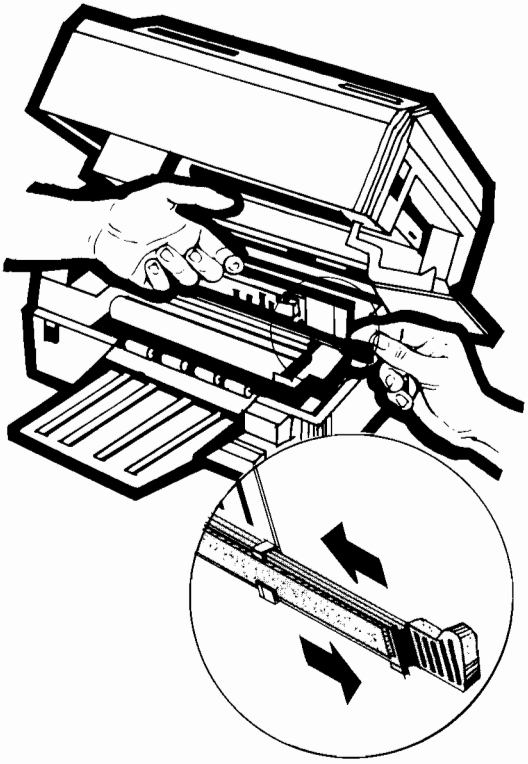


Figure 2-11. Inserting the Fusing Roller Cleaning Pad

c. Lower the green insulating cover into its closed position.

d. Lower the **upper main body** of the printer until it locks closed.

INSTALLING THE PAPER TRAYS

There are two trays supplied with the printer: the manual feed tray (smaller tray) and the print tray. Install both trays by fitting the small plastic pegs in the holes provided (see illustration below).

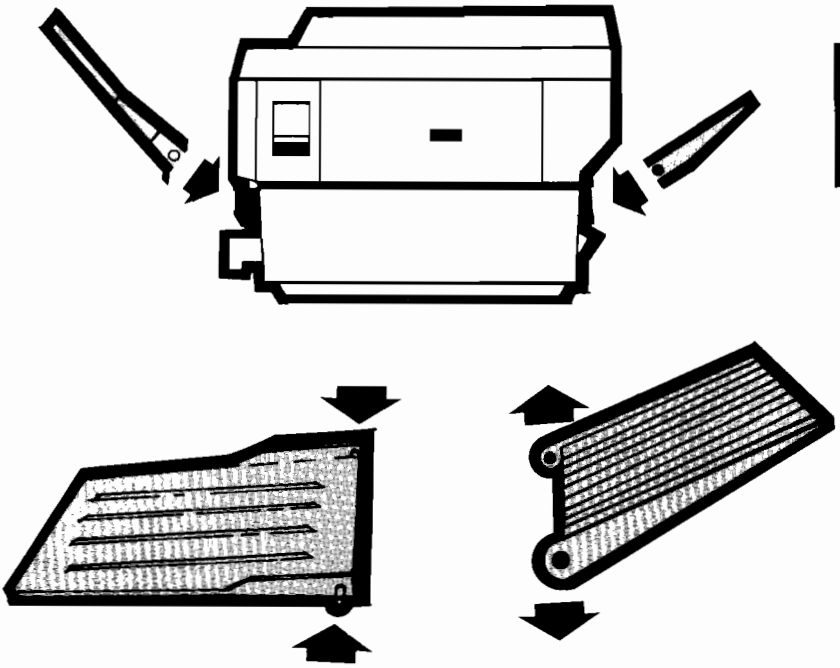


Figure 2-12. Installing Manual Feed Tray and Print Tray

LOADING PAPER

Perform the following steps to load paper into the printer:

a. Fan the stack of paper, place it in the **paper input cassette**, and tap the stack as shown. **NOTE: The correct paper input cassette must be used for the size of paper you are using. See Appendix C for the input paper cassette part numbers and ordering information.** If you are loading letterhead, the top of the letterhead (logo) should be loaded face down in the end of the **paper input cassette** that enters the pr inter first (the end with the metal clips). **NOTE: Do not insert more paper than will fit underneath the arrows on the right side of the tray. Approximately 100 sheets of paper can be loaded.**

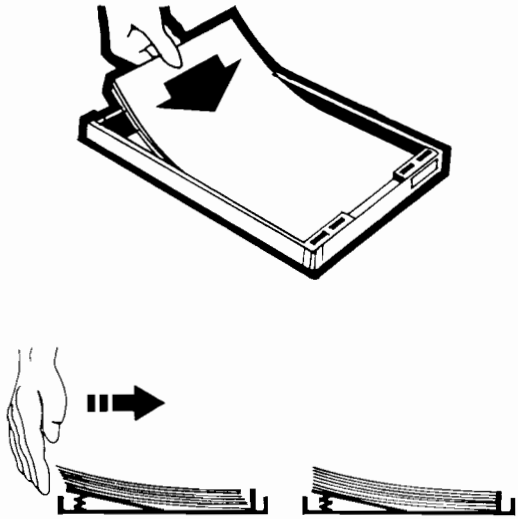


Figure 2-13. Loading Paper in the Paper Input Cassette

b. Push the stack under the retaining clips.

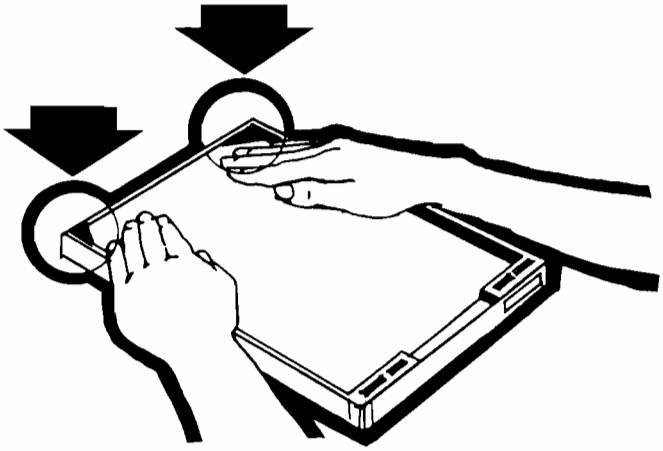


Figure 2-14. Cassette Retaining Clips

c. Insert the **paper input cassette** into the printer until it is firmly in place. **NOTE: The arrow on the right side of the paper input cassette indicates the direction the cassette should be fed into the machine (the end with retaining clips enters first).**

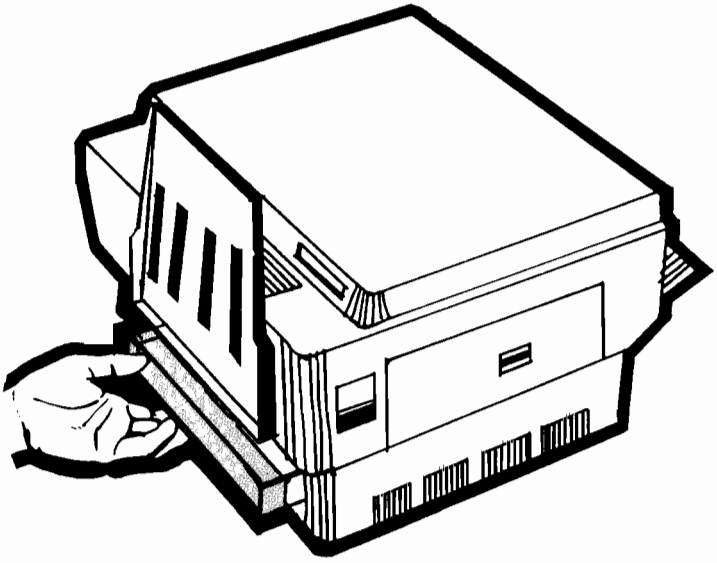


Figure 2-15. Inserting the Paper Input Cassette

Printer Installation and Configuration

Installing and configuring the printer involves connecting the AC power cord, connecting the interface cable, and configuring the computer or terminal so that it can "talk" to the printer. Printer configuration depends on the computer system to which you are connected. Follow the instructions which pertain to your system (HP 150, IBM Personal Computer, etc.); these instructions follow later in this section. If you are configuring a printer other than an HP 150 or IBM PC, consult Appendix G in this manual or ask your dealer if there is an application note written for configuring your computer to a **LaserJet** printer. Refer to Appendix F in this manual for generic configuration information.

INSTALLING YOUR PRINTER

To install your printer, follow the steps listed here:

a. Connect the interface cable from the computer system to the interface connector on the left side of the printer. **NOTE: See Appendix C for interface cable part numbers or Appendix F for pin assignments.**

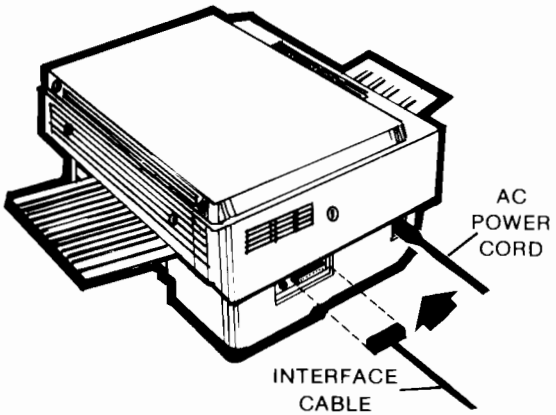


Figure 2-16. Connecting the Interface Cable to the LaserJet Printer

b. Connect the AC power cord to the power cord receptacle on the side of the printer and plug the opposite end into the AC outlet. **NOTE: The AC power cord is already permanently connected to 115 volt printers.**

CONFIRMING PROPER OPERATION

Once you have installed your printer, check its operation by performing the following procedure:

a. Press the **power switch** on the front of the printer to the ON (1) position. The printer will take up to three minutes to warm up. During this time, the **READY** indicator will be flashing and **02** will appear on the **status display**. When the indicator stops flashing and stays ON, the **status display** will display **00**. This indicates that the printer is ready to print.

b. Press the **ON LINE** key so that the printer is off-line (the yellow on-line indicator should be OFF).

c. Press the **TEST PRINT button** located on the left side of the printer. After a few seconds of delay, the printer will print a page with a striped pattern on it. Inspect this page to see that all of the lines are uniform and clear, and that there are no light spots, smudges, missing areas, or other irregularities. If the printout looks good and there are no error numbers flashing on the **status display**, you are now ready to configure your **LaserJet** printer to print your documents. If any of the above problems exist, repeat the printer self-test and see if the problem persists. If the problem does persist, consult the "Solving Print Quality Problems" discussion in Chapter V of this manual.

NOTE

After installing a new **EP cartridge**, it may take 4 or 5 pages of test prints before good print quality is achieved.

d. Press the **SELF TEST** key on the **Operator Control Panel**. After a few seconds of delay, all of the **Operator Control Panel** LEDs will light up and the printer will print a staggered pattern of letters and numbers. Check to see that all the characters are clear and well-formed, and that there are no noticeable light spots, blotches, or streaks on the paper. Also check the **status display** for any errors. If no errors occur and the printout looks good, proceed to the next step. If the printout has any of the problems mentioned above, repeat the self-test to see if these problems repeat. If the new printout is not better than the first, consult the Self-Test portion of this manual (Chapter V).

Configure your system to accept your printer by following the procedures specified for your system (HP 150, IBM Personal Computer, etc.). If you are connecting the printer to a computer other than an HP 150, IBM Personal Computer, or IBM-compatible computer, call your HP Dealer for configuration information. To assist you in performing non-documented configurations, Appendix F contains generic configuration information.

CONFIGURING YOUR PRINTER WITH THE HP 150 PERSONAL COMPUTER (RS-232C or RS-422 INTERFACE)

To configure your printer so that it operates with the HP 150, you must have an RS-232C cable connected from one of the DATACOMM ports of your HP 150 to the interface connector on the printer. The printer can be interfaced using hardware handshake (DTR) or X-on/X-off protocol. (Hardware handshaking is the preferred method.) For hardware handshake, use a 13242G interface cable; for X-on/X-off, use a 92219H interface cable. (If you decide to make your own interface cable, the cable schematics for both cables is shown below.) If you are new to interfacing printers and computers, don't worry--just choose a cable (13242G preferred) and follow the instructions below. The only difference in configuration, once you have chosen your interface cable, is in step q.--and the difference is pointed out with an asterisk (*).

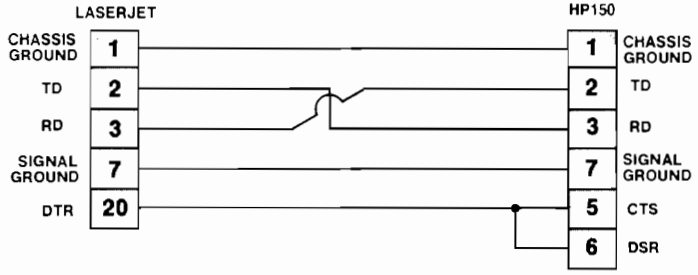


Figure 2-17. 13242G Cable Schematic--Hardware Handshake (DTR)

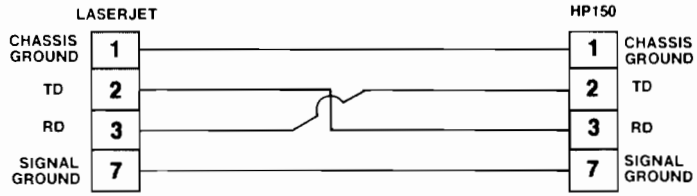


Figure 2-18. 92219H Cable Schematic--X-on/X-off Protocol

Once the interface cable is connected, perform the following steps to configure the HP 150:

a. Access the P.A.M. menu. (If you do not know how to access the P.A.M. menu, consult your HP 150 Owner's Guide.)

b. Once the P.A.M. menu is displayed, press TERMINAL on the display **or** function key f6 on the keyboard. A new set of function keys will be displayed at the bottom of the display. Make sure that there is an asterisk by REMOTE MODE on the display; if not, press REMOTE MODE on the display and an asterisk will appear.

c. Press the USER/SYSTEM key on the keyboard. A new set of function keys will be displayed at the bottom of the screen.

d. Press function key f8 (Config. Keys) to display the configuration function keys.

e. Press function key f5 (Terminal Config.) to enter the Terminal Configuration Menu.

f. Ensure that the PrinterCode4 field is set to Ext. If it is not, select Ext by moving the cursor to the PrinterCode4 field (using the TAB key) and pressing the NEXT CHOICE key (f2) until Ext appears in the PrinterCode4 field. Press SAVE CONFIG (f1) to save the new configuration.

g. Press the USER/SYSTEM key on the keyboard to display a new set of function keys.

h. Press function key f1 (DEVICE CONTROL). The DEVICE CONTROL function keys will be displayed.

i. Press function key f3 ("TO" DEVICES). The "TO" DEVICE function keys will be displayed.

j. Ensure that SERIAL DEVICE (function key f2) has an associated asterisk (*). If not, press function key f2 and an asterisk will appear.

k. If your HP 150 has an internal printer, be sure that INTERNAL PRINTER (function key f3) does not have an associated asterisk (*). If it does, press function key f3 to remove the asterisk.

l. Press the USER/SYSTEM key on the keyboard. A new set of function keys will be displayed at the bottom of the screen.

m. Press function keys f8 and then f1 to display the GLOBAL CONFIGURATION menu.

n. Check to be sure that the REMOTE/SERIAL DEV field is set to PORT 1/PORT 2. If not, tab over to the field and press f2 (NEXT CHOICE) and PORT 1/PORT 2 will be displayed in the REMOTE/SERIAL DEV field.

o. Press SAVE CONFIG on the display or function key f1 on the keyboard.

p. Press CONFIG. KEYS (f8) and then PORT 2 CONFIG (f4) to display the FULL DUPLEX HARDWIRED Port 2 menu. **NOTE: If you reach the FULL DUPLEX MODEM menu instead, press f6 and then f2 to reach the FULL DUPLEX HARDWIRED Port 2 menu.**

q. Set the FULL DUPLEX HARDWIRED Port 2 menu to the values shown below. (Move from one field to the next using the TAB key and use the NEXT CHOICE key (f2) to change the field values to the ones shown on the next page.)

Baud Rate **9600**	SR(CH) **Lo**
Parity **None**	RecvPace **None**
Databits **8**	SRRXmit **No**
Clock **INT**	RR(CF) Recv **No**
Asterisk **Off**	XmitPace **None** *
Stop Bits **1**	SRRInvert **No**
EnqAck **No**	CS(CB) Xmit **Yes** *
TR(CD) **Hi**	DM(CC)Xmit **No**
Check Parity **No**	

* For X-on/X-off operation, change the **XmitPace** field to **X-on/X-off** and the **CS(CB) Xmit** field to **No**.

r. Press SAVE CONFIG. (f1). The menu will be cleared from the screen and a new set of function keys will be displayed at the bottom.

s. Access the P.A.M. menu by holding down the SHIFT key and then pressing the STOP key (on the HP 150 keyboard).

t. Press DEVICE CONFIG. and then START APPLIC. on the HP 150 display. The Main MS-DOS Configuration menu will be displayed.

u. Set the PRN: INTERFACE field to Port 2 using the NEXT CHOICE key (f3).

v. Press the TAB key once and set the field under MODEL to LASERJET (or OTHER) using the NEXT CHOICE (f3) key.

w. Press SAVE CONFIG. (f4).

x. Press EXIT CONFIG. (f8). This will display the P.A.M. menu and you will be ready to print.

To test your configuration, first set the printer on-line by pressing the ON LINE key (on the printer's Operator Control Panel) until the indicator on the key illuminates. Then follow the instructions on the next page.

a. With the P.A.M. menu displayed, press the f5 key (File Manager) on the HP 150 keyboard. This will access the File Manager Menu.

b. Press the f1 key (Print File/Dir) on the keyboard.

c. Type "A:\" and press the RETURN key.

d. Press the f1 key (Start Print) on the keyboard. After a short delay, the printer will print the disc A file directory. **NOTE: If the printer does not print, ensure that the printer is on-line (ON LINE indicator lit) and check the interface cable connection. A disc must be loaded in drive A. If the printer is still not printing, ensure that the cable is working properly by testing it on another system (if one is available). Also make sure that the printer is working properly by performing a self-test and pressing the TEST PRINT button. Test the HP 150 by running an application program that has worked in the past, or try connecting the LaserJet printer to another HP 150 (if possible). If the printer still does not print, consult the "In Case of Difficulty" discussion in Chapter V of this manual.**

e. Press the f8 key once to exit the printing mode and then once again to exit File Manager. You may now use your **LaserJet** printer to print your documents. Read Chapter III to learn how to operate your printer.

CONFIGURING YOUR PRINTER WITH THE IBM PERSONAL COMPUTER (RS-232C or RS-242 INTERFACE)

To configure your printer to "talk" to the IBM Personal Computer requires only a few simple steps. First of all, you must either use an HP 92219J or 17255D interface cable, or wire your cable connectors as follows:

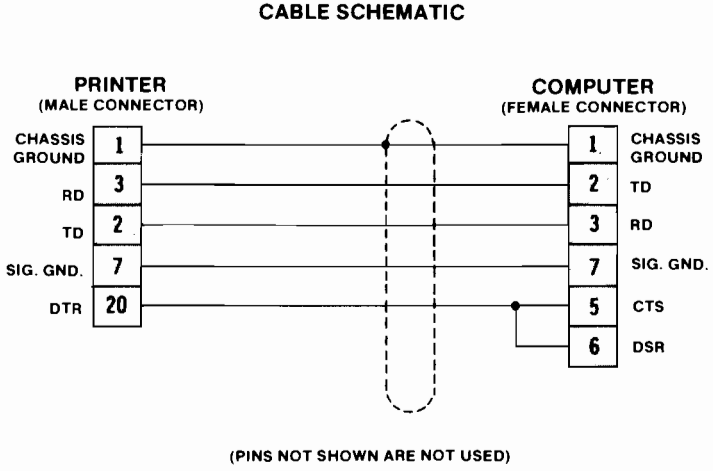


Figure 2-19. Cable Schematic for the IBM PC

Secondly, your IBM PC will need to have an Asynchronous Communications Adapter installed and configured to the EIA RS-232C/CCITT V.24 format. Be sure to note whether the adapter to be used with your **LaserJet** printer is configured as the Primary Asynchronous Adapter or as the Secondary Asynchronous Adapter. Consult the technical reference manual supplied with your adapter or consult your Dealer concerning its installation and configuration.

NOTE

The steps below assume that you are using the Primary Asynchronous Adapter with your printer. If you are using the Secondary Asynchronous Adapter instead, replace COM1 with COM2 in steps c., e., and f.

a. Power-up the computer and load a back-up copy of the PC-DOS disc. **NOTE: The disc write-protect should be off.**

b. Press the **CTRL**, **ALT**, and **DEL** keys simultaneously. The PC-DOS prompt "A>" will be displayed on the screen.

c. Do you already have an AUTOEXEC.BAT file on your PC-DOS disc? You can verify this by typing a **DIR** command and checking the display.

   If no, proceed to step d.

   If yes, add the following two lines to the AUTOEXEC.BAT file on the PC-DOS disc and then proceed to step h. **NOTE: Consult the IBM DOS manual (in the "Batch Commands" section under AUTOEXEC.BAT) if you need more information.**

```
MODE COM1:9600,N,8,1,P
MODE LPT1:=COM1
```

d. Type `COPY CON: AUTOEXEC.BAT` and press the BREAK key.

e. Type `MODE COM1:9600,N,8,1,P` and press the BREAK key.

NOTE

The **LaserJet** printer is factory-set for 9600 baud--to change your printer's baud rate, see Appendix C in your Technical Reference Manual.

f. Type `MODE LPT1:=COM1` and press the BREAK key.

g. Press the CTRL and Z keys simultaneously and then press the BREAK key.

h. Press the CTRL, ALT, and DEL keys simultaneously to reboot PC-DOS.

Your system will now automatically configure itself to print on the **LaserJet** printer when you boot up PC-DOS.

To test your configuration, set the printer on-line and run the following BASIC 2.1 program:

```
A>BASIC
10 LPRINT CHR$(27)+"E"    'RESETS THE PRINTER
20 LPRINT "LASERJET COMMUNICATION OK!"
30 LPRINT CHR$(13);       'CARRIAGE RETURN
40 LPRINT CHR$(12);       'FORM FEED
50 END
RUN
```

If the configuration is successful, the words "LASERJET COMMUNICATION OK!" will be printed. You are now ready to print your documents using the **LaserJet** printer. Read Chapter III to learn about printer operation.

If you have any problems, check the interface cable to be sure it is seated properly and ensure that the printer is on-line. Check to be sure that the Asynchronous Communications Adapter is seated properly. Test the IBM PC by running an application that you have run successfully in the past. Ensure that the printer is working by performing self-test and by pressing the TEST PRINT button. If the printer still does not print, consult the "In Case of Difficulty" discussion in Chapter V.

NOTE

If you have more than one printer connected to your IBM Personal Computer, consult the MODE command section of the IBM DOS manual.

CONFIGURING YOUR PRINTER FOR THE CENTRONICS PARALLEL INTERFACE

If you have a **LaserJet+** Option 210 printer, configuration is a very simple procedure. Follow the steps below to configure your system.

a. Connect your Centronics Parallel interface cable (part no. 40242D) from the computer's parallel port to the **LaserJet** interface connector.

b. With most computers, the parallel port is automatically selected. If so, go to step c. If not, consult your computer manuals about configuring your computer's parallel port and perform any required procedures.

c. Switch the printer power switch to the ON (1) position.

After you have powered-up the printer, you may send this simple BASIC program to test the configuration:

```
A>BASIC
10 LPRINT CHR$(27)+"E"    'RESETS THE PRINTER
20 LPRINT "LASERJET COMMUNICATION OK!"
30 LPRINT CHR$(13);       'CARRIAGE RETURN
40 LPRINT CHR$(12);       'FORM FEED
50 END
RUN
```

If the configuration is successful, the words "LASERJET COMMUNICATION OK!" will be printed. You are now ready to print your documents using the **LaserJet** printer. Read Chapter III to learn about printer operation.

If you have any problems, check the interface cable to be sure it is seated properly and ensure that the printer is on-line.

Chapter III

OPERATING YOUR PRINTER

This chapter tells you how to operate the **LaserJet** printer. The **Operator Control Panel** is thoroughly explained and instructions for changing font cartridges, using the printer's manual feed feature, adjusting print density (the darkness or lightness of the print), and printing on both sides of a page are also included here.

Any differences in operation between the standard **LaserJet** and the **LaserJet+** printers are explained where they occur.

Contents:

Using The Operator Control Panel

The **Operator Control Panel**, shown below and located on the top left portion of the front of the printer, is used to control printer operations such as selecting manual feed mode, choosing on-line or off-line, and running self-test. The **status display** on the **Operator Control Panel** displays status information and error codes to keep you informed of the printer's operating state. The following paragraphs explain the purpose of each key and explain the use of the **status display**.

Figure 3-1. LaserJet Operator Control Panel (Standard version)

Figure 3-2. LaserJet+ Operator Control Panel

READY INDICATOR

The green **ready indicator** in the upper left corner of the **Operator Control Panel** has three states: ON, OFF, and FLASHING. When the indicator is ON, the printer is in a **READY** state. This condition indicates that the printer is powered-on and ready for printing, but does not indicate whether the printer is on-line. The indicator is also ON during self-test.

When the indicator is OFF, the printer is in a **NOT READY** state. The cause of the **NOT READY** state is indicated by a number on the **status display**.

A **FLASHING** indicator on the standard **LaserJet** printer means that the printer is warming up. A **FLASHING** indicator on the **LaserJet+** (Option 200/210) printer means that the printer is receiving data.

STATUS DISPLAY

This two-digit display, located on the left side of the **Operator Control Panel**, indicates printer status and printer errors. When the displayed number is **not flashing**, a status is being displayed. When the number is **flashing**, this indicates a request or an error condition. The following table contains the status and error numbers that will be displayed when these conditions occur.

When an error condition exists, look up the number in the table and try to correct the problem. If the problem persists, look in the "Correcting Error Codes" portion of the Maintenance and Troubleshooting chapter of this manual (Chapter V). This chapter contains more detailed instructions for correcting each error condition.

TABLE 3-A. PRINTER STATUS

Number	Indication
00	Printer Ready
02	Wait
05	Self-Test (non-printing)
06	Self-Test (printing--staggered characters)
07	Reset (Option 200/210 only)
15	Test Print (striped pattern)

TABLE 3-B. OPERATOR SERVICEABLE CONDITIONS

Number	Indication
11*	No paper in cassette–add paper
12*	Printer engine power off–upper main body of printer open
13*	Paper jam
14*	No EP cartridge installed
PC*	Request for different size paper cassette
PF*	Manual paper feed request–printer ready for manual feed
PE*	Envelope feed request–printer ready for envelope feed
FC*	Check font cartridge
FE	Font cartridge removed (while being accessed)
FF	Memory buffer overflow

(Status display numbers continued on next page.)

TABLE 3-C. ERROR CONDITIONS

Number	Indication
20*	Memory overflow
21*	Print overrun error
22	Receiving buffer overflow
40*	Line error
41*	Print check error
50*	Fusing assembly malfunction
51*	Beam detect malfunction
52*	Scanner malfunction
53*	Laser temp. control circuit malfunction
54*	Main motor malfunction
55*	Printer command error
60	Bus Error
61	Program ROM checksum error
62	Internal font ROM checksum error
63	D-RAM error
64	Scan buffer error
65	D-RAM controller error
67	Illegal I/F microprocessor number

* These errors/conditions are cleared by pressing the **CONTINUE** key.

ON LINE KEY

This key allows you to switch between computer control (on-line) and operator control (off-line). The orange indicator light on this key lights up when the printer is on-line and turns off when the printer is off-line. Setting the printer on-line allows you to receive data from the computer. **NOTE: The printer will power-up on-line. If the printer is off-line and the FORM FEED light is on, do not turn the printer off or data may be lost.**

CONTINUE (CONT) KEY

The **CONTINUE** key allows you to resume printing after the printer has been placed off-line (due to an error condition). Pressing the **CONTINUE** key clears most errors and places the printer back on-line.

During a paper jam situation, the printer goes off-line. Once the paper jam is cleared and the **CONTINUE** key is pressed, the printer will reprint the page on which the jam occurred and continue to print the document.

NOTE: All of the asterisked (*) error numbers and conditions in the status display table above are cleared by the CONTINUE key. If an error is not cleared by the CONTINUE key, see the "Correcting Error Codes" portion of Chapter V.

HOLD TO RESET/CONTINUE KEY (Option 200/210 only)

The LaserJet+ printers can be reset by pressing the **HOLD TO RESET/CONTINUE** key. The CONTINUE function of this key is the same as described for the **CONTINUE** key above. The RESET function is performed by pressing and holding the **HOLD TO RESET/CONTINUE** key for 2 seconds. When the RESET command is accepted, a flashing 07 will be displayed. **NOTE: If data transmission is in progress when a RESET is performed, the printer will display a non-flashing 07 until data transmission has ended. Then, a flashing 07 will be displayed to indicate that the printer has been reset.**

Resetting the printer from the Operator Control Panel is the same as sending the escape sequence "^{E}cE" to the printer--the print buffer (memory) is cleared and the printer returns to its standard operating settings (however, permanent macros and permanent character fonts are retained in memory)

SELF TEST KEY

Pressing the **SELF TEST** key causes the printer to test the printer's built-in controller and to print a test printout. (If you hold the key down until the number 06 flashes once, the printer will continue self-test until you press the **SELF TEST** or **ON LINE** key.) The **SELF TEST** key is only operational when the printer is off-line.

During self-test, the number **05** will be displayed on the **status display** and all the indicator lights on the **Operator Control Panel** will light, indicating that self-test is in operation. When the printing portion of the self-test begins, the number **06** will be displayed. When the self-test has been completed, the status number displayed will change to **00** (indicating that the printer is **READY**). If any errors occur during self-test, an error number will be displayed to help you pin-point the problem (see the "Correcting Error Codes" portion of Chapter V for more information).

FORM FEED KEY

The **FORM FEED** key is used to empty the printer's memory while the printer is off-line and in a **READY** state. Whenever there is data in the printer's memory, the indicator on the **FORM FEED** key illuminates. If the memory contains less than a page of data, pressing the **FORM FEED** key will print that portion of the page which is contained in the buffer. When form feed is being performed, the indicator light on the **FORM FEED** key flashes.

If several pages are stored in memory, pressing the **FORM FEED** key prints the pages of data and clears the data buffer (the printer's memory). (If you are using the standard **LaserJet** you may need to press the **FORM FEED** key several times to print all of the data stored in the buffer. This feature is useful, for example, when you have been printing and then go off-line. Since the data buffer can contain several pages of data, you can press the **FORM FEED** key before turning the printer off. When the print buffer is empty, the indicator on the key will go out, indicating that you can turn the printer off without losing data.

NOTE

If the printer is taken off-line during a data transfer, a partial page may be stored in the print buffer. In this case, if the **FORM FEED** key is pressed to clear the print buffer, a partial page may be printed. When the printer returns on-line, the rest of the page will be printed; no data will be lost, but the page will not be formatted as intended. To avoid this problem, do not clear the print buffer (by pressing **FORM FEED**) unless you know that the entire contents of your file have been transferred from the computer to the printer.

When a paper jam or other error occurs during form feed, the form feed is cancelled.

When in the manual feed mode and the **FORM FEED** key is pressed, printing occurs when paper is manually fed into the printer.

MANUAL FEED KEY

Pressing the **MANUAL FEED** key changes the printer from cassette paper feed to manual paper feed and allows you to print using the manual feed feature. The printer must be off-line in order to select the manual feed mode from the **Operator Control Panel**. When in the manual feed mode (and on-line), the indicator light on the **MANUAL FEED** key is illuminated and the **status display** alternately flashes "**PF**" and the selected paper size. **NOTE: If there is no data waiting in the printer memory buffer when the MANUAL FEED key is pressed, the status display will display 00 until data is received.** See the "Using the Manual Feed Feature" discussion later in this chapter for instructions on printing using the manual feed feature.

The manual feed feature can also be used by sending escape sequences. See the "Paper Input Control" discussion in the Technical Reference Manual.

Before You Print

In order to print data from your computer system, the printer must be in the **READY** state (**READY** indicator ON and status 00 displayed), the **ON LINE** indicator must be ON (indicating on-line), and the interface cable must be properly connected from the computer to the connector on the left side of the printer. If the printer is not in a **READY** state, check the **status display** to find the reason. Once the printer is **READY**, press the **ON LINE** key and the printer will be prepared to print your document.

Adjusting The Print Density Dial

The **print density dial** is located on the left side of the printer as shown in the illustration below. The dial is used to adjust the darkness of the printed output and has a range of 1 through 9. Turning the dial counterclockwise increases print density (makes it darker) and turning the dial clockwise decreases the print density (makes it lighter). Under most conditions, leave the dial in the centered position (number 5). Increasing the density causes the printer to use more toner, which, in turn, shortens the life of the **EP cartridge**. **NOTE: There is only a slight difference in darkness noticeable between positions 1 and 9.**

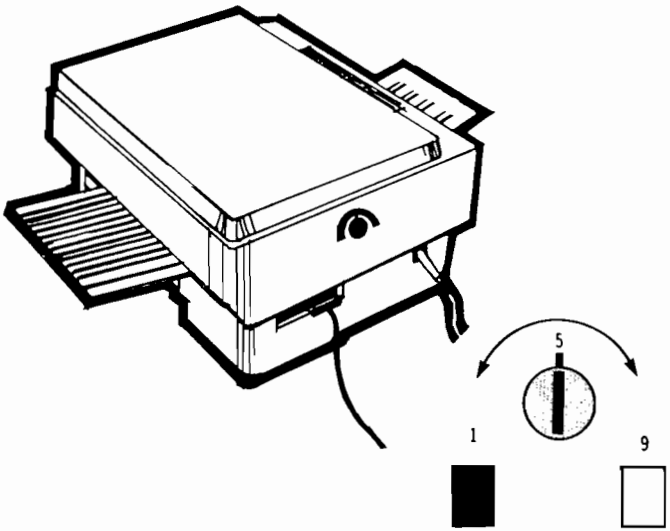


Figure 3-3. Print Density Dial

Using Font Cartridges

One of the useful features of the **LaserJet** printer is its ability to accept optional font cartridges containing a variety of character fonts. You can select these different character fonts simply by inserting a font cartridge in the printer and using an escape sequence to switch fonts (See Chapter IV for instructions on selecting character fonts.)

To insert a font cartridge, set the printer off-line and slide the cartridge into the slot in the upper right corner of the printer. Be sure that the cartridge is firmly seated in the slot before returning the printer on-line.

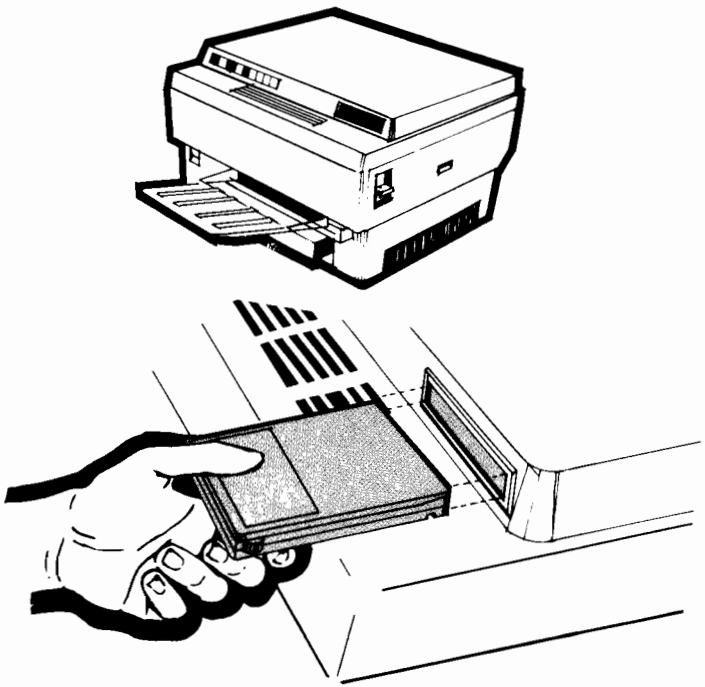


Figure 3-4. Inserting a Font Cartridge

To remove the font cartridge, set the printer off-line by pressing the ON LINE display key. Grasp the edges of the cartridge, and

slowly pull it out of the slot. Press the ON LINE key to return on-line after removing the cartridge.

Optional font cartridges are available from your local HP Dealer or from the HP Computer Supplies Operation.

Using The Manual Feed Feature

Printing Standard-Size Paper

The manual feed feature allows you to feed paper into the printer by hand, rather than by automatically feeding paper from the **paper input cassette**. Even odd-size paper and envelopes can be printed using this feature. To manually feed standard-size pages (8 1/2 x 11, A4, B5, or legal), perform the steps listed here. An explanation of printing on odd-size paper and envelopes follows this. **NOTE: Manual Feed can be performed using escape sequences. See the "Paper Input Control" discussion in the Technical Reference Manual for information on this subject.**

a. Set the printer off-line (by pressing the ON LINE key until the indicator on the key is not illuminated).

b. Press the **MANUAL FEED** key on the **Operator Control Panel**. The indicator on the **MANUAL FEED** key will light up, indicating that the printer is in the manual feed mode. If data is in the printer's memory (data buffer), the **status display** will alternately display "**PF**" and the size of the paper to be fed into the manual feed slot (L=letter, LL=legal, A4=A4, and b5=B5). Otherwise, "00" will be displayed until the printer receives data.

NOTE

The paper size that the printer "expects" to be manually fed is determined by the **paper input cassette** that is installed. The expected paper size can be overridden by the Ec**&l#P** (select page size) escape sequence. For information on how to use this escape sequence, refer to Chapter IV in this manual or see "Selecting Page Length" in the **LaserJet** Technical Reference Manual.

If you manually feed a page that is not the size indicated on the **status display**, some of your data may be lost (depending on how the page is formatted) or a false paper jam may occur.

Some software packages send a reset command (Ec**E**) to the printer--if this occurs, the printer will no longer be in the manual feed mode. To use manual feed in this situation, you will have to use the paper input control escape sequence (Ec**&l#H**). This is explained in the **LaserJet** Technical Reference Manual.

c. Press the ON LINE key until the indicator on the key illuminates.

d. Send data to the printer. The letters **PF** and the paper size will alternately flash on the display.

e. Slide your paper into the manual feed slot so that the paper rides against the right edge of the opening (along the paper feed guide) and so that the top of the paper (or letterhead) enters the printer first (face up).

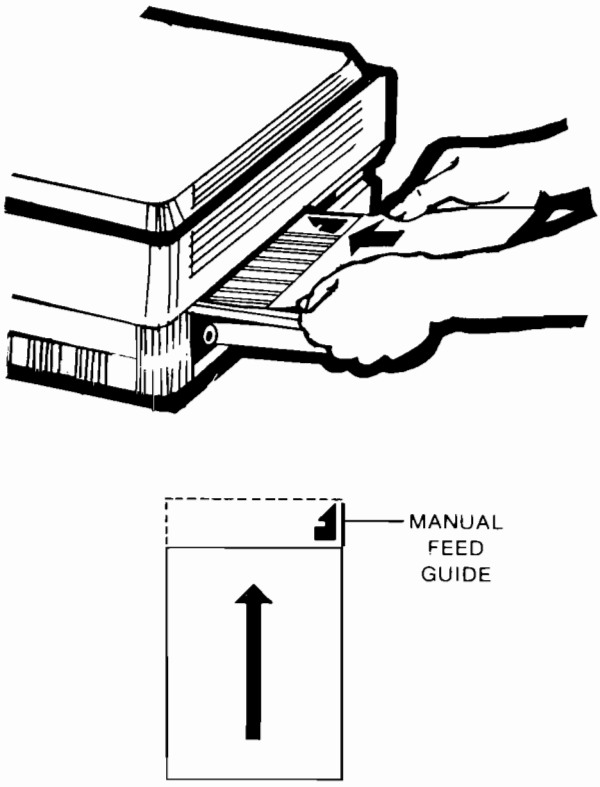


Figure 3-5. Manual Paper Feed

f. To feed more paper into the printer, wait until the printer requests the next page with the "**PF**" status display. Then feed another page exactly as you fed the first page--with the top edge first and the right edge of the paper up against the **manual feed guide** (at the far right edge of the manual feed slot).

g. To exit the manual feed mode, go off-line and then press the **MANUAL FEED** key. The indicator on the key will stop illuminating, indicating that you have exited the manual feed mode.

Printing Odd-Size Paper and Envelopes

Printing on odd-size paper and envelopes is performed the same as manually feeding standard size paper. However, the printer formats the document **as if a standard-size page was fed**. The page size is indicated on the **status display**.

For example, you want to print an address on an envelope and you currently have letter-size paper loaded in the printer. To print your address correctly, you must format your envelope as if it were a letter-size piece of paper (see the drawing below). You will need to select the landscape printing mode (to rotate your characters one-quarter turn counter-clockwise) using the **Ec&l1O** escape sequence (this is explained in Chapter IV under "Formatting Your Page").

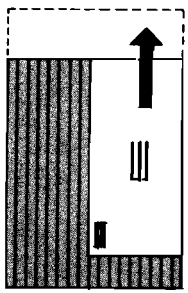


Figure 3-6. Manual Envelope Feed

NOTE

When feeding envelopes into the printer, lightly push them into the manual feed slot until the printer pulls the envelope and begins printing. Try to avoid printing on the envelope seams--printing in this area may cause poor print quality. Additionally, imperfections in the envelope may cause wrinkling or creasing to occur during printing.

As mentioned earlier, envelopes and odd-size paper must be formatted as if you are printing on standard-size paper.

For instructions on formatting and printing both letter-size and business-size envelopes, refer to Chapter IV.

The following BASIC program prints an address on a standard-size (9 1/2" x 4 1/8") business envelope.

```
10 REM ***ENTER LANDSCAPE ORIENTATION***
20 LPRINT CHR$(27);"&l1O";
30 REM ***ENABLE ENVELOPE FEED***
40 LPRINT CHR$(27);"&l3H";
50 REM ***SET TOP MARGIN***
60 LPRINT CHR$(27);"&l27E";
70 REM ***MOVE CURSOR TO LINE 0***
80 LPRINT CHR$(27);"&a0R";
90 REM ***SET LEFT MARGIN TO COLUMN 17***
100 LPRINT CHR$(27);"&a17L";
110 LPRINT "JOE SMITH"
120 LPRINT "123 EASY STREET"
130 LPRINT "MY TOWN, USA  12345"
140 REM ***MOVE CURSOR TO LINE 11***
150 LPRINT CHR$(27);"&a11R";
160 REM ***SET LEFT MARGIN TO COLUMN 52***
170 LPRINT CHR$(27);"&a52L";
180 LPRINT "FRED JONES"
190 LPRINT "456 SPRINGFIELD"
200 LPRINT "YOUR TOWN, USA  67890"
210 LPRINT CHR$(27);"E": REM **RESET**
```

Two-Sided Printing

Using the manual feed mode, you can print on both sides of a piece of paper. To do this, follow the procedure below:

a. With the printer off-line, enter the manual feed mode by pressing the **MANUAL FEED** key on the **Operator Control Panel**. The indicator on the **MANUAL FEED** key will light up.

b. Press the **ON LINE** key until the indicator on the key illuminates.

c. Feed the first side of the paper into the printer so that the top of the page enters the printer first and so the paper's right edge is against the right side of the manual feed slot. The paper will feed into the printer and the first side will be printed.

c. Take the printed page from the **output paper tray**, flip it over so that the printed side is *facing down*, and manually feed the paper into the printer (see the drawing below). If the paper is curled after printing the first side, straighten it out before feeding it in to print the second side.

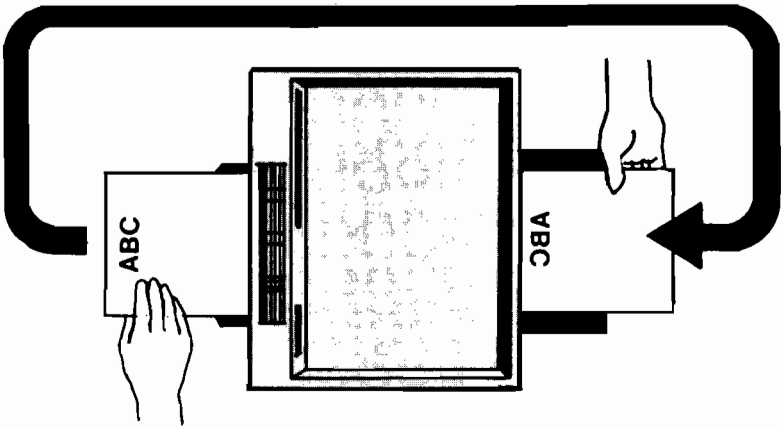


Figure 3-7. Printing Both Sides of a Page

AUTOMATIC TWO-SIDED PRINTING

The paper cassette can be loaded so that you can print both sides of the paper without much manual intervention. To do this, perform the following procedure:

a. Load the stack of paper so that the side to be printed first is face down and the top of the paper is at the end of the cassette that enters the printer first.

b. Print the desired number of copies of the first side of the page.

c. Remove the paper cassette and flip the stack of paper so that the unprinted side of the paper is facing down and the top is at the end of the cassette that enters the printer first.

d. Load the paper cassette and print the remaining side of the page.

Chapter IV

HOW TO USE THE LASERJET PRINTER

This chapter gets you started using many of the **LaserJet** printer's page formatting and printing features--including character font selection.

Contents:

Introduction

In the preceding chapters you learned about many of the **LaserJet** printer's capabilities. Here, you will be introduced to its many printing and formatting features–these allow you to perform such tasks as setting margins and selecting optional character fonts. This chapter includes step-by-step printing instructions for the **LaserJet** printer and provides all the information you need to get started.

Once you learn to use the special character sequences (called escape sequences) that send instructions to the printer, you will be able to print high-quality, error-free documents quickly and easily. To get you started, this chapter begins with an explanation of escape sequences and instructions for their use. With the escape sequences presented in this chapter, you can begin to use many of the **LaserJet's** printing features.

By the time you complete this chapter of the manual, you will be familiar with all of the printing and formatting applications included here. First, you will learn to arrange, or format, the information on your page by selecting the direction of print for your page (page orientation), setting margins, line spacing (the number of lines per inch you wish print), and text and page lengths. Next, character sets, or fonts, are thoroughly explained. The examples provided will help you to begin selecting character fonts from optional font cartridges right away. An explanation of downloading fonts, or transferring character fonts from optional font cartridges to the printer's memory, is also included in this chapter. The final part of this chapter shows you how to do common printing tasks not covered in the previous explanations.

Since this chapter is intended as a general guide to common formatting and printing applications, a few of the **LaserJet's** printing capabilities have been omitted here. Refer to your Technical Reference Manual for more detailed explanations of the printing instructions included here and for more complicated printing applications such as graphics capabilities.

Now you are ready to begin--read through the following explanations carefully.

What Are Escape Sequences?

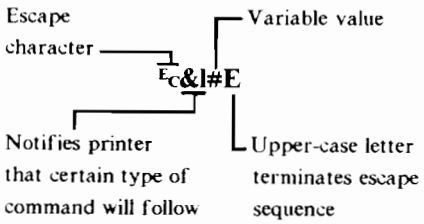
Escape sequences are simply commands that you send to the printer to tell it what tasks you want it to perform. They can be typed in as part of a text file, included when programming, or used with many software programs. When your printer receives an escape sequence, it decodes the command and then executes it. After receiving an escape sequence, your printer will continue printing as that escape sequence instructs until you send another command. For example, if you send an escape sequence which instructs the printer to set the top margin, it will continue to use that margin until you provide new instructions, or until the printer is reset.

Escape sequences look like this:

$$^{E}_{C}\&l\#E$$

Escape sequences always begin with the escape character "$^{E}_{C}$." This is followed by one or more characters which tell the printer what task you want it to perform. Some escape sequences allow you to enter a variable which represents a quantity or value and lets the printer know where to set a margin, for instance, or how many copies to print. Whenever the # sign occurs in an escape sequence, you need to select a quantity or value and enter it within the sequence. Escape sequences are always terminated with an upper-case letter. When the printer receives an upper-case letter following an escape sequence, it recognizes that character as the end of the sequence. All letters within an escape sequence (between the "$^{E}_{C}$" and the final upper-case letter) must always be lower-case.

Here is a diagram of the escape sequence shown above:



The rest of this chapter describes specific page formatting and printing applications one by one, and shows you how to send escape sequence commands to use them. It is important that you read through all of these printing instructions since information that appears later in the chapter often relies on earlier explanations for clarity.

How to Use Escape Sequences

There are many ways to send escape sequences to the **LaserJet** printer. By typing them directly into your text or program, or using them with your software package you are able to send instructions to the printer. The way you will send escape sequences depends on the type of computer system, programming language, or software package you are using. Since there are several possible methods for entering escape sequences, you need to determine which option your system uses. Refer to your computer or software manual to find out. Appendices A and B may also be helpful--they explain using escape sequences with the Lotus 1-2-3 software package (version 1A).

Most software and computer systems allow you to enter commands which represent the escape character "^{E}c" using one of these methods:

- the control key (CTRL or CNTL) pressed simultaneously with a left bracket ([), or
- the number 027 (the decimal equivalent of the escape character "^{E}c"), or
- 1B (the hexadecimal equivalent of the escape character "^{E}c").

Using these methods, the escape character "^{E}c" will not appear on your terminal screen. Instead, a different character may appear depending on which method your system uses to recognize escape characters.

Software packages often provide places in "menus" (which appear as special screens on your terminal) for you to enter escape sequences--set-up strings and programming access tables are examples of these. A few software packages do not allow you to use escape sequences at all. Consult your software manual (or, if you are using Lotus 1-2-3, Appendices A and B in this manual) for information on using escape sequences with your software package. If you cannot locate the information you need, ask your computer dealer or software supplier to provide it.

NOTE

Your **LaserJet** printer will ignore any escape sequence that it does not recognize. If part of an escape sequence is entered incorrectly, your printer may execute the commands that it recognizes and disregard the ones that it does not. Enter escape sequences carefully since no error will be reported if a mistake is made.

Before you start using escape sequences, take a minute to compare these characters:

Lower-case L--l Upper-case O--O

Number one --**1** Number zero --**Ø**

Don't let the slight differences between characters confuse you. Many escape sequences use the lower-case letter L (l) and the number one (**1**)--or the upper-case letter O (O) and the number zero (**Ø**). (The differences listed here may not be apparent on your terminal screen.)

Formatting Your Page

Arranging, or formatting, the information you want to print usually involves selecting the direction of print for your page (page orientation), setting margins, and setting the total number of lines you want to appear on your page (text length). Occasionally, you may want to change the number of lines that are printed per inch of your page, or print a page size different than the one you normally use.

The following instructions include the escape sequences used to perform these page formatting tasks. They provide general explanations for using page formatting escape sequences--you may need to modify these to suit your software package or computer system. Most software packages allow you to format your page without the use of escape sequences--this means that you will be able to set all of your margins, for instance, using your software package rather than entering the escape sequences included in this chapter to set your margins. If, however, you wish to use escape sequences to format your page--when programming, entering text directly into your terminal, or for tasks that your software doesn't perform--these instructions give you all the necessary information.

To help you along, examples are included after each page formatting task is explained. Although these examples reflect typical page formatting settings, it is easy for you to vary these settings. To get the page settings you want, simply substitute the quantities or values you require within the associated escape sequence whenever the # sign occurs.

Before you begin page formatting, it is useful to understand page orientation. Page orientation refers to the way in which print will appear on your page, or the direction of print. The **LaserJet** prints in either portrait orientation, with the text printed from left-to-right across the width of the page, or landscape orientation, with the text printed from left-to-right across the length of the page. Figure 4-1 shows the difference between portrait and landscape orientation and lists the escape sequences used to select each:

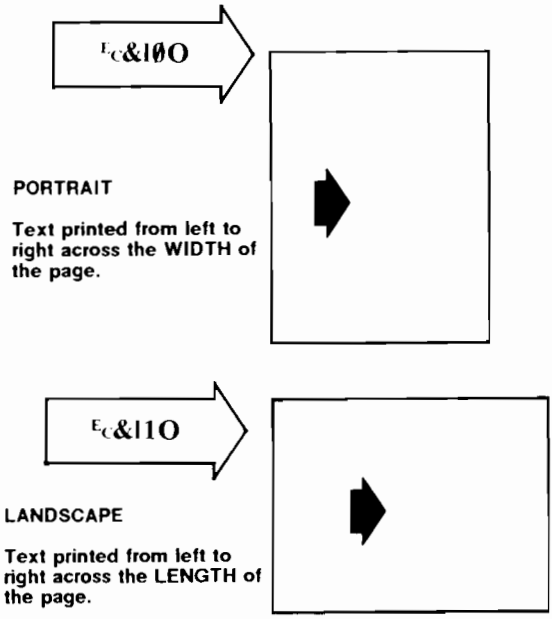


Figure 4-1. Portrait and Landscape Orientation

The **LaserJet** allows you to print in either orientation. However, both orientations cannot be used on the same page--this means that you cannot print using both portrait and landscape orientation on one page. If page orientation is not selected, the **LaserJet** printer will print in portrait orientation (since this is the printer's standard, or "default," orientation setting). This means that you do not need to enter the portrait orientation escape sequence unless you are switching from landscape orientation back to portrait.

To move from portrait orientation to landscape orientation, enter this escape sequence:

ESC&l1O

To move from landscape orientation to portrait orientation, enter this escape sequence:

^{E}c&l0O

Moving from landscape to portrait orientation can also be accomplished by

entering the printer reset command - ^{E}cE or,

resetting the printer by switching it off and then on again.

(Switching the printer off and then on again will completely reset the printer--any data in the printer's memory will be deleted.)

Generally, changing page orientation returns the top and side margins, the line spacing, and the text length to the standard operating settings--also called the "default" settings. You will need to reset these if you do not wish to print using these settings. Instructions for doing so are given in this chapter.

NOTE

When changing page orientation, the page you are currently printing on will be ejected.

Formatting your page normally involves setting the top margin , the left and right margins, and the total number of lines you want to appear on your page (text length). Occasionally, you may want to vary the line spacing (the number of lines printed per vertical inch of your page) or set a page length to print a page larger or smaller than you normally use. The following diagram (Figure 4-2) illustrates each of these areas:

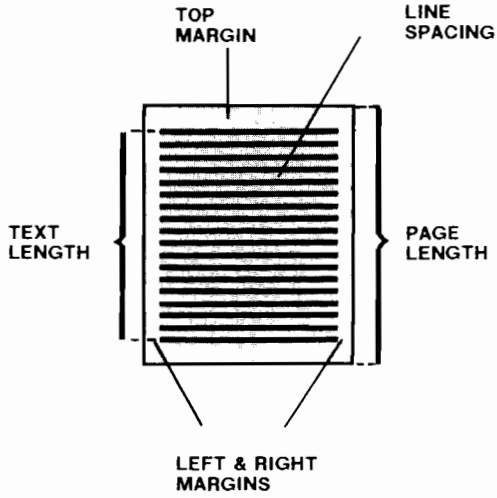


Figure 4-2. Page Formatting Areas

Figures 4-3 and 4-4 show the **LaserJet** printer's standard, or "default," settings for both portrait orientation and landscape orientation:

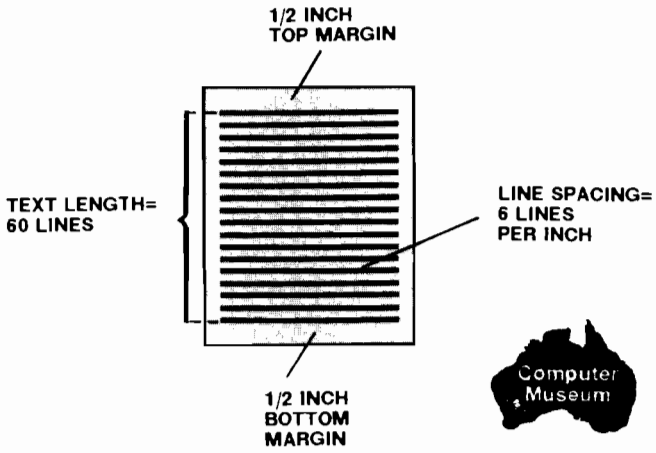


Figure 4-3. Portrait Orientation Default Settings

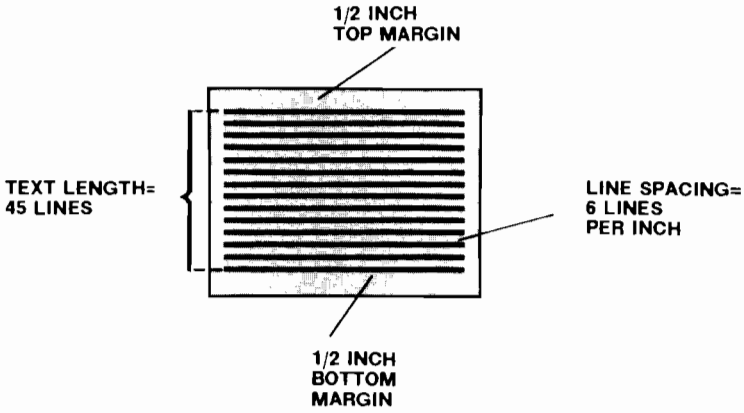


Figure 4-4. Landscape Orientation Default Settings

The term default simply refers to operating settings that the printer uses if none are specified. The default settings shown in the illustrations above are permanently contained in the printer's memory and are based on standard letter-size paper dimensions (8 1/2 x 11).

Unless you are using a software package that offsets any of the default settings shown above, the **LaserJet** will print using these settings until you send the printer different instructions (using escape sequences). Using the default settings, the top and bottom margins are each approximately 1/2" from their respective edges. Using left and right default margins, printing begins approximately 1/4" from the left edge of the page (column zero) and continues to approximately 1/4" from the right edge of the page. Using the standard line spacing setting, the **LaserJet** will print 6 lines per vertical inch of your page. The default text length settings are 60 lines per page for portrait orientation and 45 lines per page for landscape orientation.

NOTE

There is an unprintable region along the outside edges of the page. To prevent data loss, do not attempt to print within 1/4" of the top and bottom edges. (When printing in landscape orientation the unprintable bottom region is slightly more--do not attempt to print within 3/8" of the bottom edge of the page.)

SETTING THE TOP MARGIN

To set a top margin different than the 1/2" default margin and begin printing at the top margin on the first page of text, enter the following escape sequence at the top of your page:

^{E}c&l#E^{E}c&a0R

= Number of lines to skip

In place of the # sign in this escape sequence, you need to insert a quantity which represents the number of lines you wish to skip before printing the first line of text. Be sure to insert this escape sequence at the top of the page before any other commands or text appears--unless you are setting a page length, the top margin escape sequence must always be entered first.

The escape sequence shown above is actually a combination of the top margin escape sequence (Ec**&l#E**) and a cursor positioning escape sequence (Ec**&aØR**) which begins printing at the top of the page.

In the following example, a value of 9 is inserted in this escape sequence in order to set a 1 1/2 inch top margin using the printer's default line spacing setting of 6 lines per vertical inch of the page.

Example:

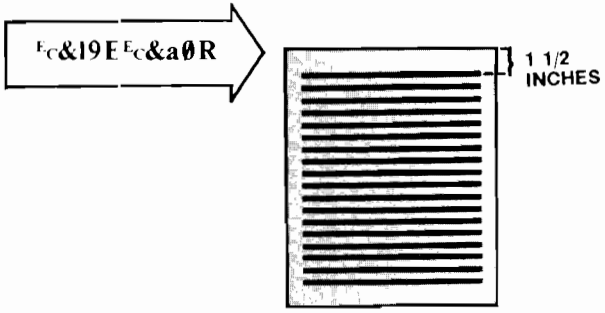


Figure 4-5. Setting the Top Margin

SETTING LEFT AND RIGHT MARGINS

To set the left and right margins enter the following escape sequences:

^{E}c&a#L (Set left margin)

^{E}c&a#M (Set right margin)

= Column number

When setting the left and right margins, select column numbers which represent the distances from the edges of the page where you want printing to begin and end. Enter these column numbers in place of the # signs when sending these escape sequences to your printer. You may combine these two sequences and send them as one string:

^{E}c&a#l#M

Remember that the printable area of your page begins and ends 1/4" from the left and right edges the paper. Column positions start at **0** where printing begins on the left side of the page and grow to a larger value as you move towards the right edge. When printing in landscape orientation, the long dimension of the page is the page width.

(The number of columns per page varies depending on the width --or "pitch"--of the characters you are using. If you need to figure the exact number of columns for a page, multiply the printable area of the page times the pitch setting listed for the character font you are using. Table 4-F at the end of this chapter lists the **LaserJet's** internal character font pitch settings–optional font cartridges list the pitch settings for the fonts they contain.)

In the following example, column numbers 10 and 70 are inserted in the escape sequence to set the left and right margins.

Example:

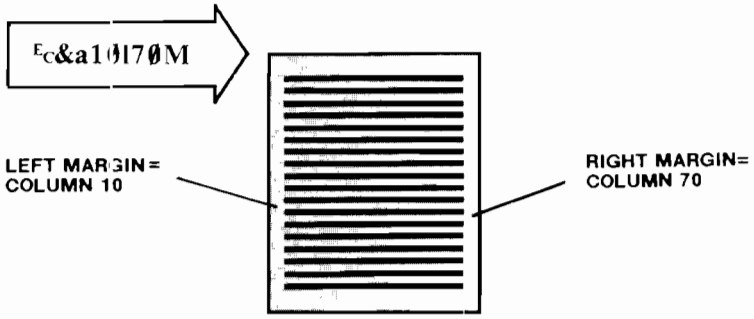


Figure 4-6. Setting Left and Right Margins

SETTING LINE SPACING

Line spacing refers to the number of text lines you want to print per vertical inch of your page. Line spacing can be set using either of two methods: lines-per-inch spacing (also called vertical line spacing) or vertical motion index. Since lines-per-inch spacing is most frequently used, this method is presented here. Refer to your Technical Reference Manual for instructions on using the vertical motion index method of line spacing.

Setting Lines Per Inch

To set the number of lines you want to print per vertical inch of your page, enter the following escape sequence:

Ec&l#D

= Number of lines per inch

Enter the number of lines per inch you wish to print in place of the # sign. Using the **LaserJet** printer's internal (or "resident") fonts, you can select any of these values to set your vertical line spacing: 1, 2, 3, 4, 6, or 8 (also 12 and 16 for printing in half-line increments). When the printer is reset, it operates at its line spacing default setting, which is 6 lines per inch.

Example:

These examples indicate the differences between line spacing values of 4, 6, and 8 lines per inch:

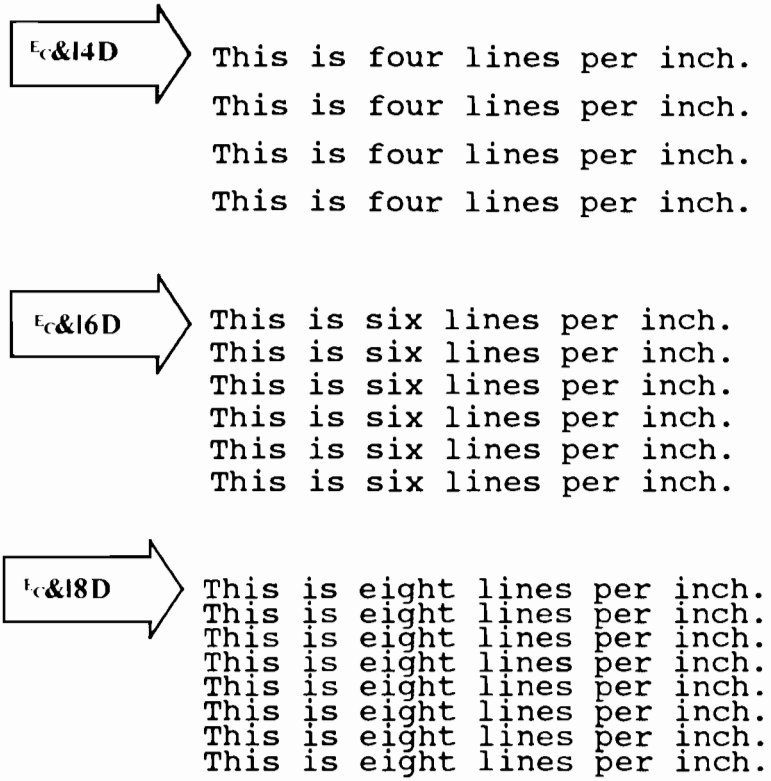


Figure 4-7. Setting Line Spacing

SETTING TEXT LENGTH AND BOTTOM MARGIN

To set text length, enter the following escape sequence:

^{E}C&l#F

= Number of text lines per page

Text length refers to the number of text lines you want to appear on each page. To enter text length, substitute the number of lines you select for the # sign.

By setting text length, you can vary the bottom margin. If you do not wish to set a text length, the printer will print a text length equal to the distance between the top margin and 1/2" from the bottom edge of the page. If you do not set a top margin or change the standard line spacing setting of 6 lines per inch, the printer will operate at its default setting and print 60 lines of text, portrait orientation, or 45 lines of text, landscape orientation. The default is set any time the page length or page orientation is changed.

Use Tables 4-A and 4-B on the following page to select standard text length settings for portrait and landscape orientation. To use these tables, print using the default line spacing setting of 6 lines per inch--**your top margin must already be set to one of the values listed across the top of the table you are using.** Move down the column that corresponds to your top margin setting and select the bottom margin you wish to use listed at the left side of the table. Enter the value that intersects the two columns in the text length escape sequence.

BOTTOM MARGIN:	TOP MARGIN SET AT: 1/2"*	1"	1 1/2"	2"
1"	57	54	51	48
1 1/2"	54	51	48	45
2"	51	48	45	42

*Top Margin Default Setting

Table 4-A. Portrait Orientation Text Length Settings

BOTTOM MARGIN:	TOP MARGIN SET AT: 1/2"*	1"	1 1/2"
1"	42	39	36
1 1/2"	39	36	33

*Top Margin Default Setting

Table 4-B. Landscape Orientation Text Length Settings

The following example uses the default line spacing setting of 6 lines per inch--a top margin of 1 1/2 inches is already set. To set a bottom margin of 1 1/2 inches, a value of 48 is inserted in the text length escape sequence.

Example:

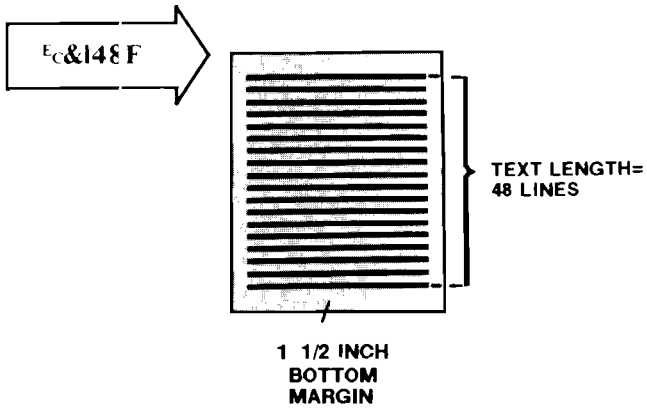


Figure 4-8. Setting Text Length and Bottom Margin

For many printing tasks, it won't be necessary to set the text length. Follow these instructions if you need to set a text length different than the ones included in the tables above.

1. Determine the total number of lines per page. This will vary depending on the line spacing you are using--multiply the number of lines per inch you are printing with times the page length to determine the total number of lines per page:

Line Spacing	x	Page Length	=	Total Number of Lines Per Page
8	x	11"	=	88

   (Refer to Tables 4-C and 4-D on pages 4-22 and 4-23 for listings of the number of lines per page for standard page sizes.)

2. Add the number of lines preceding the top margin to the number of lines you wish to make-up the bottom margin. (Figure the number of lines in terms of the line spacing you are using.)

3. Subtract this amount from the total number of page lines.

4. Enter the final amount in the text length escape sequence in place of the # sign.

Printing 66 Lines On A Letter-Size Page

Although the **LaserJet** prints 60 lines per letter-size page in portrait orientation using the default page formatting settings, the following example shows the escape sequence used to print 66 lines on a letter-size page, portrait orientation. This is accomplished by varying the line spacing setting, and combining this escape sequence with the text length escape sequence. Using this escape sequence, you will print with a 1/2" top and bottom margin.

To print 66 lines on a letter-size page using portrait orientation, enter the following escape sequence:

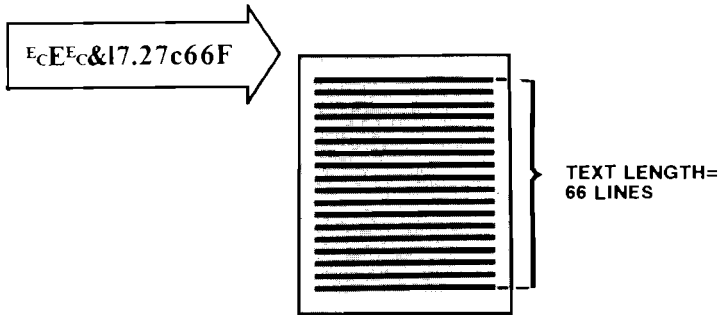


Figure 4-9. Printing 66 Lines on a Letter-Size Page

Printing 72 Lines on a European A4-Size Page

The following example shows the escape sequence used to print 72 lines of compressed print on a European A4-size page in landscape orientation. Using this escape sequence, you will print with a 1/2" top and bottom margin. To print 72 lines on an A4-size page, you need to use the 92286A font cartridge. Insert the font cartridge in the printer and enter the following escape sequence:

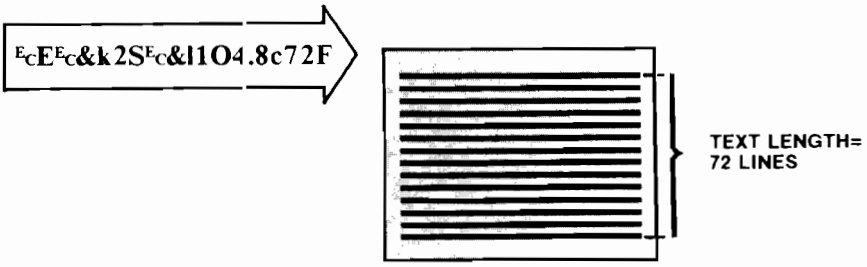


Figure 4-10. Printing 72 Lines on an A4-Size Page

SETTING PAGE LENGTH

Whenever a paper cassette is installed in the printer, it determines the size of paper the printer expects to print on. Occasionally, you may want to specify a page length different from the length set by the paper cassette you are currently using. Whenever you wish to override the paper cassette size, you must use the manual feed feature.

Whether printing in portrait or landscape orientation page length refers to the physical length of your paper from top to bottom--don't confuse this with the text length which refers to the total number of text lines you want to appear on your page.

Note: Setting the page length causes the printer to return the top margin, side margins, line spacing, and text length to their default settings. If you do not wish to use the default settings, you will need to reset these. When setting a page length, always enter the page length escape sequence first before any other commands or text appears.

To set the page length, enter the following escape sequence:

$$^{E}{}_{C}\&l\#P$$

= page length in number of lines

Insert the total number of lines per page in place of the # sign. Tables 4-C and 4-D below list the number of lines associated with standard paper sizes. Use the values in these tables to set your page length using either portrait or landscape orientation.

PAPER SIZE	CURRENT LINES PER INCH SETTING: 6	8
LETTER	66	88
LEGAL	84	112
EUROPEAN A4	70	93
EUROPEAN B5	60	80

Table 4-C. Portrait Orientation Page Length Settings

PAGE SIZE	CURRENT LINES PER INCH SETTING: 6	8
LETTER	51	68
LEGAL*	—	—
EUROPEAN A4	49	66
EUROPEAN B5	43	57

*The instructions below show you how to print a legal-size page in landscape orientation.

Table 4-D. Landscape Orientation Page Length Settings

If the page size or line spacing you wish to use is not included in the table, it is easy for you to determine the number of lines for your page. To do so, simply multiply the line spacing value times the length of your page.

NOTE

When setting a page length, the codes flashed on the display will correspond to the page size you select (L=letter size, LL=legal size, A4=A4, b5=B5).

Maximum allowable page length is 14 inches.

PRINTING A LEGAL-SIZE PAGE USING MANUAL FEED

With a legal-size paper cassette installed in the **LaserJet** printer, you do not need to send the escape sequence to set a legal-size page--the cassette automatically determines the paper size that the printer expects to print on. If, however, you do not have a legal-size paper cassette, and you want to print a legal-size page using the manual feed feature, the following instructions will show you how.

To set a legal-size page length and print using the manual feed feature, follow these instructions in the exact order listed:

1. Set the page length using the escape sequence **Ec&l84P**.

2. Enter **Ec&l2H** to automatically enable the manual feed feature.

3. Set page orientation using either the escape sequence **Ec&l0O** (portrait) or **Ec&l1O** (landscape).

4. Set any other values using the associated escape sequence-- for example, top margin, side margins, text length-- these are all returned to their default settings when the printer receives the page length escape sequence.

5. Send data to the printer. The letters "PF" and the paper size will alternately flash on the display.

6. Slide the top of your paper (face up) into the manual feed slot so that it rides against the right edge of the opening (along the paper feed guide) as shown in the illustration below. To feed more paper into the printer, wait until the the printer requests the next page with the "PF" status display.

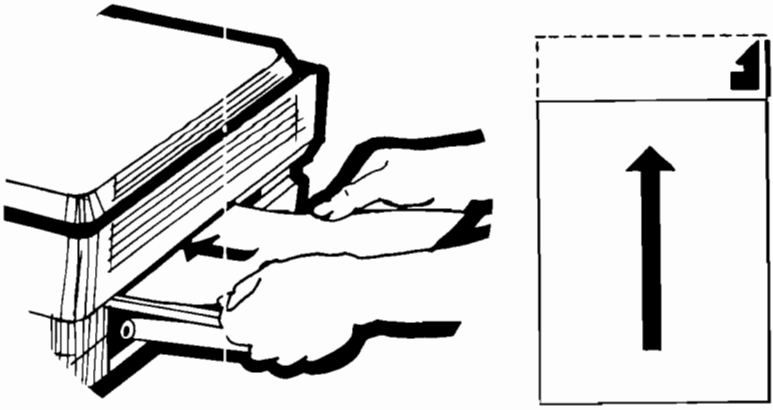


Figure 4-11. Printing a Legal-Size Page Using the Manual Feed Feature

7. When you are finished printing, exit manual feed by going off-line (press the on-line display key) and then press the **MANUAL FEED** key. Put the printer back on-line by pressing the on-line display key.

Note: The printer must receive a full page of data before it is ready to print. If you do not have a full page of data to send to the printer, refer to your software manual for instructions on printing a partial page. Printing a partial page usually involves typing a Page Break command after your data to let the printer know that you are ready to print--these commands vary according to the software package you are using. If you are not using a software package, a partial page may also be printed using the FORM FEED key of your printer.

The escape sequences in steps 1 through 3 can be combined and sent to the printer like this for portrait orientation:

^{E}c&l84p2hØO

or like this for landscape orientation:

^{E}c&l84p2h1O

In the following example, a value of 84 is inserted in the page length escape sequence to set a legal-size page length. This is combined with the escape sequence which automatically enables the manual feed feature (^{E}c&l2H) and the landscape orientation escape sequence--since no other page formatting commands are sent to the printer, the default settings will be used for printing.

Example:

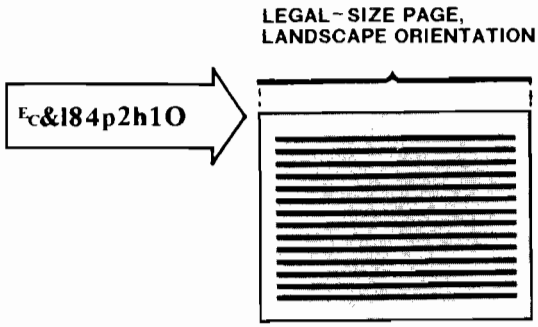


Figure 4-12. Setting a Legal-Size Page Length, Landscape Orientation

FORMATTING AND PRINTING ENVELOPES

The **LaserJet** printer formats envelopes as though they are standard letter-size pages. To print an envelope, you must send the printer specific formatting instructions.

The following instructions show you how to format and print a standard business-size envelope (9 1/2 x 4) which already has a pre-printed return address. You must enter all of the escape sequences and data requested prior to using the manual feed feature to print an envelope.

1. Set landscape orientation by entering the escape sequence **Ec&l1O**.

2. Set the envelope feed and the top margin by entering the escape sequence **Ec&l3h38E**.

3. Set the left margin by entering the escape sequence **Ec&a52L**.

4. Type the address (this will print in the center of the envelope).

5. Enter the Page Break command for the software package you are using--this lets the printer know that you are ready to print the envelope.

   (Refer to your software manual for the Page Break command used for your software package. For example, if you are using Wordstar, you will type ".PA", and if you are using MultiMate you will press "PAGE KEYS" and then "PAGE BREAK." If you are not using a software package, enter the escape sequence **EcE** in step 5 to let the printer know you are ready to print.)

6. Send data to the printer. The letters "PE" will flash on the display--this means that the printer is ready to print your envelope.

7. Slide your envelope into the manual feed slot so that the bottom of the envelope rides against the right edge of the opening (along the manual feed guide) as shown in the following illustration:

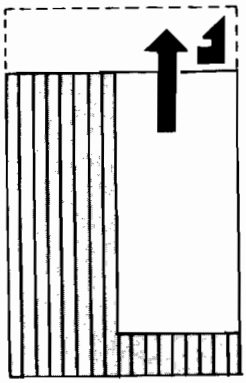


Figure 4-13. Printing an Envelope

(Lightly push the envelope into the manual feed slot until the printer pulls the envelope and begins printing.)

8. When you are finished printing, exit manual feed by going off-line (press the on-line display key) and then pressing the manual feed key. Press the on-line display key to put the printer back on-line.

If the FORM FEED display key is illuminated after printing an envelope, you may want to clear the print buffer by taking the **LaserJet** off-line, pressing the **FORM FEED** key, and then returning the printer on-line.

To print a standard letter-size envelope (7 x 3 1/2) which already has a pre-printed return address, substitute a value of 40 in the top margin escape sequence (step 2 above) and a value of 70 in the left margin escape sequence (step 2 above) and follow the instructions as listed. The escape sequences in steps 2 and 3 will look like this:

2. **Ec&l13h40E**

3. **Ec&a70L**

To print envelope sizes different than the ones shown here you will need to insert different values in the top margin escape sequence (Ec**&l#E**), and the left margin escape sequence (Ec**&a#L**). These values will vary depending on the size of envelope you wish to print.

About Character Fonts

In addition to using the **LaserJet** printer's internal, or "resident," character fonts, you can select other character fonts from optional font cartridges. Character fonts are selected using escape sequences. Explanations of font characteristics and instructions for installing and using optional font cartridges are presented here. You will need to apply the concepts included in this section to the character fonts you wish to use--either the printer's resident fonts or ones selected from optional font cartridges.

Refer to your Technical Reference Manual for a more detailed explanation of character fonts. Other character font applications are included there, as well.

INSTALLING A CHARACTER FONT CARTRIDGE

Follow these instructions to install optional font cartridges in your **LaserJet** printer:

1. Set the printer off-line (to do this, press the on-line display key).

2. Push the Power Switch to the OFF (0) position.

3. Slide the font cartridge into the slot in the upper right corner of the printer. Be sure that the cartridge is firmly seated in the slot.

4. Push the Power Switch to the On (1) position. The printer will power-up on-line.

FONT CHARACTERISTICS

Character fonts are collections of characters with uniform characteristics. These characteristics are defined using the following eight categories:

Orientation (portrait or landscape)

Symbol Set (Roman-8, Line draw, Math, etc.)

Proportional spacing or fixed spacing (character spacing)

Print pitch (characters per horizontal inch)

Character height (point size)

Character style (upright or italic)

Stroke weight (light, medium, or bold)

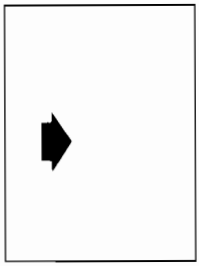
Typeface (Courier, Pica, Tms Rmn, etc.)

All font selection is done by priority. These font characteristics are listed in the order of priority that is used when sending escape sequences. This priority means that the printer considers your selection of printing orientation or symbol set more "important" than the stroke weight or typeface you request.

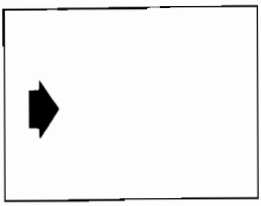
Before you learn the escape sequences associated with font selection, take a look at the following font characteristic examples. Each of these characteristics are also explained in the next section of this chapter.

Orientation

Orientation refers to the direction of print on the page. The **LaserJet** can print in either portrait orientation, with the text printed from left-to-right across the length of the page, or landscape orientation, with the text printed from left-to-right across the width of the page:



Portrait Orientation

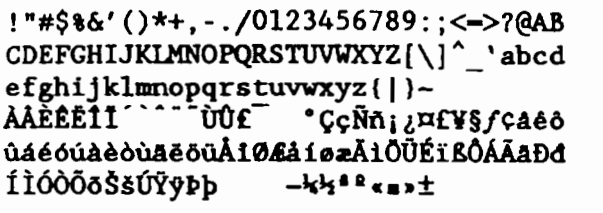


Landscape Orientation

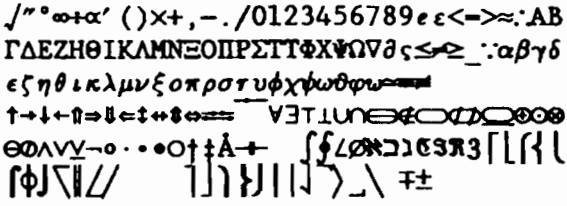
Figure 4-14. Portrait and Landscape Orientation

Symbol Set

Symbol sets represent sets of characters that are contained in the printer's memory. Differing symbol sets allow you to print different sets of characters. For instance, all of the characters on your keyboard make-up a symbol set. Here are examples of the Roman-8 and Math-8 symbol sets:



Roman-8



Math-8

Figure 4-15. Symbol Sets

Spacing

Within symbol sets, characters are composed of series of dots within cells:

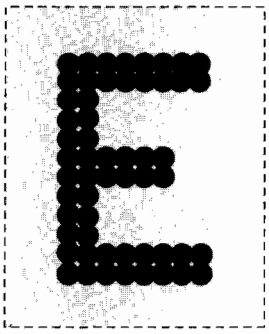
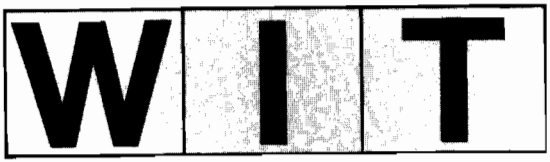
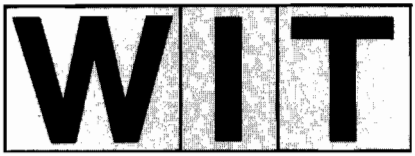


Figure 4-16. Character Cell

Spacing refers to the amount of space (width) each character cell is given--either fixed or proportional spacing can be used. Using fixed spacing, all characters fill a fixed amount of cell space. Using proportional spacing, character cell space varies depending on character size. The following illustrations show the difference between the two:



Fixed Spacing



Proportional Spacing

Figure 4-17. Character Spacing

Pitch

Pitch refers to the number of characters that can be placed in a horizontal inch of text. All fixed pitch character fonts use a specific pitch size. For example, a character font with a pitch setting of 10 will print 10 characters for every horizontal inch of your page. Character fonts with proportional spacing use varying pitch settings. Here are some examples of different pitch settings:

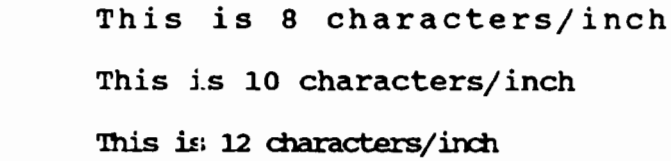


Figure 4-18. Character Pitch

Point Size

Points are units of measurement used to determine character height. There are 72 points in a vertical inch making one point equal 1/72 inch. Here are some examples of different point sizes:

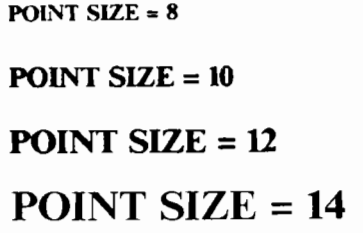


Figure 4-19. Character Height

Style

The **LaserJet** printer can print using either upright or italic character style:

UPRIGHT UPRIGHT UPRIGHT

ITALIC ITALIC ITALIC

Figure 4-20. Character Style

Stroke Weight

Stroke weight refers to the degree of print density. Bold, medium, and light stroke weights can be printed--here is an example of each:

LIGHT LIGHT LIGHT

MEDIUM MEDIUM MEDIUM

BOLD BOLD BOLD

Figure 4-21. Stroke Weight

Typeface

Typeface refers to the printed design of sets of characters. Here are some examples of different typefaces:

COURIER COURIER COURIER COURIER

TMS RMN TMS RMN TMS RMN TMS RMN

HELV HELV HELV HELV HELV HELV

LETTER GOTHIC LETTER GOTHIC LETTER GOTHIC

Figure 4-22. Typeface

Selecting Character Fonts

When you select character fonts using escape sequences, you send the printer instructions to select specific print characteristics from each of the eight categories listed above. Once these characteristics are combined, the result is the character font you wish to print with.

Optional font cartridges contain several different character fonts--the differences between fonts are determined by the kinds of selections made from these categories. **Characteristics are fixed for each font, and are not interchangeable between fonts.** To illustrate this point, take a look at the characteristics listed for the two sample fonts in Table 4-E on the next page:

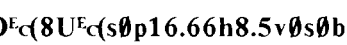
	A	B
ORIENTATION	LANDSCAPE	PORTRAIT
SYMBOL SET	ROMAN-8	ROMAN-8
SPACING	FIXED	FIXED
PITCH	16.66	10
POINT SIZE	8.5	12
STYLE	UPRIGHT	UPRIGHT
STROKE WEIGHT	MEDIUM	MEDIUM
TYPEFACE	LINE PRINTER	COURIER

Table 4-E. Sample Character Fonts

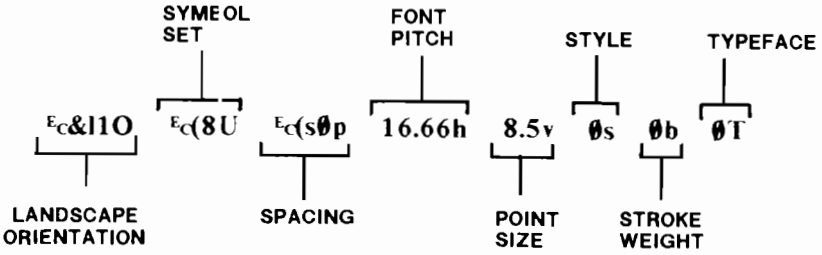
The characteristics listed for each font are fixed. In other words, you cannot mix the characteristics set for font A with those set for font B. It is not possible to "create" a separate font by combining selected characteristics from both font A and B. You must insert the exact settings listed for the font you want to use in the appropriate escape sequences. Characteristic settings are listed on optional font cartridges--refer to Table 4-F at the end of this chapter for a listing of the resident character font settings.

Because font characteristics are prioritized (orientation has the highest priority, and typeface the lowest), failing to designate the exact characteristic settings for the font you want to select may result in the printer choosing a font different than the one you want to use for printing. If some of the necessary font characteristics are not specified, the printer will select the the best-fitting font for printing.

This is what a character font escape sequence looks like:



This sequence selects all of the characteristics for font A in Table 4-E on the previous page. Here is a diagram of this escape sequence:



The following part of this section explains the escape sequences associated with font selection. Each of the escape sequences shown represent parts of a total font selection escape sequence. These escape sequences are combined and sent to the printer to select a specific character font to be used for printing. Before beginning, an explanation of default settings is included.

DEFAULT FONT CHARACTERISTICS

In the following explanations, the default setting refers to the **LaserJet** printer's internal font (the Portrait Courier font in Table 4-F at the end of this chapter) used for printing if no other character font is selected using escape sequences. This font is called the "default" font--your printer uses it any time it is reset (ESCE) or powered-up. Some of the optional font cartridges override the printer's default font and instead default to a font which is contained in the cartridge. If so, this will be marked on the cartridge and the "override" default font will be indicated.

CHARACTER FONT ORIENTATION

As explained in an earlier part of this chapter, the **LaserJet** can print characters in two orientations: portrait (with the text printed from left-to-right across the width of the page) or landscape (with the text printed from left-to-right across the length of the page).

Use these escape sequences to set portrait and landscape orientation:

$^{E}_{C}$**&l0O** - Set portrait orientation

$^{E}_{C}$**&l1O** - Set landscape orientation

If you are selecting a character font which changes the page orientation currently in use, the top margin, side margins, line spacing, and text length will be returned to their default settings. You will need to reset these if you do not wish to print using the default settings. Refer to the page formatting instructions earlier in this chapter if you need help. The printer's resident default font orientation is portrait.

SETTING SYMBOL SET

Symbol sets represent sets of characters that are contained in the printer's memory. Differing symbol sets, then, allow you to print different sets of characters--more specialized character sets make it possible to print math or legal symbols.

The **LaserJet** printer allows you to print with several different symbol sets. The following escape sequences set USASCII or Roman-8 symbol sets:

USASCII $^{E}_{C}$**(0U**

Roman-8 $^{E}_{C}$**(8U**

Refer to your Technical Reference Manual for escape sequences used to select other symbol sets. The font you are selecting must contain the symbol set you request. You must insert the symbol set escape sequence for the font you are selecting from either the resident fonts, or from an installed font cartridge.

Optional font cartridges list the symbol sets for the fonts they contain. The printer's resident default font symbol set is Roman-8.

SETTING SPACING

Spacing refers to the amount of space (width) each printed character is given. Characters are printed using one of two types of spacing--either fixed or proportional spacing is designated for each character font. Using fixed spacing, all characters fill a fixed amount of space--each character cell is the same size. Using proportional spacing, character cell space varies depending on character size.

Use the following escape sequences to set either proportional or fixed spacing:

Fixed spacing **Ec(s0P**

Proportional spacing **Ec(s1P**

Proportional spacing cannot be used unless there is a proportionally spaced font available on an installed font cartridge--you must enter the spacing escape sequence which is set for the font you are selecting. The printer's resident default font spacing is fixed.

SETTING FONT PITCH

Pitch refers to the number of characters that can be placed in a horizontal inch of text. All fixed pitch (non-proportional) character fonts use a specific pitch size which is listed on the font cartridge expressed in characters per inch (cpi). For example, a character font which uses a pitch setting of 10 will print 10 characters for every horizontal inch of your page.

Font cartridges with proportional spacing use varying pitch settings--these settings are automatically determined by the printer. For more detailed information on the relation between proportional spacing and pitch size refer to your Technical Reference Manual.

Use the following escape sequence to set character pitch:

$$^{E}c(s\#H$$

= Print pitch

Insert the pitch setting in place of the # sign when sending this escape sequence. You must set the character pitch which is listed for the font you are selecting.

If you request a print pitch different than the one set for the font you are selecting, the printer will select a font with the next greater pitch for printing. The printer's resident default font pitch setting is 10.

If you are using a font with proportional spacing, you do not need to set the print pitch.

SETTING POINT SIZE

Point size is a unit of measurement used to measure character height. There are 72 points in a vertical inch making one point equal 1/72 inch.

Use the following escape sequence to set point size (character height):

$$^{E}c(s\#V$$

= Point size

Insert the point size in place of the # sign when sending this escape sequence to the printer. You must insert the exact point size for the font you are selecting within the escape sequence. If the point size you request is not available, a font with a point size closest to your request will be selected by the printer. The printer's resident default font point size is 12.

SETTING CHARACTER STYLE

Either italics or upright character style can be printed using the **LaserJet** printer Use the following escape sequences to set the character style:

Upright: ^{E}(s0S

Italics ^{E}(s1S

To set italic style, a font cartridge with an italic font must be installed in the printer. The printer's resident default style is upright.

SETTING STROKE WEIGHT

Stroke weight refers to the degree of print density. It can be specified as bold, medium or light. A range of values are used to select both light and bold stroke weights.

Use the following escape sequence to set the stroke weight:

^{E}(s#B

= Stroke weight

Insert the number which specifies the stroke weight for the character font you are selecting in place of the # sign when sending this escape sequence to the printer. Optional font cartridges list the number to be inserted in this escape sequence to set the stroke weight for the font you wish to select.

You must set the stroke weight which is listed for the font you are selecting. If the stroke weight you request is not available on the font you select, a font with the closest matching stroke weight will be selected by the printer. The printer's resident default font stroke weight is medium.

SETTING TYPEFACE

Typeface refers to the printed design of character sets. Use the following escape sequence to set the typeface:

$^{E}{}_{C}$(s#T

= Typeface setting number

Insert the setting number in place of the # sign when sending this escape sequence to the printer. Optional font cartridges list the number associated with the typeface set for the font you to use for printing. Refer to Table 4-F at the end of this chapter for typeface setting numbers associated with the **LaserJet** printer's resident fonts.

You must request the typeface that is set for the font you are selecting. If you request a typeface that is not available on the font you are selecting, the printer will provide a typeface--this may result in a character font different than the one you want to print with being selected. The printer's resident default font typeface is Courier.

All of the escape sequences shown above represent parts of a font selection escape sequence. When they are combined, they select a particular character font to be used for printing--either one chosen from the **LaserJet** printer's resident fonts or from optional font cartridges.

Combining Escape Sequences

It is often possible to simplify escape sequences when sending them to the **LaserJet** printer. Many software packages have space limitations in the menus used for entering escape sequences. Due to these space limitations, you may need to shorten escape sequences. The following instructions will show you how to combine and simplify both page formatting and character font selection escape sequences. **You do not have to combine escape sequences using these instructions unless you do not have room to enter them in your terminal or software package menu.**

First, take a look at this example:

The following two escape sequences set the left and right margins. They can be sent to the printer separately as:

^{E}c&a10L and **^{E}c&a70M**

or they can be combined and sent to the printer as one simplified string:

^{E}c&a10l70M

Notice that the escape character "^{E}c" and the "& a" are dropped from the second escape sequence when the two are combined. Also, the upper-case "L" that ended the first escape sequence becomes a lower-case "l" when these escape sequences are combined.

Remember these three important rules when combining escape sequences:

1. The first two characters after the escape character "E_c" must be the same in all of the escape sequences to be combined. In the example above, these are "&" and "a." The escape character "E_c" and the first two characters following it are used only once in a string of combined escape sequences.

2. The final upper-case character of the internal escape sequences must be changed to lower-case. In the example above, "L" becomes "l." The final character in the sequence must be upper-case to let the printer know that the escape sequence is complete and ready to be executed ("M" in the example above).

3. The escape sequences will be performed in the order in which they are specified (from left to right), so be sure to combine escape sequences in the order that they need to be performed.

Here is an example of a font selection escape sequence. When selecting font A from the sample fonts in Table 4-E above (page 4-38), instead of entering all of the individual font selection escape sequences like this:

E_c&l1OE_c(8UE_c(sØPE_c(s16.66HE_c(s8.5VE_c(sØSE_c(sØBE_c(sØT

This "combined" escape sequence is sent to the printer:

E_c&l1OE_c(8UE_c(sØp16.66h8.5vØsØbØT

Notice that the combined font selection escape sequence uses the escape character "E_c" only once after the first two escape sequences. Since all of the sequences that follow the first two contain the characters "(s" after the escape character "E_c,"

these two characters can be dropped from the combined escape sequences, along with the escape character "^{E}c."

Each of the upper-case letters is changed to lower-case within the combined escape sequence and the final letter remains upper-case to let the printer know that the escape sequence is complete.

Follow the instructions listed above to drop the escape character "^{E}c" and other characters from the individual escape sequences (the "parts" of a font selection escape sequence shown in the section above) to send font selection escape sequences.

Transferring Character Fonts to the Printer's Memory (LaserJet+ Only)

Using the **LaserJet+** printer (Option 200/210), it is possible to transfer character fonts from font file discs to the printer's memory using escape sequences. This is referred to as "downloading" character fonts. You may want to download fonts in order to use additional character sets for printing.

The information included in this section is intended as an introduction to downloading Hewlett-Packard character fonts. For more complete information and detailed instructions on downloading fonts to the **LaserJet+** printer, refer to your Technical Reference Manual.

As with the escape sequences used for page formatting and printing applications, the escape sequences presented here can be entered in a software file, a computer program, or can be transferred directly from your terminal to the printer. However, downloading character fonts requires you to use your operating system in order to copy your escape sequence and the font file information to the printer's memory.

Downloading Hewlett-Packard font files to the printer is a two-step process. First, you must assign a font ID number to the character font you want to transfer to the printer's memory. Use this escape sequence to assign a font ID number:

$$^{E}{}_{C}{}^{*}c\#D$$

In place of the # sign in this escape sequence, insert the number that you want to assign to the character font to be downloaded. This is an arbitrary number which you assign to the font for identification purposes.

Next, you need to copy the font file to the printer. All of the character font files on Hewlett-Packard discs are named. To copy the character font file to the printer, you will need to determine your operating system's copy command and then use that command along with the font file name to copy the file to the printer.

Follow these instructions to download a character font to the **LaserJet+** printer:

1. Enter the font ID escape sequence:

   $$^{E}{}_{C}{}^{*}c\#D$$

   In place of the # sign, insert the number you want to assign to the character font you are downloading.

2. Copy the character font file to the printer using your operating system's copy command (for example, the MS-DOS "COPY" command) and the name of the file you are downloading. The names of font files are given with HP font discs.

Once the character font is copied to the printer, you can print using the downloaded font by entering the following escape sequence:

$$^{E}_{C}(\#X$$

In place of the # sign in this escape sequence, enter the font ID number you assigned to the font you want to use for printing. You may enter this escape sequence in the place provided by your software package--for instance, a menu or set-up string--in order to print using a downloaded font.

After you have downloaded a font to the printer, you may wish to assign it a "permanent" status. This is an optional step--assigning a file as permanent allows you to reset the printer without deleting the downloaded font from the printer. To assign permanent status to a downloaded font, enter the following escape sequence after your file has been copied to the printer:

$$^{E}_{C}*c\#d5F$$

In place of the # sign in this escape sequence, enter the font ID number of the font you wish to make permanent.

If you do not wish to enter this escape sequence, the downloaded font is automatically assigned a "temporary" status. This means that the font will be deleted from the printer's memory any time you press the printer's RESET key or send the escape sequence "$^{E}_{C}E$."

If you wish to purge a downloaded font (either a permanent or a temporary font) from the printer's memory, enter the following escape sequence:

$$^{E}_{C}*c\#d2F$$

In place of the # sign in this escape sequence, enter the font ID number of the font you wish to purge.

Be sure to consult your Technical Reference Manual for additional instructions and information before downloading character fonts. Use the Basic program included there to download HP character fonts to the **LaserJet+** printer.

NOTE

Both permanent and temporary downloaded character fonts are deleted from the printer's memory any time the printer loses power or is turned off.

Miscellaneous Printing Features

Underlining

Use these escape sequences to underline any part of your text:

Begin underlining **Ec&dD**

Stop underlining **Ec&d@**

For example, to underline the word LaserJet in the following example, you would insert the underlining escape sequences like this:

Ec&dDLaserJetEc&d@

And your printed copy would look like this:

LaserJet

Figure 4-23. Underlining

Printing Multiple Copies

Use the following escape sequence to select the number of copies you wish to print:

^{E}c&l#X

= Number of copies

Enter the number of copies you want to print (up to 99) in place of the # sign. Most software packages will allow you to print multiple copies without requiring you to enter this escape sequence. If your software package does not perform this task, enter this escape sequence in the menu or other place provided by your software. If you are not using a software package, this escape sequence can be inserted anywhere on your page--it affects the current page and every page thereafter. This means that you need insert this escape sequence only once to print the same number of copies for each page of your document.

Example:

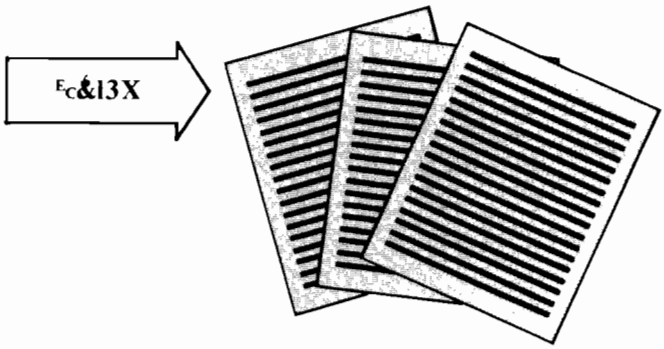


Figure 4-24. Printing Multiple Copies

LaserJet Printer Resident Character Fonts

The table below lists the font characteristics for the **LaserJet** printer's internal character fonts. The Portrait Courier font in this table operates as the printer's resident default font. This font is in use any time the printer is reset or powered-up. The Portrait Compressed Line Printer font is available with the **LaserJet+** printer only.

	PORTRAIT COURIER (DEFAULT FONT)	LANDSCAPE COURIER	PORTRAIT COMPRESSED LINE PRINTER *
ORIENTATION	PORTRAIT	LANDSCAPE	PORTRAIT
SYMBOL SET	ROMAN 8	ROMAN 8	ROMAN 8
SPACING	FIXED	FIXED	FIXED
PITCH	10 CPI	10 CPI	16.66 CPI
POINT SIZE	12 POINT	12 POINT	8.5 POINT
STYLE	UPRIGHT	UPRIGHT	UPRIGHT
STROKE WEIGHT	MEDIUM	MEDIUM	MEDIUM
TYPE FACE	COURIER	COURIER	LINE PRINTER

* Available with the **LaserJet+** only.

Table 4-F. Resident Font Characteristics

Send the following escape sequences to the print with any of the **LaserJet** printer's internal fonts:

Portrait Courier Font -- **ᴱc&l0OᴱcU8ᴱc(s0p10h12v0s0b3T ****

Landscape Courier Font -- **ᴱc&l1OᴱcU8ᴱc(s0p10h12v0s0b3T**

Portrait Compressed
Line Printer Font -- **ᴱc&l0OᴱcU8ᴱc(s0p16.66h8.5v0s0b0T**
(LaserJet+ Only)

** The Portrait Courier font operates as the printer's resident default font. You may switch from other character fonts to the the default font by resetting the printer (enter ᴱcE or press the HOLD TO RESET key available with the **LaserJet+** printer) or by switching the power off and then on again, as well as by entering the escape sequence listed here.

Chapter V

MAINTENANCE AND TROUBLESHOOTING

This chapter explains the maintenance procedures to follow in order to keep your printer operating at top performance. Troubleshooting instructions are included here in case you encounter any problems while printing. These instructions will help you to solve print quality problems or clear paper jams, for instance.

Contents:

Printer Maintenance

In order to keep your printer running smoothly and printing high-quality documents, the following procedures must be performed periodically:

- Replacing the EP Cartridge and Fusing Roller Cleaning Pad
- Cleaning the Coronas and General Cleaning
- Replacing the Separation Belt

REPLACING THE EP CARTRIDGE

The **EP Cartridge** needs replacement after approximately 3000 pages printed with the **print density dial** set to position 5 and the coverage about 4% (about the same coverage as the controller self-test). After approximately 3000 pages, printouts will begin to show white streaks in the direction of paper motion. At this point, the life of the **EP cartridge** can be slightly extended by removing the cartridge and shaking it as shown in the following EP cartridge replacement procedure. After doing this, insert the cartridge into the printer and run 3 or 4 test prints to check the image before printing data.

NOTE

The indicator window, located on the side of the **EP Cartridge**, does not accurately indicate cartridge life.

Setting the print density dial to a position darker than 5 will shorten cartridge life. Heavy graphics printing will also use toner more quickly than normal printing--this will require more frequent EP cartridge replacement.

You may notice a slight variation in print density (darkness) between different EP Cartridges.

If the **EP cartridge** needs replacing as indicated above, perform the following steps:

NOTE

When replacing the **EP Cartridge**, the **fusing roller cleaning pad** should be replaced as described below, and the transfer corona wires should be cleaned with a cotton swab. The cleaning pad and the cotton swab are both contained in the box with the new EP cartridge. See the "General Cleaning" section in this chapter for information on cleaning the corona wires.

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a. With the **upper main body** of the printer open, open the printer's **right door**, pull out the used **EP cartridge**, and disc it.

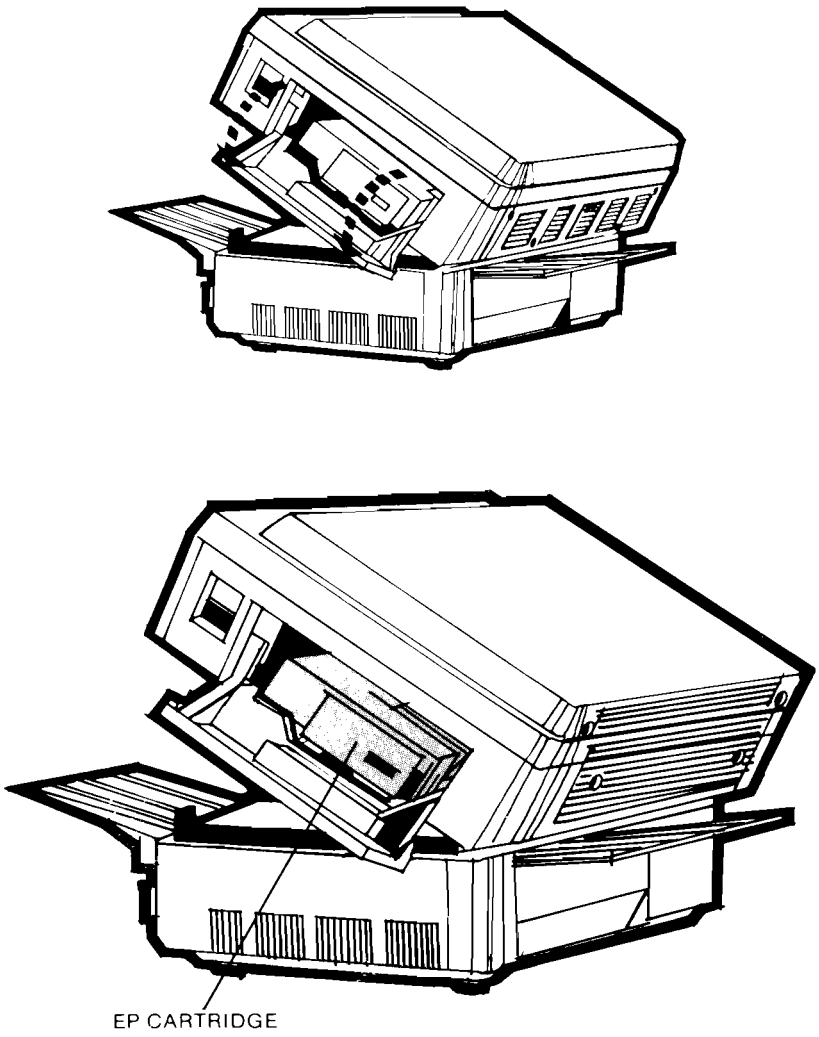


Figure 5-1. Removing the EP Cartridge

b. Hold the new **EP Cartridge** horizontally (as shown below) and shake it about five times in the direction of the arrow.

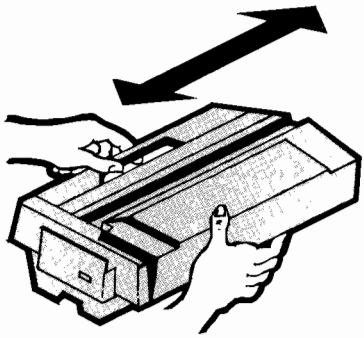


Figure 5-2. Toner Distribution

c. Fully insert the new **EP cartridge** into the printer.

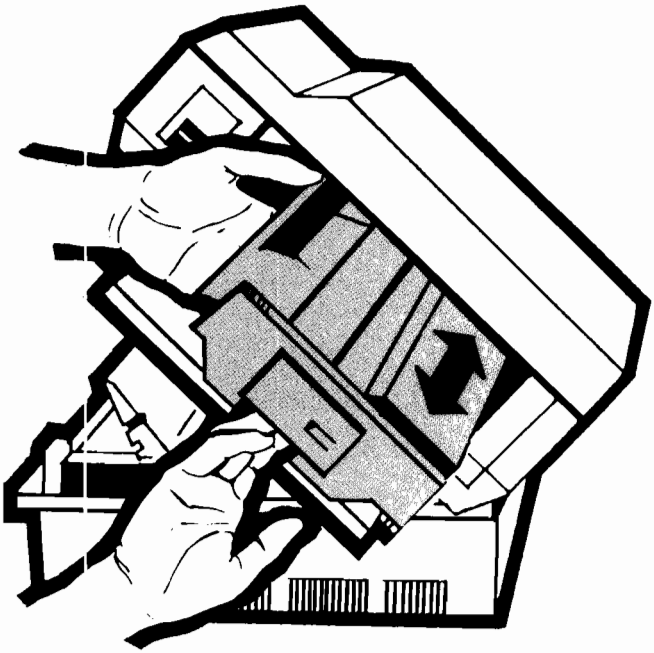


Figure 5-3. Inserting the EP Cartridge

d. Flex the black tab on the **EP cartridge** *until it breaks loose* (hold the cartridge steadily). Pull the tab out completely to remove the attached sealing tape. Dispose of the sealing tape. **NOTE: If the sealing tape separates from the black tab, grasp the sealing tape and pull it completely out of the cartridge.**

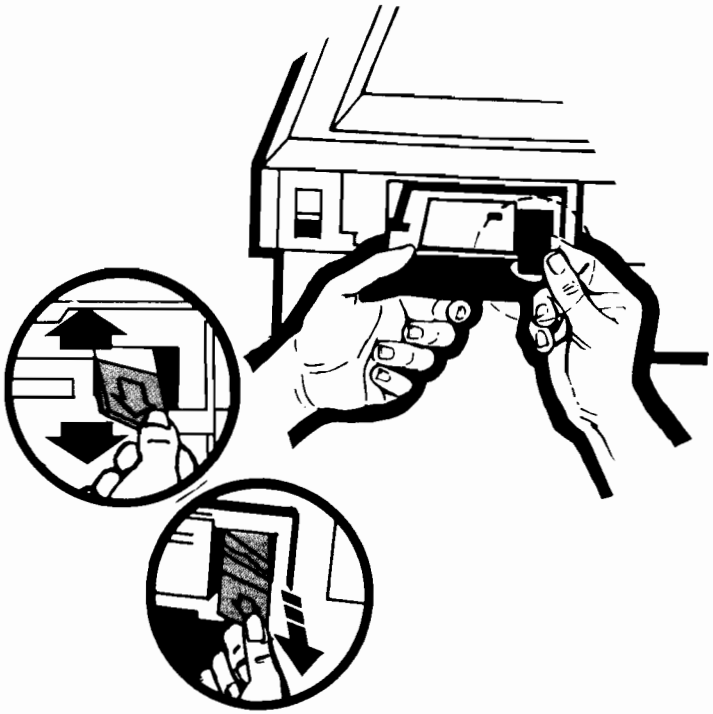


Figure 5-4. Removing the EP Cartridge Sealing Tape

e. Close the printer's **right door**.

f. Raise the **fusing assembly cover** and slide the green-handled **fusing roller cleaning pad** to the right. Slide a new cleaning pad into the slot and lower the **fusing assembly cover**. **NOTE: A new fusing roller cleaning pad comes in the box with the new EP cartridge.**

WARNING

The area around the fusing assembly gets hot during printing, so be cautious when installing a new cleaning pad.

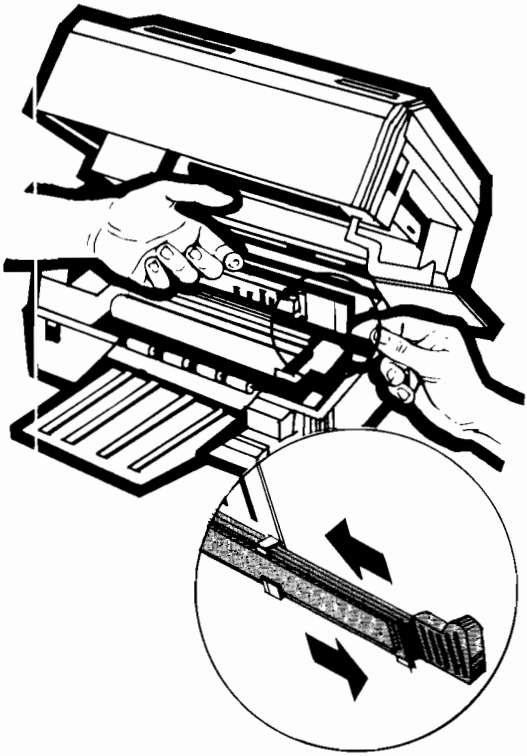


Figure 5-5. Inserting the Fusing Roller Cleaning Pad

NOTE

If the fusing rollers (located under the green **fusing assembly cover**) are dirty, turn the power switch OFF and, after the printer has cooled down, clean the rollers with a damp cloth (**CAUTION: Use water only**).

GENERAL CLEANING

The printer should be kept in a general state of cleanliness--any visible toner should be wiped away with a damp cloth and then re-wiped with a dry cloth.

There are three areas that need regular cleaning to keep the **LaserJet** printer printing at top performance: the **primary corona wire**, the **transfer corona wire**, and the **transfer guide**. This cleaning procedure takes only a few minutes and is simple to perform. Clean the three printer areas by performing the following procedures:

PRIMARY CORONA WIRE

a. Open the printer by pressing the **upper unit release lever** and lifting the **upper main body** of the printer.

b. Pull out the **EP cartridge**.

c. Locate the green-handled **wire cleaner** next to the fusing assembly (the location is pictured in step f. of the "Unpacking and Inspection" discussion in Chapter II).

d. Insert the green-handled **wire cleaner** into the long slot of the **EP cartridge** and move it back and forth several times in the slot (the cleaner displaces the thin protective plastic sheet). This step clears the **primary corona wire** within the **EP cartridge**.

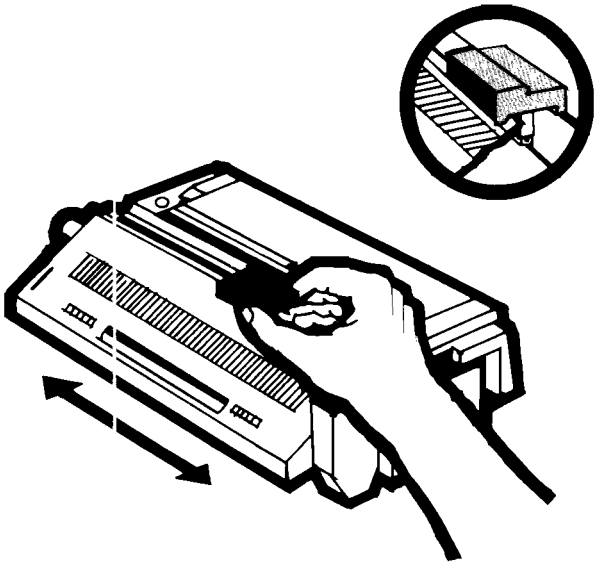


Figure 5-6. Cleaning the Primary Corona Wire

e. After cleaning the **primary corona wire**, re-insert the **EP cartridge** into the printer.

TRANSFER CORONA WIRE

a. With the upper main body of the printer open, dip a cotton swab in alcohol and gently wipe the **transfer corona wire**. Repeat this process until no residue remains.

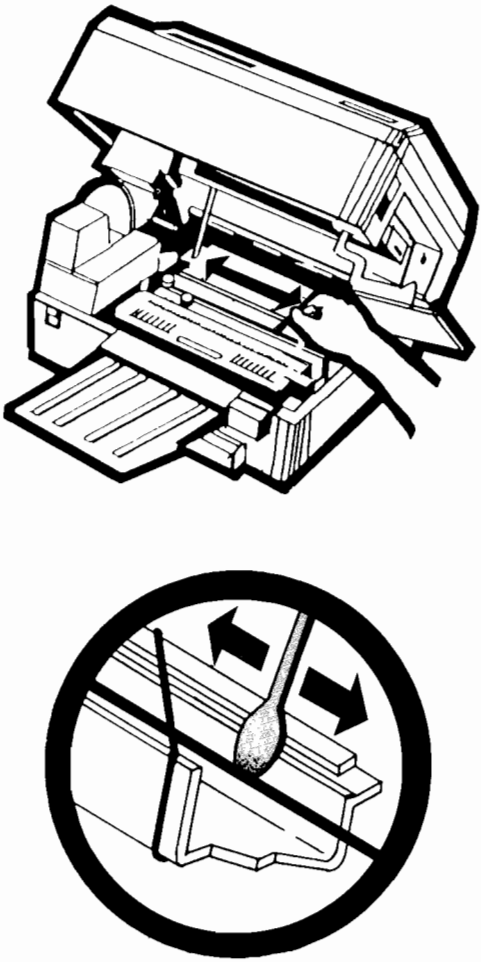


Figure 5-7. Cleaning the Transfer Corona Wire

TRANSFER GUIDE

a. With the printer open, dampen a cloth (it should be moist, not wet) and wipe the **transfer guide** clean.

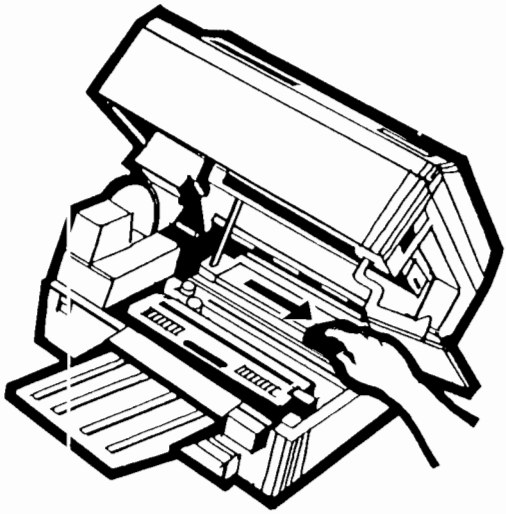


Figure 5-8. Cleaning the Transfer Guide

SEPARATION BELT REPLACEMENT AND CLEANING

SEPARATION BELT REPLACEMENT

The **separation belt** helps to guide paper through the printer and has a life expectancy of approximately 30,000 pages. If your printer's **separation belt** breaks, paper will not feed correctly and will jam in the machine. You can easily replace the belt by following the instructions below. **NOTE: A replacement separation belt is stored near the wire cleaner. If you use the replacement belt, be sure to order a new one from your Dealer or from the nearest HP Sales and Service Office (part no. RF1-0224-000CN).**

a. Press the **release lever** and lift open the **upper main body** of the printer.

b. The **separation belt** is located on the left side of the printer and is attached by loop A and loop B as shown in the illustration under step e. Remove the broken belt by sliding loop A from its hanger and loop B from the spring suspender.

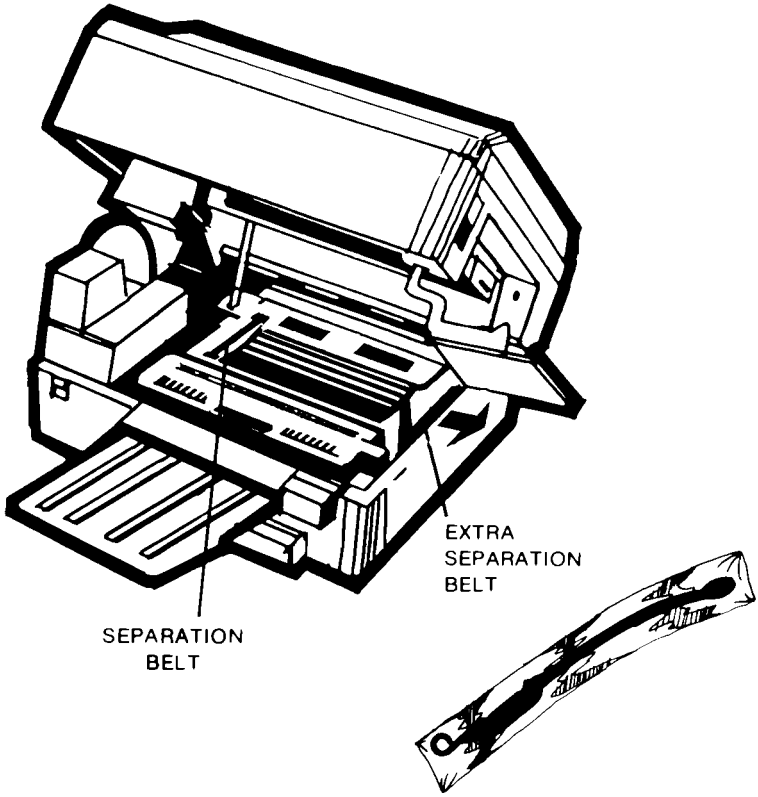


Figure 5-9. Locating the Separation Belt

c. Open loop A of the new **separation belt** so that the loop can fit around the upper transfer guide (see illustration).

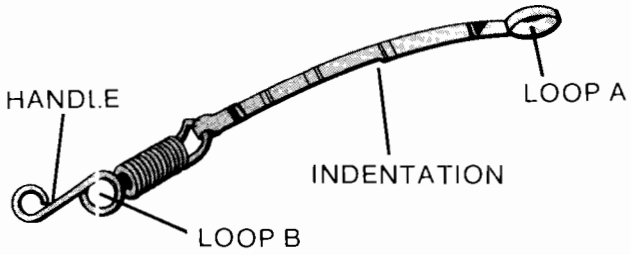


Figure 5-10. Separation Belt

d. Attach loop A on the hanger located on the right side of the **upper transfer guide**. The indentation on the **separation belt** belongs on the right side.

e. Pass the separation belt **over** the transfer roller and **under** the upper separation roller.

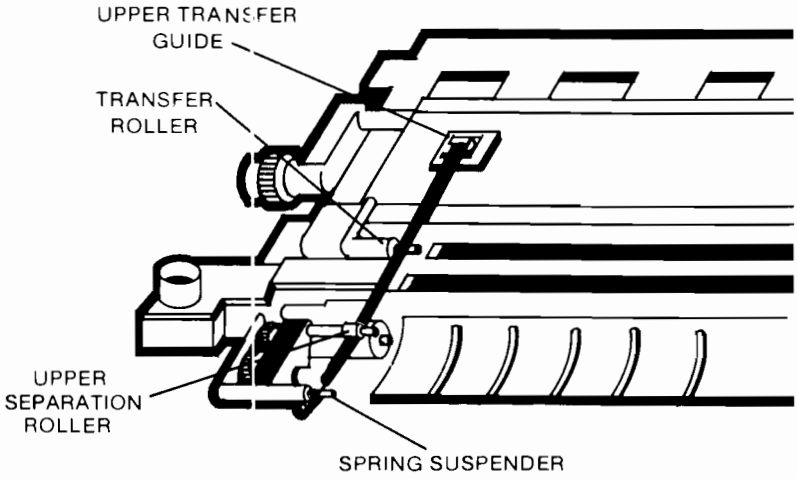


Figure 5-11. Installing the Separation Belt

f. Hook loop B on the spring suspender as shown in the illustration (loop B fits around the spring suspender).

g. Check the following items after installing the **separation belt**.

- Is the belt twisted or cut?
- Is the indentation on the right side as shown in the illustration above?
- Is loop A securely hung from the upper transfer guide?
- Does the belt pass over the transfer roller?
- Does the belt pass between the upper and lower separation rollers?
- Is the **separation belt** spring hooked securely to the spring suspender (through loop B)?

h. After you have checked to make sure the belt is on correctly, close the **upper main body** of the printer.

SEPARATION BELT CLEANING

Check the **separation belt** if a black line appears on the right edge of a printed sheet. If the face or rear of the belt is soiled, clean it with a cotton swab or with soft paper. Follow the separation belt replacement procedure above to remove the **separation belt** for cleaning.

In Case of Difficulty

Printer problems range from forgetting to plug in the power cable to serious electronic or mechanical problems which require an experienced Dealer or HP Service Representative to solve. This portion of the manual is designed to help you determine the cause of the problem and to solve it by yourself. A simple checklist is provided below to help you troubleshoot before you try more involved procedures. If, for some reason, you cannot solve the problem by reading and performing the procedures described in this section, call your local HP Dealer or call 1-800-472-6224 for assistance.

WHERE TO BEGIN?

Read and follow this checklist before you try more involved troubleshooting procedures:

- Is the AC power cord attached properly and plugged into an outlet of the correct voltage (the voltage is noted on the label to the left of the printer's AC power cord)?
- Is the power switch in the ON (1) position?
- Are the interface cable connectors seated properly on both the printer and the computer?
- Is the printer on-line (ON LINE indicator lit)?
- Are there any error numbers displayed on the **status display**? If so, consult the "Self-Test" and "Correcting Error Codes" discussions in this chapter.

If you are still experiencing a problem after following the above checklist, you are ready to narrow the problem down to a specific type. The problems most likely to occur are simple paper jams, used-up **EP cartridges**, dirty **primary** and **transfer coronas**, or a broken **separation belt**.

- Paper jam problems can be solved by following the instructions in the "Paper Jams" section of this chapter.

- Old or faulty **EP cartridges** are easily replaced by following the "EP Cartridge Replacement" procedure (earlier in this chapter).

- A broken **separation belt** can be replaced by following the "Separation Belt Replacement" procedure (earlier in this chapter).

- Most print quality problems can be solved by performing the "General Cleaning" procedures outlined earlier in this chapter and or replacing the **EP cartridge**. (Also see the "Solving Print Quality Problems" discussion in this chapter.)

The printer's self-test feature allows you to diagnose the majority of problems you may encounter. Read through the following "Self-Test" discussion and consult the "Correcting Error Codes" section below for possible problem/causal relationships.

Many problems are easily solved by following the procedures outlined in this chapter. If you cannot solve the problem by reading and performing the procedures outlined here, call your HP Dealer or HP Service Representative.

SELF-TEST

The **LaserJet** printer has two printing self-tests: a *print engine* self-test (TEST PRINT) which prints a pattern of striped lines (for checking print quality) and an *interface* self-test which prints rows of characters and also runs a diagnostic check of several printer functions. If an error occurs during the self-test (or during normal operation), a number will be displayed on the **status display** which indicates a particular error. These numbers are listed in the following "Correcting Error Codes" discussion, along with probable causes for the problem you are experiencing.

NOTE

The printer must be in a **READY** state and off-line to perform self-test. If the printer has been powered-up but never reaches the **READY** state, check the **status display** for an error number and, if an error number is displayed, check the "Correcting Error Codes" section below for a possible cause.

PERFORMING SELF-TEST

To perform the print engine and interface self-tests, follow the steps listed below:

a. With the printer off-line and in a READY state, press the **TEST PRINT button** located on the left side of the printer (see illustration on the next page). After a few seconds of delay, a striped printout will be printed for each time you press the **TEST PRINT button**. Check the printout to see that all the lines are uniform and clear, and that there are no light spots, smudges, missing areas, or other irregularities. If the printout does not appear satisfactory, check the "Solving Print Quality Problems" discussion in this chapter for possible causes.

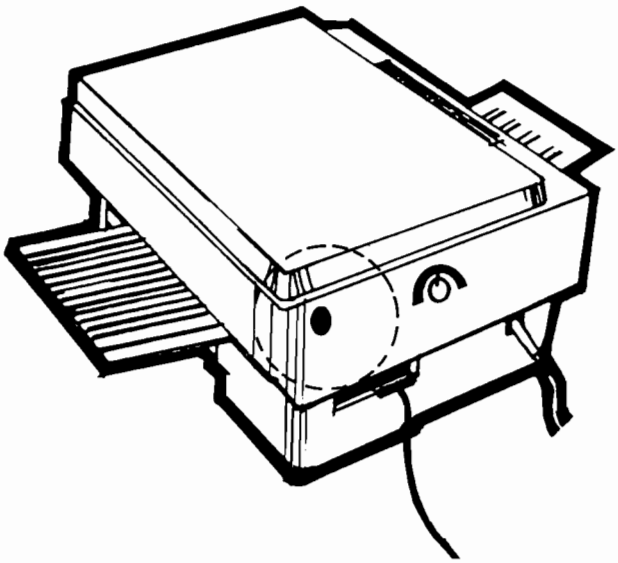


Figure 5-12. Test Print Button Location

b. Press the **SELF TEST** key on the **Operator Control Panel**. After a few seconds of delay, the printer will print a staggered character font pattern. Check to see that all the characters are clear and well-formed, and that there are no noticeable light spots, blotches, or streaks on the paper. If the printout has any of the problems mentioned above, repeat the self-test to see if these problems are repeated. If the problem is repeated, check the discussion on "Solving Print Quality Problems" in this chapter for possible causes.

c. Check the **status display** on the **Operator Control Panel** to see if any error numbers are displayed. If an error number is displayed, check the "Correcting Error Codes" discussion for possible ways to solve the problem.

CORRECTING ERROR CODES

If an error number flashes on the **status display** when you are running self-test (or even when printing), consult the table below to find out what you can do to correct the error. If you cannot correct the error after following the corrective procedure indicated, contact your HP Dealer or HP Sales and Service Office for assistance.

ERROR NUMBER	CORRECTIVE ACTION
00	Printer ready status--this is not an error condition. The printer ready status indicates that the printer is ready to print.
02	Wait status--this is not an error condition. The wait status indicates that the printer is warming up and will be ready soon.
05	Self test status (non-printing)--this is not an error. This status indicates that the printer is performing the non-printing portion of an interface self-test. When the non-printing portion of the self-test has been completed successfully, the status display will change to 06 (printing portion of the interface self-test).
06	Self test status (printing--staggered characters)--this is not an error. This status indicates that the printer is performing the printing portion of an interface self-test. When self-test has been completed, the status display will return to the printer ready status (00). Printing can be continued by pressing the **ON LINE** or **CONTINUE** key on the **Operator Control Panel**.
07	A flashing number 7 indicates that the printer has been reset from the Operator Control Panel--this is not an error message. (This applies to **LaserJet+** printers only.)
11	A flashing number 11 means that either the **paper cassette** is empty or the cassette is not loaded into the printer. To correct this problem, add paper to the cassette, load the cassette into the printer, and press the **CONTINUE** switch on the **Operator Control Panel**. Printing will not be allowed until the condition is corrected. **NOTE: If the wrong size paper**

cassette is loaded, "PC" will flash on the status display as printing is attempted.

12 A flashing number 12 indicates that the upper main body of the printer is not closed properly. Close the printer until it is firmly latched and then press the **CONTINUE** key. **NOTE: Printing will not continue until the printer is completely closed.**

13 A flashing number 13 on the **status display** indicates that a paper jam has occurred. Open the upper main body of the printer and check for jammed paper. Remove the jammed paper, close the printer, and press the **CONTINUE** key. Data on the jammed page will be reprinted automatically. **NOTE: the printer must be opened to clear the paper jam error.** For more information on clearing paper jams, see the "Paper Jam" discussion later in this chapter.

14 A flashing number 14 indicates that the **EP cartridge** is either not installed or not correctly installed in the printer. To correct the error, insert an **EP cartridge** or make sure the installed cartridge is fully seated in the printer. Press the **CONTINUE** key to resume printing. **NOTE: printing will not continue unless the condition is corrected.**

15 Test print status (striped pattern)--this is not an error. This status indicates that the TEST PRINT button has been pressed and that a print engine self test is being performed. When the test print has been completed, the status display will return to the printer ready status (00). Printing can be continued by pressing the **ON LINE** or **CONTINUE** key on the **Operator Control Panel**.

PC When this message flashes, the **status display** alternates between PC and a paper size number requested by the computer system (L=letter size, LL=legal, A4=A4, or b5=B5). To clear this condition, insert the requested paper cassette and press the **CONTINUE** key; if the requested paper cassette is not inserted, pressing the **CONTINUE** key will cause the printer to ignore the paper cassette request. **NOTE: If the requested paper size does not match the installed cassette, the CONTINUE key will allow you to print on the loaded paper.**

However, the output will be formatted for the requested paper size and a possibility exists for a clipped image (due to the fact that formatting is intended for the requested size paper). For information on how to request a paper cassette size using escape sequences, consult the "Setting Page Length" (Esc&l#P) portion of Chapter IV.

PF When this message flashes, a manual paper feed has been requested. The **status display** will alternately flash PF and a paper size (L=letter size, LL=legal size, A4=A4, and b5=B5). Insert a sheet of the requested-size paper into the printer's manual feed slot. **NOTE: Inserting a paper size other than that requested on the status display may cause clipping of your image (due to the fact that the formatting is based on the requested paper size).** To exit the manual feed mode, press the **ON LINE** key to put the printer off-line and then press the **MANUAL FEED** key. Begin printing from the paper cassette by pressing the **CONTINUE** key.

PE A flashing PE indicates a request for an envelope to be fed into the printer. When an envelope is fed into the printer, the PE on the **status display** disappears and printing begins. To exit the envelope feed mode, press the **ON LINE** key to go off-line and press the **MANUAL FEED** key to exit the manual feed mode. Press the **CONTINUE** key to resume printing from the paper cassette.

FE A flashing FE on the **status display** indicates that the font cartridge was removed when the printer was on-line and being accessed. To clear the error condition, re-insert the font cartridge into the printer, press the power switch to the OFF (0) position to reset the printer, and then press the power switch to the ON (1) position.

FC A flashing FC indicates that a font cartridge was removed or replaced during the formatting of a page. Re-insert the removed cartridge and press the **CONTINUE** key. The current page will be formatted and then printed as intended.

FF This error occurs when the page buffer has been filled beyond capacity. Check to see if the correct font cartridge is installed. Check to see if an excess amount of data was sent to the printer (be aware of combined text and graphics

limitations). Switch the printer's power OFF and then ON to clear the error. If the problem persists (with a reasonable amount of data on the page), call your HP Dealer for assistance.

20 A flashing number 20 indicates a memory overflow error, meaning that there is more data received from the computer than will fit on the page. This error may also be caused by switching the computer power ON before switching the **LaserJet** power ON. To continue printing, press the **CONTINUE** key. Only the amount of data that fits on your page will be printed.

21 The flashing number 21 indicates that the page formatting process is not fast enough for the printer. Press the **CONTINUE** key to continue printing. **NOTE: There may be some data loss on the page that was being formatted when the error occurred.**

22 This error indicates that the printer's receiving buffer has overflowed during a busy state. Pressing the **CONTINUE** key resumes printing, but results in a loss of data.

40 This error indicates that a data error (parity, framing, or line overrun) has occurred during the reception of data from the computer. The error may also indicate an incorrect configuration or that the computer's baud rate does not match the **LaserJet** setting (factory set at 9600 baud). To continue printing, press the **CONTINUE** key. **NOTE: This error may also occur if you power-up the computer while the printer is on-line. If this happens, simply press the CONTINUE key to clear the error.** If this error occurs repeatedly, check the interface connector to ensure that it is connected firmly to the printer and computer. Also check to make sure that the configuration is set so that ENQ/ACK is OFF and Xon/Xoff is ON. If the error still occurs after ensuring that the interface connector is snugly seated and the configuration is correct, call your HP Dealer or HP Service Representative.

41 This error indicates that a temporary error has occurred in the printed page. To correct the error, remove the paper from the **output paper tray** and press the **CONTINUE** key to

resume printing. The page the error occurred on will be reprinted automatically.

50 This error number indicates a fusing assembly malfunction. The printer cannot immediately recover from this type of error. Switch the printer OFF (0) and wait a minimum of 10 minutes; then switch the printer power ON((1) and resume printing. If the **FORM FEED** light was on at the time the error occurred, resend the data to the printer.

51 A flashing number 51 indicates a beam detect malfunction. Press the **CONTINUE** key to resume printing.

52 Error number 52 indicates a scanner malfunction. Press the **CONTINUE** key to resume printing.

53 A flashing number 53 indicates a malfunction in the laser temperature control circuitry. The printer cannot immediately recover from this error. Switch the printer's power OFF and wait a minimum of 10 minutes; then switch the power ON and resume printing. If this error occurs repeatedly, call your HP Service Representative.

54 Check to see if the paper cassette is over-full (max. 100 sheets). If so, remove the excess paper and press the **CONTINUE** key to resume printing. If the paper cassette is not over-full, error number 54 indicates a main motor malfunction. Pressing the **CONTINUE** key clears the error and resumes printing. If this error occurs repeatedly, call your HP Service Representative.

55 Error number 55 indicates a printer command error, meaning that commands cannot be exchanged between the print engine and its controller. Press **CONTINUE** to resume printing.

60 This error indicates a bus error caused by a circuit malfunction. An improperly seated font cartridge may also cause this error message to be displayed. If a font cartridge is installed, make sure it is firmly seated in the slot. Switch the power to the OFF (0) position to reset the printer and then switch the power ON (1). If this error occurs repeatedly, call your HP Service Representative.

61 A number 61 flashing on the **status display** indicates a checksum error on the interface program ROM. Switch the power switch to the OFF (0) position to reset the printer and then set the power switch back ON (1). If this error occurs repeatedly, call your HP Service Representative.

62 Error number 62 indicates an internal font ROM checksum error. Switch the power switch first to the OFF (0) position and then to the ON (1) position to clear the error.

63 Error number 63 indicates a dynamic RAM error (read/write rror or parity error). Switch the printer's power OFF (0) and then ON (1).

64 Error number 64 indicates a scan buffer error. Switch the power switch first to the OFF (0) and then to the ON (1) position.

65 Error number 65 indicates a D-RAM controller error. Switch the power to the OFF (0) position and then to the ON (1) position.

67 Error number 67 indicates a miscellaneous interface hardware error. If this error occurs, switch the power switch first to the OFF (0) and then to the ON (1) position.

SOLVING PRINT QUALITY PROBLEMS

The majority of print quality problems can be solved by performing the "General Cleaning" procedure described earlier in this chapter, by using manufacturer-approved paper (see the Paper Specification Guide available from your HP Dealer or HP Sales and Service Office), and by replacing the **EP cartridge** when it becomes depleted (approximately every 3000 pages).

If you are experiencing a print quality problem, put the printer off-line and press the **TEST PRINT Button** a few times to see if the problem persists. If the problem persists, read through the possible print quality problems listed here (on the next few pages). Each situation has a procedure to follow to eliminate the problem. If these procedures do not solve the problem, call your HP Dealer.

BLANK PRINTOUT

Has the **EP cartridge** been inserted correctly in the printer? If not, re-insert the cartridge and perform the self-test.

Has the **EP cartridge** been used for more than 3000 pages? If so, replace the **EP cartridge**.

Has the sealing tape been removed from the **EP cartridge**? If not, remove the sealing tape and try the self-test procedure again. (See "Replacing the EP Cartridge" earlier in this chapter.)

If none of these procedures helps, see the "COMPLETE IMAGE IS LIGHT" discussion below.

COMPLETE IMAGE IS LIGHT

Is the **print density dial** set with its dot at the top (position number 5)? If not, set the dial to number 5 and repeat the self-test procedure. Does print quality improve when new paper is used? Be sure that the paper you are using meets the paper specifications listed in the Paper Specification Guide (available from your HP Dealer or HP Sales and Service Office).

Is the **transfer corona wire** broken (see discussion on cleaning **transfer corona wire**)? If so, call your HP Dealer.

COMPLETE IMAGE IS DARK

Is the **print density dial** set correctly (near the middle setting)? If not, set it correctly and repeat the self-test procedure. If this does not improve the image, try replacing your **EP cartridge**.

BLACK IMAGE

Is the **primary corona wire** broken (the wire is located under the vinyl flap of the **EP cartridge**)? If so, replace the **EP cartridge**.

STAINED STRIP ALONG RIGHT SIDE OF PAPER

Is the **separation belt** or the area around the belt dirty? If so, clean the dirty area and perform the self-test procedure (see "Separation Belt Cleaning and Replacement" in this chapter). If this does not eliminate the black stain along the right side of the page, replace the **EP cartridge**.

STAINS ON BACK OF PAPER

Is the area around the manual paper feed slot dirty? If so, clean it first with a damp cloth and then with a dry cloth.

Is there any toner on or around the **transfer corona assembly**? If so, clean it with a damp cloth and then with a dry cloth.

Is there visible toner on any of the printer rollers? If so, clean them first with a damp cloth and then with a dry cloth.

Is there any toner on the underside of the **EP cartridge**? If so, clean the cartridge with a damp cloth, then with a dry cloth.

Is the **fusing roller cleaning pad** dirty? If so, replace the **fusing roller cleaning pad** (see "EP Cartridge Replacement" procedure earlier in this chapter).

DARK VERTICAL LINES (IN DIRECTION OF PAPER FEED)

Is the **fusing roller cleaning pad** dirty? If so, replace the pad as described in the "EP Cartridge Replacement" procedure earlier in this chapter. If this does not eliminate the dark vertical lines, replace the **EP cartridge**.

SHARP HORIZONTAL BLACK LINES (CROSS FEED DIRECTION)

Call your HP Dealer or your Hewlett-Packard Service Representative.

BLURRED VERTICAL STRIPES (PAPER FEED DIRECTION)

Does the print image improve after cleaning the **primary corona wire**? If not, replace the **EP cartridge**.

BLURRED HORIZONTAL STRIPES (CROSS FEED DIRECTION)

Check the distance of the stripes from the edge of the paper. If they are approximately 188 mm (7.4 in) or 66 mm (2.6 in) from the edge, replace the **EP cartridge**.

WHITE HORIZONTAL LINES (OR OTHER SHAPES) ON BLACK BACKGROUND

Does the paper being used meet the specifications listed in the Paper Specifications Guide (available from your HP Dealer or HP Sales and Service Office)? Try another type of paper and see if the problem is corrected.

Is the paper damp? If so, replace it with dry paper and be sure to store your paper within the humidity range specified in Appendix D.

THIN VERTICAL WHITE LINES OR STRIPES (PAPER FEED DIRECTION)

Has the **EP cartridge been used for more than 3000 pages? If so, replace the EP cartridge.** If not, remove the cartridge and shake it as described in the section on replacing the cartridge. This will distribute the toner more evenly. Insert the cartridge into the printer and run self-test to see if the problem has been corrected. **NOTE: Shaking the cartridge may leak toner and stain some of the following prints. Print 3 to 5 test prints to check this before printing anything else.**

Is the **fusing roller cleaning pad** dirty? If so, replace the pad as described in the "EP Cartridge Replacement" procedure earlier in this section.

Does the print quality improve after the **transfer corona wire** is cleaned (see the cleaning procedure in the "Transfer Corona Wire" section of this chapter)? If not, replace the **EP Cartridge**.

FAULTY REGISTRATION

Is the leading edge of the paper curled excessively? If so, straighten the edge of the paper before using it or add new paper.

Is manufacturer-approved paper being used? If not, try an approved paper.

POOR FUSING (TONER SMEARS WHEN RUBBED)

Is manufacturer-approved paper being used? If not, add approved paper and try a self-test.

IMAGE WAVINESS OR DISTORTION

Call your HP Sales and Service Office.

PRINTER DOES NOT POWER-UP (READY INDICATOR DOES NOT LIGHT)

Is the power cord plugged into the AC outlet?

Is the AC power outlet receiving power?

Is the printer's power switch in the ON position?

Is the upper main body of the printer firmly closed?

CLEARING PAPER JAMS

When paper flows through the printer, it passes through four main areas: (1) manual feed area, (2) cassette feed area, (3) separation/feeder area, and (4) fusing/delivery area.

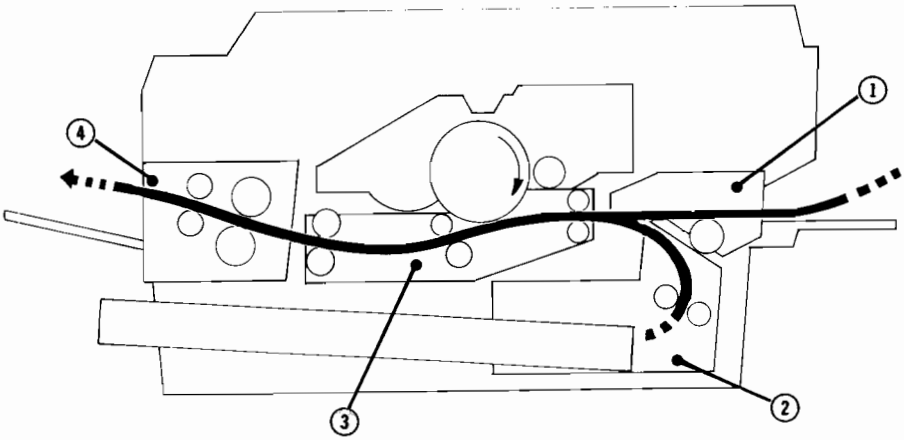


Figure 5-13. Printer paper Flow

When normal paper flow through the printer is obstructed, a number 13 will flash on the **status display**. To clear the jammed paper from the machine, follow the procedure shown below:

NOTE

If paper jams occur repeatedly, check to see if the **separation belt** is broken.

---

a. Press the **release lever** and lift open the upper main body of the printer. NOTE: **Some parts of the printer are sensitive to light, so do not allow the printer to be open for an extended amount of time in a well-lit room.**

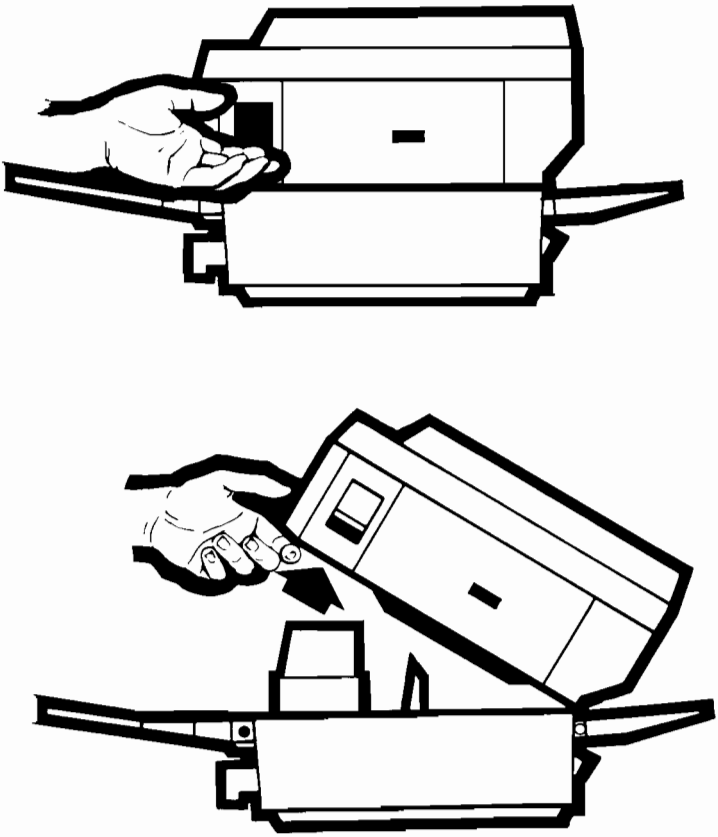


Figure 5-14. Printer Upper Main Body Open

b. Look for jammed paper in the **separation/feeder area**. (If the paper has entered the fusing area (green cover), see step c.) Carefully remove the sheet of paper. If the jammed paper is not in this area, proceed to step c.

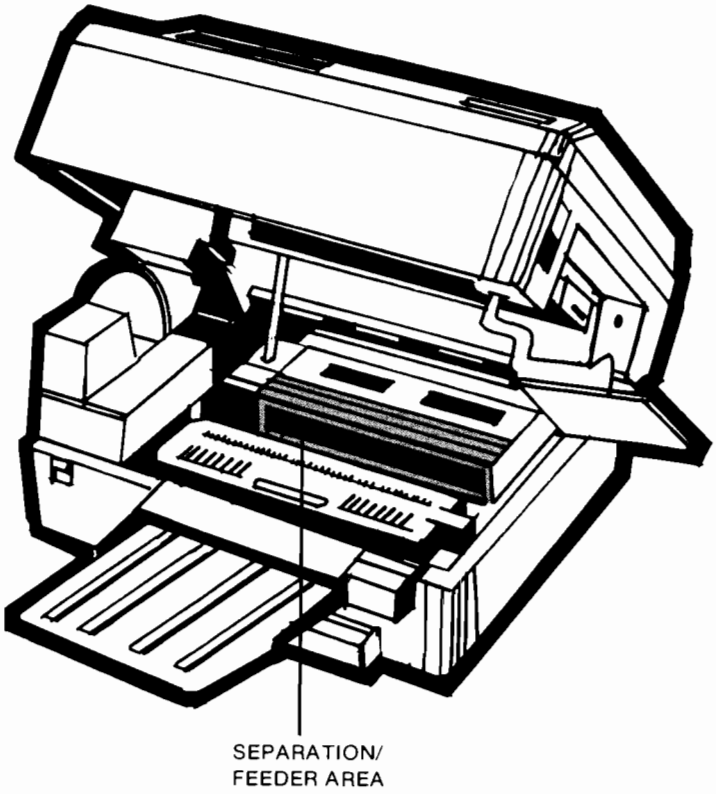


Figure 5-15. Separation/Feeder Area

c. If the jammed paper was not found in step b., open the green **fusing assembly cover** and check for jammed paper. Remove the paper by pulling it gently out of the printer. (It is not recommended to pull paper toward the front of the printer--see illustration below for correct way to remove paper.) If the jammed paper is not in this area, proceed to step d.

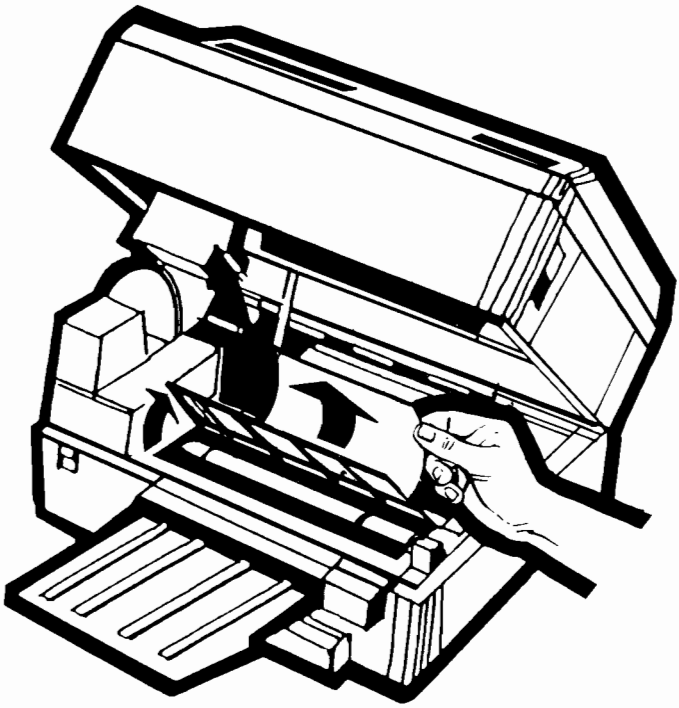


Figure 5-16. Opening the Fusing Assembly Cover

d. If the jammed paper was not removed in step c., open the **rear door** and check for jammed paper. Gently pull the paper out of the printer and close the **rear door**.

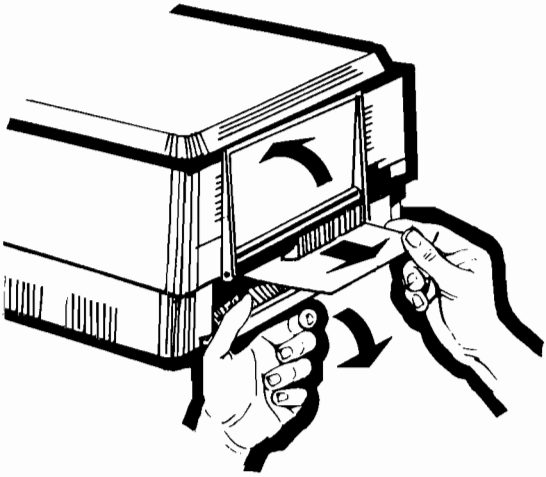


Figure 5-17. Opening the Printer's Rear Door

e. Press the **CONTINUE** key on the **Operator Control Panel** to resume printing. The page that was being printed during the jam will be automatically reprinted.

Appendix A

USING THE LASERJET AND LOTUS 1-2-3 (Version 1A) WITH THE IBM PC AND IBM PC/XT

Introduction

This appendix explains how to use the **LaserJet** printer with Lotus 1-2-3 and your IBM PC or IBM PC/XT. This appendix is not a substitute for reading the Lotus 1-2-3 documentation--it is meant to allow you to easily configure your LaserJet, IBM PC and Lotus 1-2-3 to access the printing features you need.

NOTE

Although your **LaserJet** printer is capable of printing graphics, the Print Screen driver for printing graphs and charts must be obtained from your HP Dealer. Alternatively, you may obtain a copy of "Graphics Printer Library II" from Lotus Development Corporation. Without either one of these drivers, you may not print charts and graphs with PrintGraph or dump graphics screens with Shft-PrtSc.

Using Lotus 1-2-3 with your IBM PC involves the following general steps:

- Configuring your printer (explained in Chapter II of this manual)

- Creating a batch file on your Lotus 1-2-3 working disc so that you may easily access Lotus 1-2-3

- Configuring Lotus 1-2-3 so that you can use the print features that you want

These steps are explained in the paragraphs below.

Printer Set-Up and Creating a Batch File

Before performing the procedures mentioned here, your printer must be configured as explained in the "Configuring Your Printer with the IBM Personal Computer" discussion in Chapter II of this manual. This section describes the cable, interface adapter, and necessary connections for connecting your printer and computer.

After going through the "Getting Started" section of your 1-2-3 manual and following the instructions there, you will have installed DOS and the proper drivers on your 1-2-3 system discs or on your hard disc. (You may run your 1-2-3 Electronic Tutorial before or after configuring your printer; this tutorial does not use your printer.)

The following instructions create a batch file on your disc that allows you to load Lotus 1-2-3 by simply typing **123**. (If you have a flexible disc drive, load your Lotus 1-2-3 working disc in disc drive A and type **A:** to get the A> prompt. The write-protect tab must be removed from your working disc.)

Create the batch file by doing the following from the A> prompt:

a. Type **COPY CON:123.BAT** and press ⏎.

b. Type **MODE COM1:9600,N,8,1,P** and press ⏎.

c. Type **MODE LPT1:=COM1** and press ⏎.

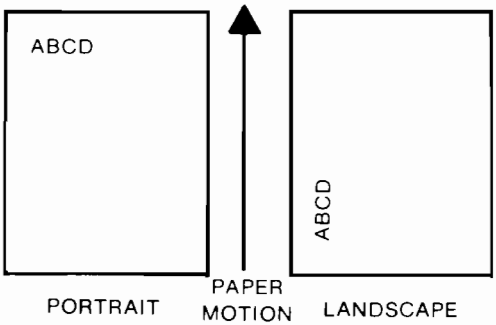
d. Type **LOTUS** and press ⏎.

e. Type **Ctrl-Z** and press ⏎.

Now, when you type **123** your computer will be configured to dump text screens to your **LaserJet** Printer and Lotus 1-2-3 will be loaded.

Configuring Lotus 1-2-3

The following steps set up 1-2-3 so that your printed output is formatted the way you want it. The **LaserJet** Printer has the capability to print worksheets in several different formats, either in portrait mode (from left-to-right across the width of the paper) or landscape mode (from left-to-right across the length of the paper).



The following steps assume that you have just loaded Lotus 1-2-3.

a. Type **1** to select 1-2-3.

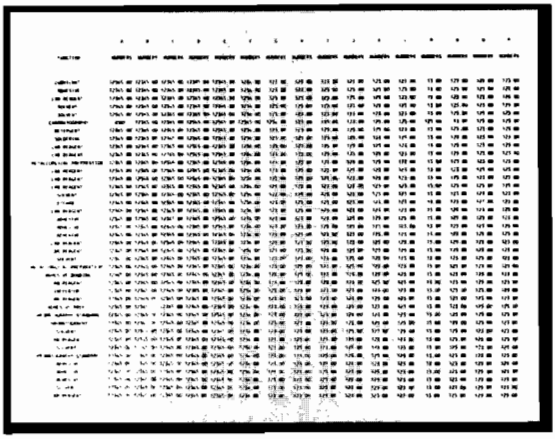
b. Press any key after the 1-2-3 logo appears to clear it from the screen.

c. Type / to access the command menu and type **WGDP** to select Worksheet, Global, Default, and Printer.

d. Type **128** to select your primary asynchronous interface and set it to 9600 baud. (If you wish to use your secondary asynchronous interface instead, type **148**.)

e. Type AN to set the Auto-LF off.

f. Choose how you would like to format your printout from the sample setups below, type S to enter the Setup String Menu, and enter the setup string corresponding to the setup format you desire. (**NOTE: Capital letters and lower-case letters have different meanings in the setup string. Type these in with care.**)



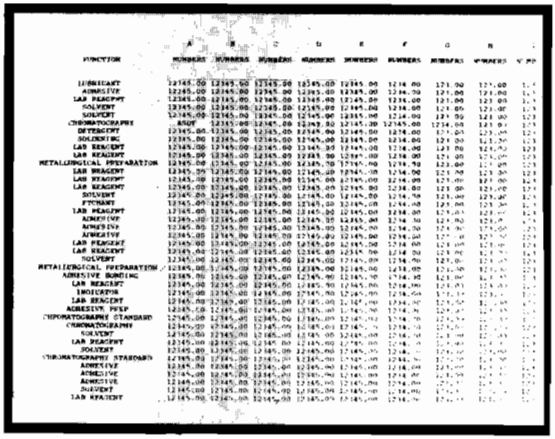
Setup Number 1 -- Landscape/compressed print, 176 columns, 45 or 66 lines per page (requires font cartridge)

Setup string for 176 columns, 45 lines per page:

Type -- **\Ø27E\Ø27&l1O\Ø27&k2S** and press ⏎.

Setup string for 176 columns, 66 lines per page:

Type -- **\Ø27E\Ø27&l1o2e5.647c66F\Ø27&k2S** and press ⏎.



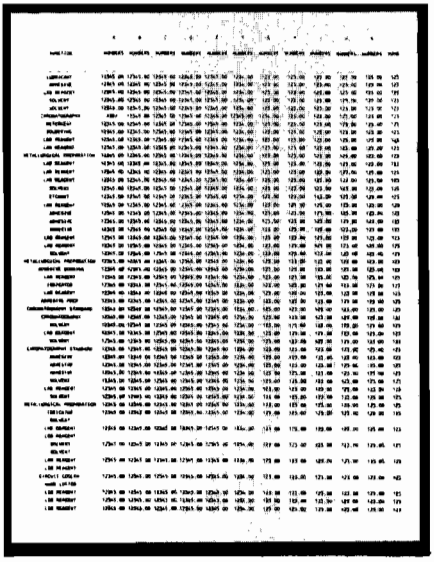
Setup Number 2 -- Landscape/normal print, 106 columns, 45 or 66 lines per page

Setup string for 106 columns, 45 lines per page

Type -- **\027E\027&l1O** and press ↵.

Setup string for 106 columns, 66 lines per page

Type -- **\027E\027&l1o2e5.647c66F** and press ↵.



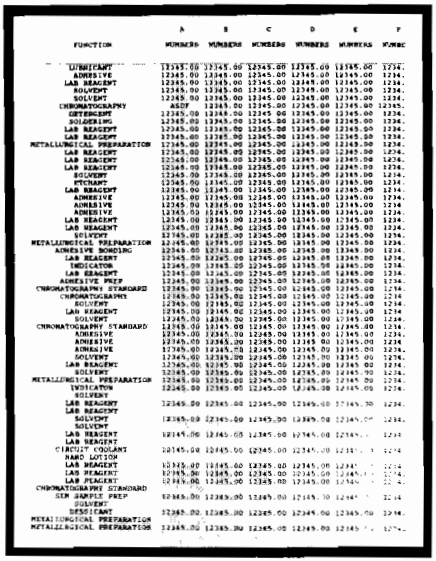
Setup Number 3 -- Portrait/Compressed Print, 132 columns, 60 or 89 lines per page (requires font cartridge or **LaserJet+**)

Setup string for 132 columns, 60 lines per page:

Type -- **\027E\027&k2S** and press ⏎.

Setup string for 132 columns, 89 lines per page:

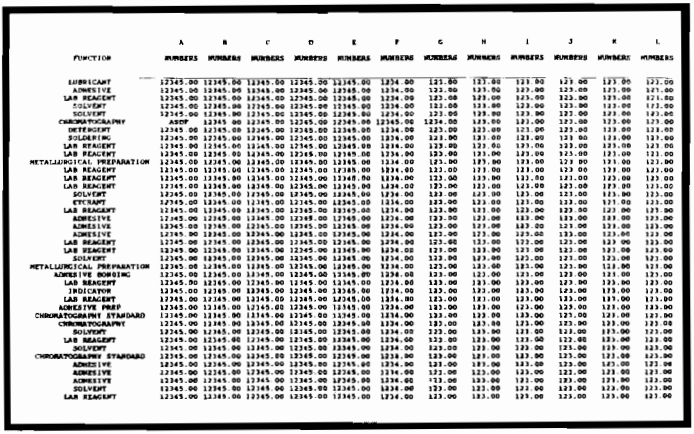
Type -- **\027E\027&l2e5.647c89F\027&k2S** and press ⏎.



Setup Number 4 -- Portrait/Normal Print, 80 columns, 66 lines per page

Setup string for 180 columns, 66 lines:

Type -- **\Ø27E\Ø27&l14c1e7.64c66F** and press ⏎.



Setup Number 5 -- Manual feeding legal-size paper/landscape mode compressed print, 136 columns, 45 or 66 lines per page (requires font cartridge or **LaserJet+**)

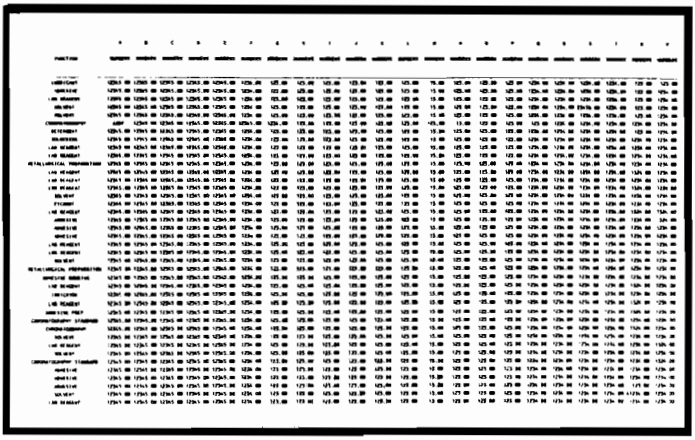
Setup string for 136 columns, 45 lines per page:

Type -- **\Ø27E\Ø27&l84p2h1O\Ø27&k2S** and press ⏎.

Setup string for 136 columns, 66 lines:

Type -- **\Ø27E\Ø27&l84p2h1o2e5.647c66F** and press ⏎.

This setup string will automatically access manual feed mode. When you are finished printing in the manual feed mode, press the ON LINE key to get off-line, press the MANUAL FEED key to exit manual feed mode, and then press the ON LINE key to get back on-line.



Setup Number 6 -- Manual feeding legal-size paper/landscape mode/normal print, 136 columns, 45 or 66 lines per page

Setup string for 136 columns, 45 lines:

Type -- **\Ø27E\Ø27&l84p2h1O** and press ↵.

Setup string for 136 columns, 66 lines:

Type -- **\Ø27E\Ø27&l84p2h1o2e5.647c66F** and press ↵.

NOTE

The setup options listed above are the most common ones. It would be impractical and confusing to list all the combinations that are possible with the **LaserJet** printer. If you wish to use other features or other combinations of features, all of the programmable features are documented in the **LaserJet** Technical Reference Manual. All of the commands in the setup string are escape sequences described in the manual. Notice that all the commands in the sample setup strings begin with \Ø27. That is because Lotus 1-2-3 translates \Ø27 into an escape character ($^{E}_{C}$). For example, the escape sequence to set the line spacing to 8 lines

configuration for one print job only), type /**PPO** for **P**rint, **P**rinter, **O** ptions and proceed from step e. of the setup procedure.

NOTE

Since the **U**nformatted option (step n.) cannot be configured as part of the global default menu, steps m. through p. must be repeated for every print job.

Using the PrintGraph Program

Once you have configured your printer and computer as described in Chapter II, configure PrintGraph as follows:

NOTE

To use PrintGraph with the IBM PC and **LaserJet**, you must have the Graphics Printer Library II (from Lotus Development Corp.).

---

a. Type **C** for **C**onfigure from the main PrintGraph menu.

b. Type **D** for **D**evice and specify the device as the **LaserJet** Printer according to the PrintGraph instructions.

c. Type **I** for **I**nterface and specify its value as **2**. (This step assumes that you are using the primary asynchronous adapter. If you are using the secondary asynchronous adapter, select **4** instead of 2.) This step makes the PRN device your output device.

d. Type **P** for **P**age to define the printable size of the page.

e. Type **L** for **L**ength, type **10.6** and press RETURN.

f. Type **W** for **W**idth, type **8.0** and press RETURN.

g. Type **Q** to **Q**uit the page menu.

NOTE

The page layout specified is based on an 8 1/2 x 11 inch page. Appendix D lists the printable limits for other paper sizes.

---

h. If you are running the program from flexible discs, remove your write-protect sticker so that writing is enabled. (Remember to replace the sticker when you are finished configuring.)

i. Type **S** to **S**ave your configuration on the disc.

j. Type **Q** to **Q**uit the configuration menu.

The following steps must be performed every time you want to change the size of a graph and every time you enter PrintGraph:

a. Type **O** for **O**ptions to enter the list of available printing options.

b. Type **S** for **S**ize to change the physical size of the output.

c. Specify the following values for the list of choices in this menu:

For portrait orientation:
Left: .5
Top: .5
Width: 4.0
Height: 6.0
Rotation: 0

For landscape orientation:
Left: .25
Top: .25
Width: 6.00
Height: 8.5
Rotation: 90

NOTE

These sizes give a graph of reasonable proportions, but are by no means a limit of size. Feel free to experiment with these values. They are limited by the physical size of the printable are on the page and the size of the graphics buffer in the **LaserJet** printer. If your entire graph is not printed, it may be because you have specified values beyond these limits.

---

d. Type **Q** three times to **Q**uit the Options menu and return to the Main menu.

Following the above steps, you are ready to select the graphs and print them as described in the PrintGraph section of the Lotus 1-2-3 User's Manual.

If you have any other questions concerning Lotus 1-2-3, consult your 1-2-3 manual or call Lotus Development Corporation.

Printer Set-Up

Before performing the procedures mentioned here, your printer must be configured as explained in the "Configuring Your Printer with the HP 150" discussion in Chapter II of this manual. This section describes the cable, interface adapter, and necessary

The following steps assume that you have just loaded Lotus 1-2-3.

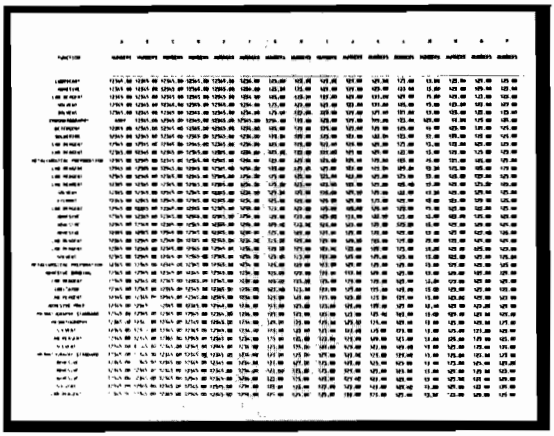
a. Type any key after the 1-2-3 logo appears to clear it from the screen.

b. Type / to access the command menu and type **WGDP** to select **W**orksheet, **G**lobal, **D**efault, and **P**rinter.

c. Type **I1** to select system device PRN as your printer.

d. Type **AN** to set the Auto-LF off.

e. Choose how you would like to format your printout from the sample setups below, type **S** to enter the Setup String Menu, and enter the setup string corresponding to the setup format you desire. (NOTE: **Capital letters and lower-case letters have different meanings in the setup string. Type these in with care.**)



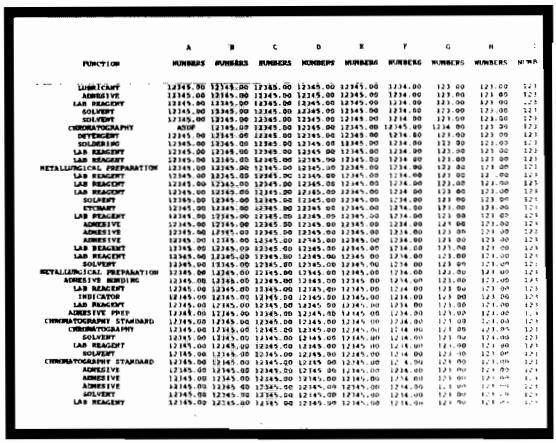
Setup Number 1 -- Landscape/compressed print, 176 columns, 45 or 66 lines per page (requires font cartridge)

Setup string for 176 columns, 45 lines per page:

Type -- **\027E\027&l1O\027&k2S** and press RETURN.

Setup string for 176 columns, 66 lines per page:

Type -- **\027E\027&l1o2e5.647c66F\027&k2S** and press RETURN.



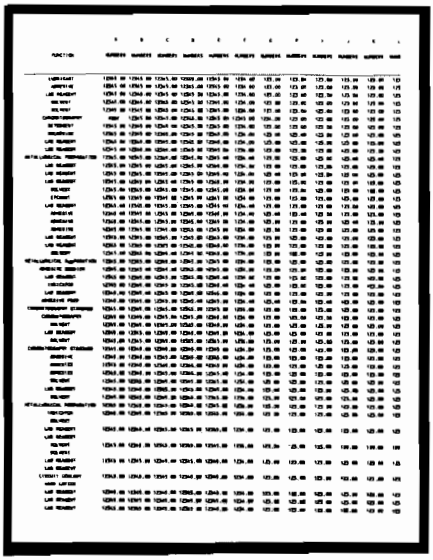
Setup Number 2 -- Landscape/normal print, 106 columns, 45 or 66 lines per page

Setup string for 106 columns, 45 lines per page

Type -- **\027E\027&l1O** and press RETURN.

Setup string for 106 columns, 66 lines per page

Type -- **\027E\027&l1o2e5.647c66F** and press RETURN.



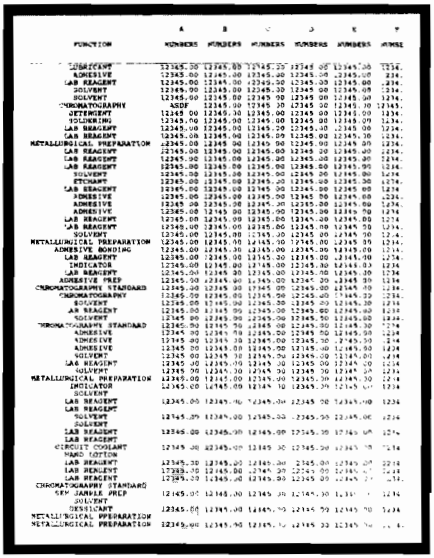
Setup Number 3 -- Portrait/Compressed Print, 132 columns, 60 or 89 lines per page (requires font cartridge or **LaserJet+**)

Setup string for 132 columns, 60 lines per page:

Type -- **\027E\027&k2S** and press RETURN.

Setup string for 132 columns, 89 lines per page:

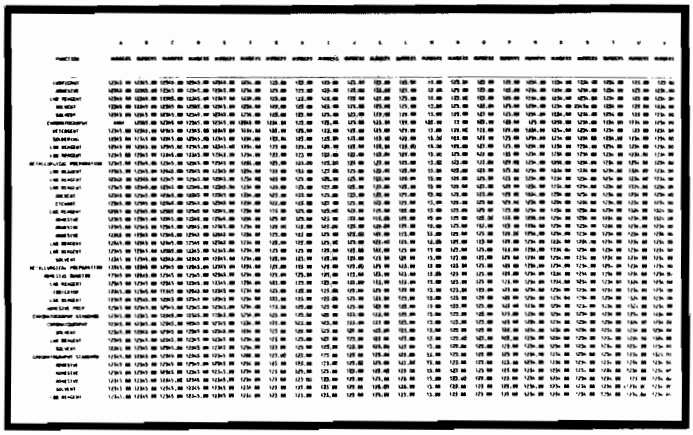
Type -- **\027E\027&l2e5.647c89F\027&k2S** and press RETURN.



Setup Number 4 -- Portrait/Normal Print, 80 columns, 66 lines per page

Setup string for 180 columns, 66 lines:

Type -- **\Ø27E\Ø27&l14c1e7.64c66F** and press RETURN.



Setup Number 5 -- Manual feeding legal-size paper/landscape mode/compressed print, 136 columns, 45 or 66 lines per page (requires font cartridge or **LaserJet+**)

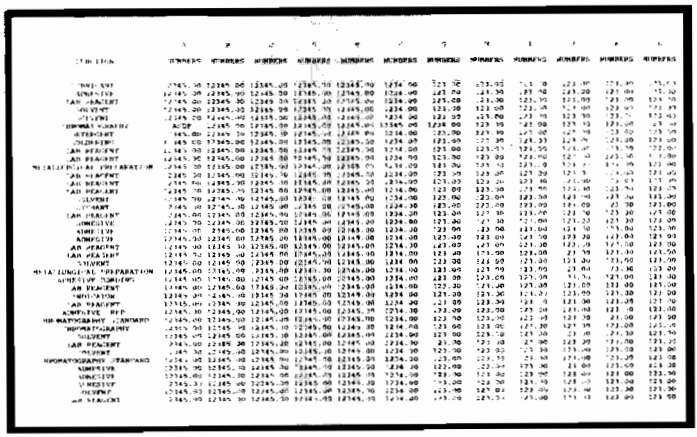
Setup string for 136 columns, 45 lines per page:

Type -- **\Ø27E\Ø27&l84p2h1O\Ø27&k2S** and press RETURN.

Setup string for 136 columns, 66 lines:

Type -- **\Ø27E\Ø27&l84p2h1o2e5.647c66F** and press RETURN.

This setup string will automatically access manual feed mode. When you are finished printing in the manual feed mode, press the ON LINE key to get off-line, press the MANUAL FEED key to exit manual feed mode, and then press the ON LINE key to get back on-line.



Setup Number 6 -- Manual feeding legal-size paper/landscape mode/normal print, 136 columns, 45 or 66 lines per page

Setup string for 136 columns, 45 lines:

Type -- **\Ø27E\Ø27&l84p2h1O** and press RETURN.

Setup string for 136 columns, 66 lines:

Type -- **\Ø27E\Ø27&l84p2h1o2e5.647c66F** and press RETURN.

NOTE

The setup options listed above are the most common ones. It would be impractical and confusing to list all the combinations that are possible with the **LaserJet** printer. If you wish to use other features or other combinations of features, all of the programmable features are documented in the **LaserJet** Technical Reference Manual. All of the commands in the setup string are escape sequences described in the manual. Notice that all the commands in the sample setup strings begin with **\Ø27**. That is because Lotus 1-2-3 translates **\Ø27** into an escape character (^{E}c).

For example, the escape sequence to set the line spacing to 8 lines per inch is **Ec&l8D** (as explained in the **LaserJet** Technical Reference Manual). To set up Lotus 1-2-3 for 8 lines per inch, you would substitute **\027** for the Ec character and enter **\027&l8D** in the setup string.

Here are some more examples:

Function	Escape Sequence	Add This To Lotus Setup String
Set number of copies to 25	**Ec&l25X**	**\027&l25X**
Select compressed print	**Ec&k2S**	**\027&k2S**

f. Set the **P**agelength by typing **P**, followed by the number of lines per page you desire. For example, if you want 66 lines per page, you would type **P66** and press RETURN.

g. Set the **T**op margin by typing **T0** and then RETURN. Set the **B**ottom margin by typing **B0** and then RETURN.

h. Set the left and right margins according to your page size and whether you are using normal or compressed print. See the explanation below for your application.

> **Landscape/Normal print** -- Type **L4** and press RETURN; type **R102** and press RETURN. This setting gives you 98 printable columns and 4 columns margin on the left and right. You may set the right margin as high as 106 and the left margin as low as 1 to get a full 106 columns with the normal font.
>
> **Landscape/Compressed print** -- Type **L4** and press RETURN; type **MR172** and press RETURN. This setting gives you 168 printable

columns and 4 columns margin on the left and right. You may set the right margin as high as 176 and the left margin as low as 1 to get a full 176 columns with the compressed font.

Portrait/Normal print -- Type **L4** and press RETURN; type **R76** and press RETURN. This setting gives you 72 printable columns and 4 columns margin on the left and right. You may set the right margin as high as 80 and the left margin as low as 1 to get a full 80 columns with the compressed font.

Portrait/Compressed print -- Type **L4** and press RETURN; type **R128** and press RETURN. This setting gives you 124 printable columns and 4 columns margin on the left and right. You may set the right margin as high as 132 and the left margin as low as 1 to get a full 132 columns with the compressed font.

i. Type **Q** to **Q**uit the Default Settings Menu.

j. Type **U** to **U**pdate the Lotus 1-2-3 default configuration; otherwise, the configuration will default to the standard default configuration.

k. Type **Q** to **Q**uit the Configuration menu.

l. Type /**PPOO** for **P**rint, **P**rinter, **O**ptions, and **O**ther.

m. Type **U** for **U**nformatted.

n. Type **Q** to **Q**uit the Options Menu.

o. Type **Q** to **Q**uit the Printer menu.

The printer set-up just described sets up the default Lotus 1-2-3 configuration. You may go back and change the default configuration at any time by repeating the setup procedure (beginning with step b.).

For landscape orientation:

Left: .25
Top: .25
Width: 6.00
Height: 8.5
Rotation: 90

NOTE

These sizes give a graph of reasonable proportions, but are by no means a limit of size. Feel free to experiment with these values. They are limited by the physical size of the printable are on the page and the size of the graphics buffer in the **LaserJet** printer. If your entire graph is not printed, it may be because you have specified values beyond these limits.

---

d. Type **Q** three times to **Q**uit the Options menu and return to the Main menu.

Following the above steps, you are ready to select the graphs and print them as described in the PrintGraph section of the Lotus 1-2-3 User's Manual.

If you have any other questions concerning Lotus 1-2-3, consult your 1-2-3 manual or call Hewlett-Packard at 1-800-472-6224.

Appendix C

SUPPLIES AND ACCESSORIES

Ordering Information

Consumable supplies and accessories may be ordered from your HP Dealer or directly from the Hewlett-Packard Computer Supplies Operation (CSO). Direct phone service is available to HP customers within the continental U.S. Orders may be taken from 9 a.m. to 5 p.m. in all U.S. time zones. If it is more convenient, orders may be placed with your local Hewlett-Packard Sales and Service Office. In Europe, orders may also be placed with the local HP Sales and Service Office. The phone number for Hewlett-Packard's Computer Supplies Operation is:

800-538-8787 TOLL FREE
CALIFORNIA (408) 738-4133 COLLECT

Printer Supplies

Black EP Cartridge--part no. 92285A--Electrophotographic cartridge contains toner (dry ink), the drum, and the development unit. Also included are a replacement **fusing roller cleaning pad**, a cleaning applicator, and user installation instructions.

Separation Belt--part no. RF1-0224-000CN (obtain from the nearest HP Dealer or HP Sales and Service Office)

Letter Size (8.5 x 11 inch) Paper Input Cassette--part no. 92285B (Holds 100 sheets)

Legal Size (8.5 x 14 inch) Paper Input Cassette--part no. 92285C (Holds 100 sheets)

A4 Size (198 x 287 mm) Paper Input Cassette--part no. 92285D (Holds 100 sheets)

B5 Size (170 x 247 mm) Paper Input Cassette--part no. 92285E (Holds 100 sheets)

Cabling

RS-232C CABLES

Part number 13242G (or 92219H)

HP 150 to **LaserJet** (5 metre male-to-male with pin 2/3 swap)--also HP 262X terminal slave cable

Part number 92219J (or 17255D)

IBM PC to **LaserJet** (female-to-male with pin 2/3 swap)

Part number 17355A

Male-to-male standard RS-232C cable (no pin swap)

Part number 40242D

RS-232C EXTENSION CABLES (NO 2/3 PIN SWAP)

Part number 92215F

15 metre, all pins extended (male-to-female)

Part number 30062-60018

7.6 metre cable (female-to-male) with 2, 3, and 7 pin extension

Part number 92215A

15 metre cable (female-to-male) with 2, 3, and 7 pin extension

Font Cartridges

Over 15 font cartridges are available for printing various sizes and styles of type. Bold, italic, compressed characters, line draw, and math symbols are just some of the fonts available. Contact your HP Dealer or HP Sales and Service Office for information about the available font cartridges.

Appendix D

SPECIFICATIONS

Printer's Physical Dimensions

Width:	47.5 cm. (18.5 inches)
Depth (body only):	41.5 cm. (16.2 inches)
Depth (with trays):	72.3 cm. (28.2 inches)
Height:	29.3 cm. (11.4 inches)
Weight:	32 Kg. (71 pounds)

Electrical

Voltage/Frequencies
115V +/-10% 58 - 62 Hz
100V +/-10% 48 - 52 Hz
220V +/-10% 48 - 52 Hz
240V +/-10% 48 - 52 Hz

Power Consumption at 115 Vac
850 Watts (printing maximum)

Environmental

Temperature (Printer and EP Cartridge)

Operating: 10 to 32.5 degrees Celsius
(50 to 91 degrees F.)

Storage: 0 to 35 degrees Celsius
(32 to 95 degrees F.)

Humidity

Operating: 20 to 80% Relative Humidity (RH)
Non-Operating: 10 to 80% RH

Altitude

Operating: 0 to 2,500 metres
(0 to 8,200 feet)

Non-Operating: 0 to 15,000 metres
(0 to 49,200 feet)

*** Audible Noise**

Printing: <55 dBA

Standby: <45 dBA

* Average sound pressure measured at one metre according to ISO/DP 7779.

Printable Characters-Per-Line (Fixed Pitch)

Print Pitch	Portrait/Landscape			
	Letter	Legal	A4	B5
10	80/106	80/136	77/112	66/97
12	96/127	96/163	93/135	80/116
16.7	132/176	132/226	129/188	111/167

Printable Lines-Per-Page

Lines/Inch	Portrait/Landscape			
	Letter	Legal	A4	B5
6	62/48	80/48	66/46	56/39
8	84/64	108/64	89/61	76/52

Printable Surface

		Letter	Legal	A4	B5
Width:	Inches	8.0	8.0	7.8	6.7
	mm	203	203	198	170
Length:	Inches	10.6	13.6	11.3	9.7
	mm	269	345	287	247

Paper

The **LaserJet** printer accepts 16 to 21 lb. (60-80 g/m^2) cut-sheet paper. Four paper sizes are acceptable: Letter size (8.5 x 11 in.), legal (8.5 x 14 in.), European A4 (210 x 297 mm), and B5 (182 x 257 mm). The printer was designed for use with high-quality copier bond paper. Therefore, for maximum reliability and print quality, copier bond paper is recommended for normal usage. The printer can also accommodate a wide variety of special application paper, such as labels, colored and preprinted paper, paper with pre-punched binder holes, as well as overhead transparency film. It is strongly recommended that all paper be tested before purchasing. Refer to the Paper Specifications Guide (available from your HP Dealer or HP Sales and Service Office) for more information on acceptable paper for your printer.

Appendix E

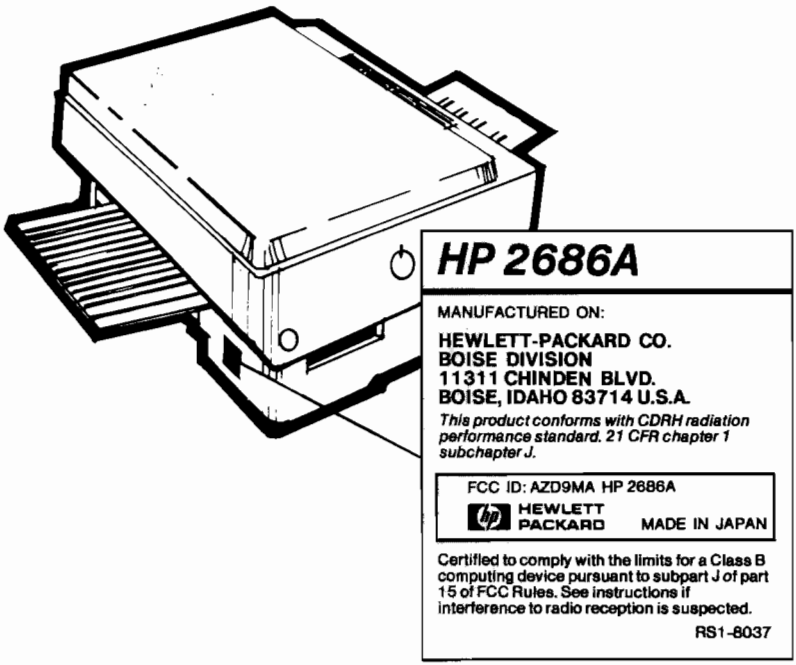
SAFETY AND WARRANTY INFORMATION

Operator Safety

The **LaserJet** printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since laser light emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

The Center of Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States. The label shown on the back of the printer indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States. **NOTE: The label location is shown in the illustration on the next page.**



Compliance Label Location

FCC Notice

*Federal Communications Commission Radio Frequency Interference Statement

This equipment generates and uses radio frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions) may cause interference to radio and television reception. The equipment has been type tested and found to comply within 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 to radio or television reception will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off

and on, the user is encouraged to try to correct the interference by one or more of the following measures:

a. Reorient the receiving antenna.

b. Relocate the computer equipment with respect to the receiver.

c. Move the computer away from the receiver.

d. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The Federal Communications Commission has prepared a booklet entitled "How to Identify and Resolve Radio - TV Interference Problems" which may be helpful to you. This booklet (stock #004-000-00345-4) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

* Use of a shielded interface cable is required to comply within the Class B limits in Subpart J of Part 15 of FCC rules.

Service and Warranty Information

Depending on how your system is purchased and how it is used, the optimum source of assistance may be Hewlett-Packard, your HP Dealer, or your own organization.

ASSISTANCE FROM YOUR LOCAL DEALER

If your printer is purchased from an HP Dealer or system house, your Dealer is the best source of assistance--knowing you, your needs, and your configuration. Of course, your Dealer is also backed up by special support resources within HP.

ASSISTANCE FROM YOUR OWN ORGANIZATION

If yours is a large organization with many purchased Hewlett-Packard printers, the best source of assistance may be within your own company. Some companies will designate central support personnel that you may go to when you have any problems with your printer--or when you need consumable items such as **EP cartridges**, **separation belts**, or paper. The central support personnel, in turn, can call on special resources within Hewlett-Packard for assistance.

HARDWARE MAINTENANCE

Recognizing that mechanical parts do wear and that electronic devices do occasionally need service, high-quality professional hardware support is provided through HP Personal Computer Dealer Repair Centers and the world-wide network of HP Sales and Service Offices. Larger organizations may elect to perform their own maintenance. . .backed up by HP parts and expertise.

MAINTENANCE BY HEWLETT-PACKARD

- Under a *Field Repair Center Maintenance Agreement*, you send the printer to a nearby HP Field Repair Center, where it is repaired within three working days. This contract is priced below the average cost of per-incident service. In addition, you get higher-priority service. . .and your costs are pre-budgeted, with no chance of an unexpected expense.

- *On-Site Maintenance Agreements* are available with several levels of response time and coverage. . .so that you may select the support level best suited for your system usage. For example, if you are within 100 miles of a primary service office, the support available ranges from next-weekday repair to 4-hour response, 24 hours per day, 7 days a week.

- For organizations with multiple **LaserJet** printers, a *Volume On-Site Maintenance Agreement* provides scheduled weekly repair visits at your central location if you are located within

100 miles of an HP Service Office. A contract can be written for any combination of 25 or more work-station products--processors, discs, printers, or plotters--all at low Field Repair Center Agreement rates.

Hewlett-Packard Field Repair. . . The "Worldwide Sales and Support Directory" of this manual lists HP repair locations worldwide--including HP Field Repair Centers. If there is no Repair Center in your country, contact an HP Sales and Service Office for assistance--ask for "Computer Customer Engineering".

MAINTENANCE BY YOUR LOCAL DEALER

The HP Dealers who are designated as *Personal Computer Dealer Repair Centers* provide maintenance at their location; many also offer maintenance contracts which include additional services such as pickup-and-delivery or loaner equipment.

*Dealer Repair Centers. . .*Many Hewlett-Packard Dealers are Authorized HP Personal Computer Dealer Repair Centers. To find the nearest Dealer Repair Center:

- In the U.S., call 800/835-HPHP
- In other countries, call your HP Sales and Service Office--ask for "Personal Computer Dealer Sales".

MAINTENANCE BY YOUR OWN PERSONNEL

If yours is a large organization, cooperative support may be the most economical alternative. Self-paced maintenance courses, service manuals, parts, exchange assemblies, and technical assistance are available from HP.

CAUTION: Use of controls, adjustments, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

Warranty Statement

90-DAY LIMITED WARRANTY

Hewlett-Packard warrants its computer hardware products against defects in materials and workmanship for a period of 90 days from receipt by the end user. During the warranty period, HP will either, at its option, repair or replace products which prove to be defective.

Should HP be unable to repair or replace the product within a reasonable amount of time, the Customer's alternate exclusive remedy shall be a refund of the purchase price upon return of the product.

CUSTOMER RESPONSIBILITIES

This warranty shall not apply to defects resulting from: improper or inadequate maintenance by customer; customer-supplied interfacing; unauthorized modification or misuse; operation outside of the environmental specifications for the product; or improper site preparation and maintenance.

OBTAINING SERVICE

To obtain warranty service, products must be returned to a service facility designated by HP. HP may repair on-site at the option of the customer. Customer is responsible for travel charges when on-site repair is requested.

If a twelve-month On-Site Maintenance Agreement is purchased within ten days of equipment delivery, warranty will be upgraded from return-to-HP to on-site free of charge.

Customer shall prepay shipping charges for products returned to HP for warranty service and HP shall pay for return of the products to customer. However, customer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

LIMITATION OF WARRANTY

HP makes no other warranty, either expressed or implied, with respect to this product. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. However, any implied warranty of merchantability or fitness is limited to the 90-day duration of this written warranty.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state, or province to province.

EXCLUSIVE REMEDIES

The remedies provided herein are customer's sole and exclusive remedies. In no event shall HP be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

OBTAINING SERVICE DURING OR AFTER WARRANTY

During the Warranty Period

If your hardware should fail during the warranty period, follow the test procedures indicated in this manual--if you cannot fix the problem, bring the failed piece of equipment to an Authorized HP Personal Computer Dealer Repair Center--or send the equipment to one of the HP Field Repair Centers listed at the end of this appendix.

- When sending equipment to a Field Repair Center, enclose a copy of the Repair Information Form, use the original shipping container, if possible, and insure the shipment.

- If you purchased a twelve-month On-Site Maintenance Agreement within ten days of equipment delivery, your on-site coverage has been extended to include the warranty period. Please fill out the reverse side of the attached Repair Information Form before you call.

After the Warranty Period

If your hardware should fail after the warranty period, follow the test procedure in this manual and then, if you cannot fix the problem, contact an Authorized HP Personal Computer Dealer Repair Center--or request service under your HP Field Repair Center or HP On-Site Maintenance Agreement. If you do not have a Maintenance Agreement, arrange for either repair center service or on-site service on a per-incident basis.

- When sending equipment to a Field Repair Center, enclose the attached Repair Information Form, use the original shipping container, if possible, and insure the shipment.

- When telephoning for on-site service, please fill out the reverse side of the attached Repair Information Form before you call.

Call your Authorized HP Dealer or your HP Sales and Service Office for details of the services available in your area.

Repair Information Form

If you are shipping your product for repair, please fill out this form and enclose it with your shipment. Repair cannot begin until we have this information.

If you are telephoning for on-site service, please fill out the reverse side of this form before you call.

Who is returning the equipment?

Company/Institution_____Date_____

Person to Contact_____Phone_____

Alternate Contact_____Phone_____

Return Shipping Address:

_____

_____

_____

Special Shipping Instructions

_____

_____

_____

How will the repair be paid for?

Check one of the three boxes and fill in the information in that section:

( ) Warranty

Purchased/Received Date_____

Enclose proof of purchase or receiving document indicating original received date.

( ) Maintenance Contract Contract No._____

( ) Order

Except for contract and warranty repairs, a purchase order number and/or authorized signature must accompany your request for service. If standard repair prices do not apply, a minimum purchase order is required. Standard repair prices may be obtained by contacting the repair center. Purchase Order No._____

Billing Address:

_____

_____

_____

Special Billing Instructions:

_____

_____

_____

Authorized Signature_____Phone_____

(over)

What is being sent?

Model Number_____

Serial Number_____

Be sure that you have followed the test procedure described in this manual.

Do not ship accessories which are not required to complete the repair (manuals, cables, cleaning supplies, etc.).

What needs to be done?

1. Describe how the failure appears.

_____

_____

_____

2. Perform the self-test described in this manual. What error number was displayed on the **status display** during the test? Please attach any relevant printouts.

_____

_____

_____

3. If failure is intermittent, how long does it take between failures?

_____

4. List the computer that the printer is connected to (give manufacturer and model number).

_____

_____

5. Additional comments:

_____

_____

_____

_____

Thank you.

Appendix F

INTERFACE CONFIGURATION AND CABLE PIN ASSIGNMENTS

Introduction

This appendix provides general instructions for configuring your computer to the **LaserJet** printer. If you wish to configure your **LaserJet** printer to an HP 150 or IBM Personal Computer, see the specific configurations for these computers in Chapter II. Hewlett-Packard has also printed application notes which describe configurations with other computers (see Appendix G in this manual). If an application note has been written for configuring your computer with the **LaserJet**, you may request a copy from your dealer. If an application note does not exist for your computer, or if you cannot obtain one, the following configuration guidelines will help you to successfully communicate to your new printer.

The configuration procedure consists of the following five steps:

1. Serial Interface Selection
2. Signal Protocol Selection
3. Cabling
4. CPU Configuration
5. Testing the Configuration

SERIAL INTERFACE CONFIGURATION

The **LaserJet** printer is configured with an RS-232C interface when it is shipped, but it may also be configured with an RS-422 interface by performing the "Switching Interfaces" procedure in appendix C in you Technical Reference Manual.

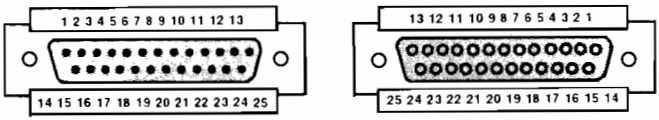
SIGNAL PROTOCOL

It is important to remember that RS-232C is not a standard, but is a set of guidelines. Therefore, there are several popular implementations of RS-232C. The communication protocols (or handshakes) that are supported on the **LaserJet** are X-on/X-off and DTR (hardware handshake). The **LaserJet** printer does not support Enq/Ack protocol. Therefore, if your computer only supports Enq/Ack protocol, you will probably not be able to communicate with the printer.

Since the **LaserJet** printer can only use X-on/X-off protocol or hardware handshake, you must decide which of these two protocols you wish to use and configure your computer to communicate using the chosen protocol.

CABLING

The RS-232C interface connector on the **LaserJet** is a standard 25-pin female connector. This requires that the printer end of the interface cable has a male connector (see the following figure for a connector diagram).



25-PIN MALE CONNECTOR

25-PIN FEMALE CONNECTOR (LASERJET)

Of the 25 pins in the connector, the **LaserJet** only utilizes those listed in the following table. Using the pinout diagram listed below and the pinout diagram for your computer, obtain a compatible cable (taking into consideration the protocol to be

used). **NOTE: The pin defined as transmit data (TD) from the computer must go to receive data (RD--pin 3) of the LaserJet printer and the pin defined as receive data (RD) from the computer must go to transmit data (TD--pin 2) on the printer.**

PIN NUMBERS	DESCRIPTION	SIGNALS USED RS-232C (X-on)	RS-232C (DTR)	RS-422
1	FG--Frame Ground	X	X	X
2	TD--Transmitted Data to the computer	X	X	
3	RD--Received Data from the computer	X	X	X
7	SG--Signal Ground	X	X	X
9	SDA--Send Data			X
10	SDB--Not Send Data			X
18	RDB--Not Received Data			X
20	DTR--Data Terminal Ready		X	

CPU CONFIGURATION

Once the correct cable is connected between the computer (CPU) and the printer, the computer's port must be configured for the **LaserJet** printer. The configuration should be set to the following parameters:

Start Bits – 1
Data Bits – 8
Stop Bits – 1
Parity -- None
Baud Rate – 9600 or desired baud

Except for the baud rate, none of the above parameters may be changed in the **LaserJet** configuration. If, however, you desire to change the baud rate, perform the "Changing Baud Rate" procedure in Appendix C in your Technical Reference Manual.

Configuring Your HP LaserJet Printer with the IBM Personal Computer AT

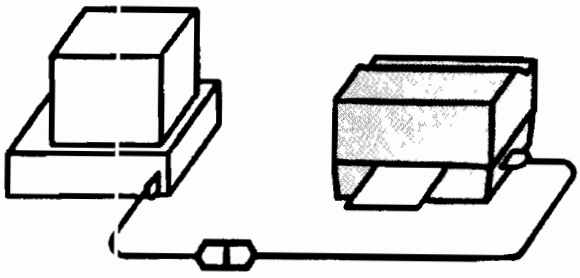
Introduction

This instruction sheet will explain how to set up your IBM Personal Computer AT so it can communicate with the HP LaserJet Printer. Before you begin, check the following list to be sure you have all the necessary components.

Typical Configuration*

Computer system: IBM Personal Computer AT
Printer equipment: HP LaserJet Printer
M-to-F IBM Serial Device Adapter Cable
(IBM #6450217 or IBM #6450242)
M-to F Special RS-232C Cable
IBM Personal Computer AT
Serial/Parallel Adapter

** Check with your software supplier for specific hardware and memory requirements for your system.*



IBM Personal Computer AT

Connection Instructions

Follow these steps to install the asynchronous communications adapter in the COMPAQ system unit.

1. Turn off the system unit and any other components.

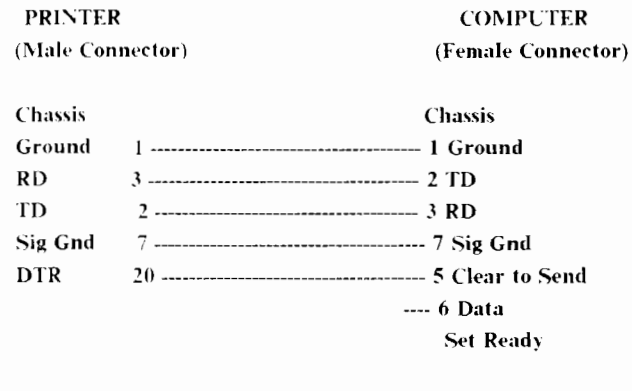
2. Remove the cover from the system unit.

3. Look at the asynchronous communications adapter (RS-232C serial card). The adapter has a 25 pin male connector and a plug-in module attaches to the computer; make sure it is positioned so the plug-in module is on the bottom of the board and the 25 pin male connector is on the lower portion of the right side. This position is necessary for RS-232C communication.

4. Now look inside the system unit. Across the rear of the circuit board there is a row of five narrow sockets called "slots." Hold the adapter (serial card) by the top corners and press into any unused slot.

5. Replace the cover of the system unit.

6. Connect your LaserJet to the computer using the male-to-female RS-232C cable. We recommend the HP 92219J or 17255D interface cables or wire your cable connectors as follows:



(Pins not shown are not used)

Follow these steps to enable your system to automatically configure itself to print on the LaserJet Printer when you boot up MS-DOS.

NOTE

The steps below assume you are using the primary asynchronous adapter with your printer. If you are using the secondary asynchronous adapter instead, replace COM1 with COM2 in steps 3, 5, and 6.

---

1. Power up the computer and load a backup copy of the MS-DOS disc.

NOTE

The disc write-protect should be off.

---

2. Press the CTRL, ALT, and DEL keys simultaneously to boot your system. The MS-DOS prompt "A>" will be displayed on the screen. (You may need to enter the current date and time before the prompt is displayed.)

3. Do you already have AUTOEXEC.BAT file on your MS-DOS disc? You can verify this by typing a DIR command and pressing the ENTER key. Look for this file on the list which is displayed.

   If not on your MS-DOS disc, proceed to step 4.

   If file exists, add the following two lines to the AUTOEXEC.BAT file on the MS-DOS disc and then proceed to step 8.

MODE COM1: 9600,N,8,1,P
MODE LPT1: = COM1

Configuring Your HP LaserJet Printer with the Wang Professional Computer

Introduction

This instruction sheet explains how to set up your Wang Professional Computer so that is can communicate with the HP LaserJet Printer. The configuration described provides basic printing from the word processing application of the Wang PC to the LaserJet printer. Other applications, such as Multiplan, Lotus 1-2-3, BASIC, etc., on the Wang PC may not print to the LaserJet with this configuration. Before you begin, check the following list to be sure you have all the necessary components.

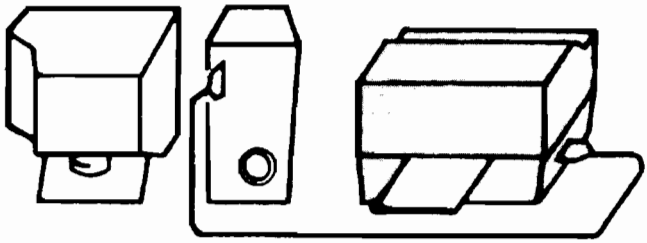
Typical Configuration*

Computer System: Wang Professional Computer

Printer Equipment: HP LaserJet Printer
M-to-M Special RS-232C cable

**Check with your software supplier for specific hardware and memory requirements for your system.*

Connection Instructions



Wang Professional Computer

HP LaserJet Printer

Fig. 1: Connecting the HP LaserJet Printer to the Wang Professional Computer.

1. Connect your HP LaserJet Printer to the Wang Professional Computer using the male-to-male special RS-232C cable connected from the RS-232C serial interface port of your Wang PC to the RS-232C serial interface connector on the printer (See Figure 1). We recommend the HP 13242G cable or wire your cable connectors as follows:

PRINTER (Male Connector)		WANG PC (Male Connector)
Chassis Ground	1---------1	Chassis Ground
RD	3---------2	TD
TD	2---------3	RD
Signal Ground	7---------7	Signal Ground
DTR	20---------5	Clear to Send
	----6	Data Set Ready

(Pins not shown are not used)

Once you have the RS-232C cable connected, perform the following steps to configure your Wang Professional Computer to print on the HP LaserJet Printer:

2. Power on the computer by pressing the red switch located on the back of the Wang PC.

3. Enter the current date and time or ignore by pressing EXEC on the Wang PC keyboard.

4. From the "MAIN SYSTEM MENU", select "Communications" by pressing the SPACE BAR until the item is highlighted. Now press EXEC to display the "COMMUNICATIONS MENU".

5. Select "Set Serial Port #1 Options" from the "COMMUNICATIONS MENU" and press EXEC to proceed.

6. Set the fields on the "SET SERIAL PORT OPTIONS UTILITY" screen as follows, using the SPACE BAR to select the field value and RETURN to move to the next field:

Baud Rate	**9600**
Parity	**NONE**
Data Bits	**8**
Stop Bits	**1**

Press EXEC and the "Options Reset" message will be displayed. Next, press CANCEL to return to the "COMMUNICATIONS MENU" and CANCEL again to return to the "MAIN SYSTEM MENU".

7. Select "System Utilities" from the "MAIN SYSTEM MENU". Press EXEC to proceed to the "SYSTEM UTILITIES MENU".

8. Select "Directory Display" from the "SYSTEM UTILITIES MENU" and press EXEC. By selecting A, B, or C as the drive, determine the location of file, PM012V0.PDT, on your system. Press CANCEL to return to the "SYSTEM UTILITIES MENU".

Line Feed Size:		
48 lpi	1B266C343844	[Esc & l 4 8 D]
24 lpi	1B266C323444	[Esc & l 2 4 D]
12 lpi	1B266C313244	[Esc & l 1 2 D]
8 lpi	1B266C3844	[Esc & l 8 D]
6 lpi	1B266C3644	[Esc & l 6 D]
4 lpi	1B266C3444	[Esc & l 4 D]
3 lpi	1B266C3344	[Esc & l 3 D]
2 lpi	1B266C3244	[Esc & l 2 D]
Horizontal Spacing:		
5 cpi	1B266B323448	[Esc & k 2 4 H]
10 cpi	1B266B313248	[Esc & k 1 2 H]
12 cpi	1B266B313048	[Esc & k 1 0 H]
15 cpi	1B266B3848	[Esc & k 8 H]
16.5 cpi	1B287331362E3648	[Esc (s 1 6 . 6 H]

After pressing EXEC, you should have returned to the "PRINTER FUNCTION TABLE EDITOR" screen.

15. Select "Write to Disk" and press EXEC. A prompt for the file name of the printer function table will be displayed. Enter "PM012V0.PDT" and press EXEC.

NOTE

If the file already exists, the message "File already exists: Press EXECUTE or CANCEL" will be displayed. Press EXEC so the current file will be overwritten with the modifications from Step 14. (If you have renamed the file as described is Steps 7-10, the file will not exist.)

The message "Task Completed" will be displayed. Press CANCEL to return to the "PRINTER SUPPORT MENU".

16. Select "Install Wang Daisy Driver" and press EXEC. The following will be displayed:

    C: Copy Ser1drvr.COM Printer.COM
    1 File(s) copied

    C: PAUSE Printer Driver Installed; Restart system to activate (2nd+COMMAND/CANCEL) Strike a key when ready...

Press the 2ND key and COMMAND key simultaneously and then CANCEL to re-start the Wang PC to activate the LaserJet printer driver.

Communication Verification

Once you have installed your LaserJet printer driver, you are ready to test the configuration using the Word Processing application. Power on the LaserJet printer and set ON-LINE. Perform the following steps to verify communication and illustrate the Word Processing features which work properly with the LaserJet printer:

1. From the "MAIN SYSTEM MENU", select "Applications" and press EXEC.

2. Select "Word Processing" from the "APPLICATIONS MENU" and press EXEC.

NOTE

Notice the Version Release displayed in the "WANG PC WORD PROCESSING" screen header. The following tests were successful using Release 1.10 and 2.00. If you have a different version, the configuration described, may or may not work successfully.

---

3. Select "Create a New Document" and press EXEC. A document name prompt will be displayed. Enter a file name for your document between 1 and 8 characters in length. For example, LJTEST or LJDEMO may be used as a file name. Press EXEC.

4. Follow the script below to enter your test document. (If you wish to only verify the communication, enter the first sentence and press CANCEL, then EXEC, to save the document and return to the "WANG PC WORD PROCESSING" screen. Proceed to Step 5 to print the document.)

NOTE

Type in the data following "TEXT:" and press the specified key on the keyboard following "KEYSTROKE:".)

TEXT: This is a test of the LaserJet printer communication with the Wang PC. Each of the features of the Word Processing application are shown below as printed on the LaserJet.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Centering:

KEYSTROKE: RETURN

KEYSTROKE: CENTER

TEXT: This line should be centered.

KEYSTROKE: RETURN

KEYSTROKE: INDENT

KEYSTROKE:

TEXT: This is a test of the INDENT/CENTER feature.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Underscore:

KEYSTROKE: RETURN

KEYSTROKE: INDENT

TEXT: The command underscore feature should work with the LaserJet.

KEYSTROKE: WEST ARROW (LEFT) until cursor is under the letter "u" of the word "underscore" in the sentence.

KEYSTROKE: COMMAND (The message "Which Command?" will be displayed in the upper right corner of the screen.)

KEYSTROKE: SHIFT and _ (the underscore key) (The message "Underscore what?" will be displayed in the upper right corner of the screen.)

KEYSTROKE: EAST ARROW (RIGHT) until the entire word "underscore" in the sentence has been highlighted.

KEYSTROKE: EXEC (The message "(Rearranging)" is displayed. After a slight pause, the word "underscore" will appear underscored on the screen.)

KEYSTROKE: EAST ARROW (RIGHT) until cursor is at the end of the sentence.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Double Underscore:

KEYSTROKE: RETURN

KEYSTROKE: INDENT

TEXT: The command double underscore should also work with the LaserJet.

KEYSTROKE: WEST ARROW (LEFT) until the cursor is under the "d" of the word "double" in the sentence.

KEYSTROKE: COMMAND (The message "Which Command?" will be displayed.)

KEYSTROKE: SHIFT and) (the close paren) (The message "Double Under what?" will be displayed.)

KEYSTROKE: EAST ARROW (RIGHT) until the entire words "double Underscore" in the sentence are highlighted.

KEYSTROKE: EXEC (The message "(Rearranging)" is displayed. After a slight pause, the words, "double underscore" will appear with the underscore above and below the words.

KEYSTROKE: EAST ARROW (RIGHT) until cursor is at the end of the sentence.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Bold:

KEYSTROKE: RETURN

KEYSTROKE: INDENT

TEXT: The command BOLD feature will not work with the LaserJet.

KEYSTROKE: 'WEST ARROW (LEFT) until the cursor is under the "B" of the word "BOLD" in the sentence.

KEYSTROKE: COMMAND (The message "Which Command?" will be displayed.)

KEYSTROKE: SHIFT and ([Open paren]. (The message "Bold what?" will be displayed.)

KEYSTROKE: EAST ARROW (RIGHT) until the entire word 'BOLD" in the sentence is highlighted.

KEYSTROKE: EXEC (The message "(Rearranging)" is displayed. After a slight pause, the word "BOLD" will appear in reverse video on the screen.)

KEYSTROKE: EAST ARROW (RIGHT) until the cursor is at the end of the sentence.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Superscripts:

KEYSTROKE: RETURN

KEYSTROKE: INDENT

TEXT: The superscript feature would appear as follows: example123.

KEYSTROKE: WEST ARROW (LEFT) until the cursor is under the "1" in the sentence.

KEYSTROKE: COMMAND (The message "Which Command?" will be displayed.)

KEYSTROKE: SHIFT and SUBSCRIPT/SUPERSCRIPT (shown here) located to the immediate right of the COMMAND key. (The message "Superscript what?" will be displayed.)

KEYSTROKE: EAST ARROW (RIGHT) until the "123" in the sentence is highlighted.

KEYSTROKE: EXEC (The message "(Rearranging)" is displayed. After a slight pause, the "123" will move up above the print line on the screen.

KEYSTROKE: EAST ARROW (RIGHT) until the cursor is at the end of the sentence.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Subscripts:

KEYSTROKE: RETURN

KEYSTROKE: INDENT

TEXT: The subscript feature would appear as follows: example456.

KEYSTROKE: WEST ARROW (LEFT) until the cursor is under the "4" in the sentence.

KEYSTROKE: COMMAND (The message "Which Command?" will be displayed.)

KEYSTROKE: SHIFT and SUBSCRIPT/SUPERSCRIPT key (shown here) located to the immediate right of the COMMAND key. (The message "Superscript what?" will be displayed.)

KEYSTROKE: EAST ARROW (RIGHT) until the "456" in the sentence is highlighted.

KEYSTROKE: EXEC (The message "(Rearranging)" is displayed. After a slight pause, the "456" will move down below the print line on the screen.

KEYSTROKE: EAST ARROW (RIGHT) until the cursor is at the end of the sentence.

KEYSTROKE: RETURN

KEYSTROKE: RETURN

TEXT: Selecting other fonts seems to be the major restriction of using the LaserJet printer with the Wang PC Word Processing application.

KEYSTROKE: CANCEL (The message "End of Edit?" will be displayed.)

KEYSTROKE: EXEC

Now the "WANG PC WORD PROCESSING" screen should be displayed.

5. Select "Print Document" and press EXEC.

6. The prompt for the document to be printed will be displayed. Enter the name of the file created (same as in Step 3) and press EXEC.

7. The "PRINT DOCUMENT" screen will be displayed. Select the appropriate attributes (number of copies, left margin, pitch, etc.). Press EXEC. The document will be sent to the LaserJet and begin printing.

NOTE

A blank page will preceed your document the first time you print from the word processing application. Further printing will not cause the blank page, unless the word processing application is exited.

Your output should demonstrate the features of the Wang PC Word Processor. Other features of the LaserJet may not be accessible without a third party driver such as the driver available from:

MCS Group, Inc.
2465 West Chicago
Rapid City, SD 57701
(605) 341-6755

The Computer Group
1260 Boylston Street
Boston, MA 02215
(617) 536-4242

If there is no communication, check the following:

--Ensure the RS-232C cable is seated properly.
--Ensure the printer is on-line.
--Ensure the printer is working properly through self-test and test print.
--Ensure the computer is working properly by running an application you know works.
--Ensure you have the correct RS-232C cable.

Configuring the HP LaserJet Printer with the DEC Rainbow

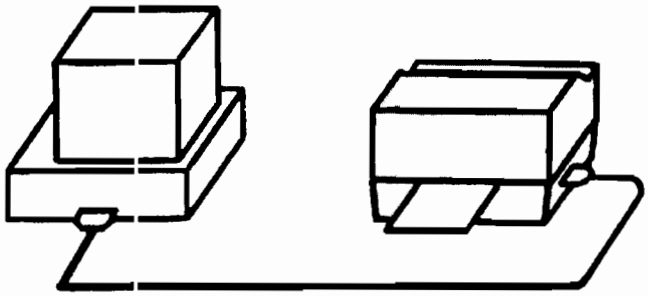
Introduction

This instruction sheet will explain how to set up your DEC Rainbow 100 so it can communicate with the HP LaserJet Printer. Before you begin, check the following list to be sure you have all the necessary components.

Typical Configuration*

Computer system: DEC Rainbow 100
Printer equipment: HP LaserJet Printer
Male-to-Male Standard RS-232C Cable

* *Check with your software supplier for specific hardware and memory requirements for your system.*



DEC Rainbow 100 HP LaserJet

Connection Instructions

Follow the steps to connect your HP LaserJet Printer to your DEC Rainbow Computer.

1. Connect your HP LaserJet Printer to the computer using the male-to-male standard RS-232C cable connected from the "PRINTER" port of the DEC Rainbow 100 to the RS-232 interface connector on the printer. We recommend the HP 17355M cable or wire your cable connectors as follows:

PRINTER (Male Connector)			COMPUTER (Male Connector)
Chassis Ground	1	1	Chassis Ground
TD	2	2	TD
RD	3	3	RD
	.	.	
	.	.	
	.	.	
	25	25	

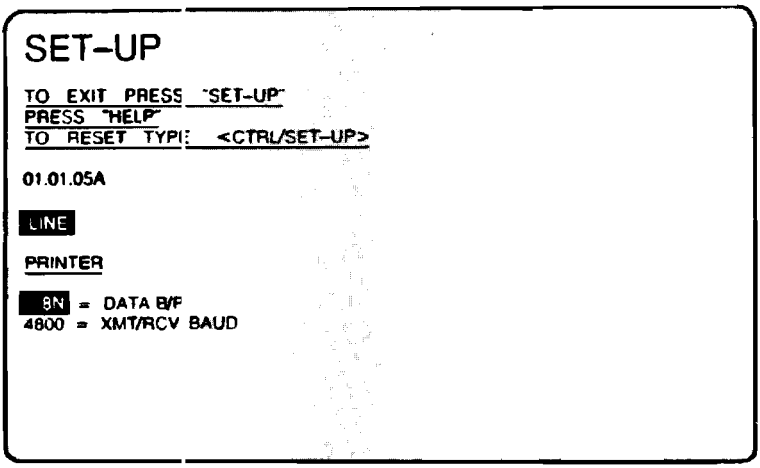
Once you have the RS-232C cable connected, the following steps will configure your DEC Rainbow 100 to print on the HP LaserJet Printer:

2. Power up the computer.

3. Place your CP/M-86/80 Operating System Disk in the "A" drive or other available drive. Press "A" (or the letter of the drive you are using) to load the operating system.

4. Press the "SET-UP" key on the keyboard to enter set-up mode.

5. Press the "NEXT SCREEN" key until the following "PRINTER" set-up screen is displayed:



Set the fields as follows:

8N = Data B/P
9600 = Xmit/RCV Baud

(Use the left and right arrows to tab to the desired field. Use the up and down arrows to change the field values.)

6. Press the "SET-UP" key to save your configuration and to exit the set-up mode.

Communication Verification

To verify your configuration, power on the HP LaserJet Printer and set on-line. Next, type in the following BASIC-86 program. This program simply verifies that the computer and the printer are communicating.

```
A > MBASIC
10 LPRINT CHR$(27) + "E"                    'Resets the Printer
20 LPRINT "LASERJET COMMUNICATION OK!"
30 LPRINT CHR$(13);                         'Carriage Return
40 LPRINT CHR$(12);                         'Form Feed
50 END
```

Finally, enter RUN on the computer and press the "RETURN" key. The HP LaserJet Printer will print "LASERJET COMMUNICATION OK!"

If you have followed these steps carefully, your DEC Rainbow 100 and HP LaserJet Printer are communicating with each other.

If there is no communication, check the following:

--Ensure the RS-232C interface cable is seated properly.
--Ensure the printer is on-line.
--Ensure the printer is working properly through self-test and test print.
--Ensure the computer is working properly by running an application you know works.
--Verify the operating system and programming language you are using are those listed in this instruction sheet.

Configuring the HP LaserJet Printer with the Apple IIe Computer

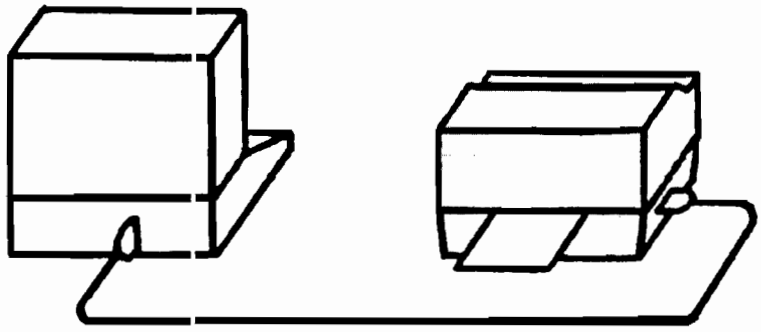
Introduction

This instruction sheet will explain how to set up your Apple IIe so it can communicate with the HP LaserJet Printer. Before you begin, check the following list to be sure you have all the necessary components.

Typical Configuration*

Computer system:	Apple IIe System
Printer equipment:	HP LaserJet Printer
	Apple Super Serial Card (Apple A2B0044)
	Male-to-Male Standard RS-232C Cable

* *Check with your software supplier for specific hardware and memory requirements for your system.*



Apple IIe **HP LaserJet**

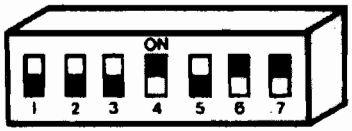
Connection Instructions

Follow these steps to install the Apple Super Serial Card in the Apple IIe system unit:

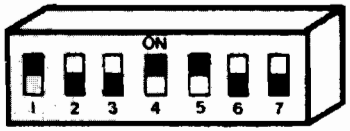
1. Turn off the system unit and any other components.

2. Remove the cover from the system unit.

3. Prepare your Apple Super Serial Card for printer mode by correctly positioning the dip switches on SW1 and SW2 as follows (this will set the baud rate to 9600 and the data format to 1 stop bit):

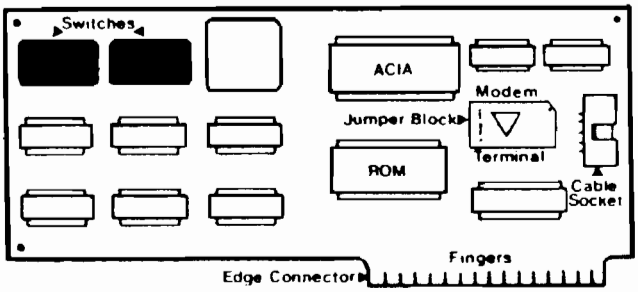


SW1



SW2

Also position, the jumper block such that the arrow is pointing to TERMINAL (see the following diagram).



NOTE

For explanation of switch settings and the jumper block, refer to the Apple II Super Serial Card Installation and Operating Manual.

4. Install the Apple Super Serial Card in card slot #2 of your Apple IIe Computer.

5. Replace the cover of the system unit.

6. Connect your HP LaserJet Printer to the computer using the male-to-male standard RS-232C cable connected from the Apple Super Serial Card connector to the interface connector on the printer. We recommend the HP 17355M cable or wire your cable connectors as follows:

PRINTER (Male Connector)			COMPUTER (Male Connector)
Chassis Ground	1	1	Chassis Ground
TD	2	2	TD
RD	3	3	RD
	.	.	
	.	.	
	.	.	
	25	25	

Communication Verification

To verify your configuration perform the following steps: 1) Power on the computer and then power on the HP LaserJet Printer. 2) Set the HP LaserJet Printer on-line. 3) Next type in the following Applesoft BASIC program. This program simply verifies that the computer and the printer are communicating. (The "cntl I" is performed by holding the "CNTL" key down and pressing the "I" simultaneously).

```
10  PR#2
20  PRINT "cntl I1D"          * Sets Apple SSC to "Space" parity
30  PRINT "cntl I7P"          * Sets data format to 7 bits,1 stop
40  PRINT CHR$(27) + "E"                    'Resets Printer
50  PRINT "LASERJET COMMUNICATION OK!"
60  PRINT CHR$(13);                         'Carriage Return
70  PRINT CHR$(12);                         'Form Feed
80  PR#0
90  END
```

1. Finally, enter RUN on the computer and execute. The HP LaserJet Printer will print "LASERJET COMMUNICATION OK!"

2. If you have followed these steps carefully, your Apple IIe and HP LaserJet Printer are communicating with each other.

If there is no communication, check the following:

--Ensure the RS-232C interface cable is seated properly.
--Ensure the RS-232C interface cable is working properly. on another system.
--Ensure the Apple Super Serial Card is seated properly.
--Ensure the printer is on-line.
--Ensure the printer is working properly through self-test and test print.
--Ensure the computer is working properly by running an application you know works.

NOTE

The two print statements noted above reset the Apple Super Serial Card to 7 data bits, 1 stop bit, and SPACE parity. You may want to configure your card at 7 data bits, 1 stop on SW2; however, the setting really only affects the stop bits. The parity set to SPACE parity is important as the default (no parity) actually sends a high (1) eighth bit causing printed output using the ROMAN-8 extended characters. The parity setting cannot be done by SW2 in printer mode. (Refer to the Apple II Super Serial Card Installation and Operating Manual). The consequences of configuring at 7 data bits, 1 stop bit, and SPACE parity are that you will not have access to the ROMAN-8 extended characters. Also, graphics is not recommended.

Configuring Your HP LaserJet Printer with the Apple /// Computer

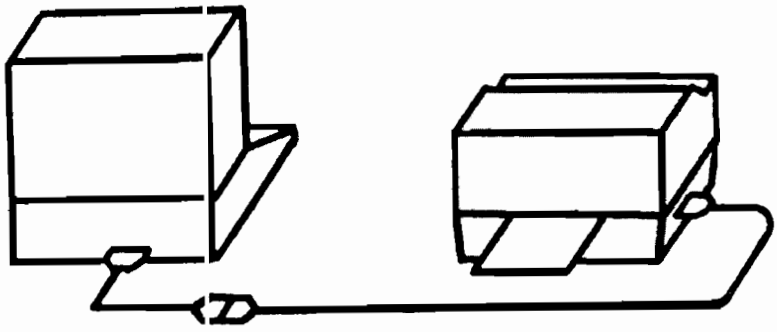
Introduction

This introduction sheet will explain how to set up your Apple /// so it can communicate with the HP LaserJet Printer. Before you begin, check the following list to be sure you have all the necessary components.

Typical Configuration*

Computer system: Apple /// System
Printer equipment: HP LaserJet Printer
Apple /// Modem Eliminator Cable
(Apple A3M0019)
Male-to-Male Standard RS-232C Cable

** Check with your software supplier for specific hardware and memory requirements for your system.*

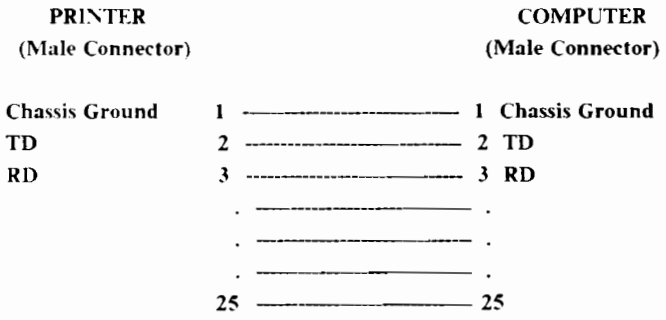


Apple /// **HP LaserJet**

Connection Instructions

Follow these steps to install the HP LaserJet printer to the Apple /// computer.

1. Connect your HP LaserJet Printer to the Apple /// Computer using both the Apple Modem Eliminator Cable and the male-to-male RS-232C cable. Connect one end of the Apple Modem eliminator cable to the interface connector on the computer and the other end to one end of the RS-232C cable. The other end of the RS-232C cable should be connected to the RS-232 interface connector on the printer.



Once you have the cable connections, the following steps will configure your Apple /// to print on the HP LaserJet Printer:

1. Power on the computer.

2. Using the Apple /// System Configuration Program, modify the RS-232C serial driver by setting the driver configuration block as follows (for more details, refer to the Apple /// Standard Device Drivers Manual):

BYTE	0	1	2	3	4	5	6	7	8	9	A	B
VALUE	0E	00	00	00	00	00	00	00	00	00	00	80

This sets the driver to 9600 baud, 8 data bits, no parity, and hardware handshaking.

Communication Verification

To verify your configuration, power on the HP LaserJet Printer and set on-line. Next, type in the following Apple Business BASIC program. This program simply verifies that the computer and the printer are communicating.

```
10  OPEN #1, "RS232"                    'Opens the serial port
20  PRINT #1; CHR$(27) + "E"            'Resets the printer
30  PRINT #1; "LASERJET COMMUNICATION OK!"
40  PRINT #1; CHR$ (13);                'Carriage Return
50  PRINT #1; CHR$ (12);                'Form Feed
60  CLOSE #1                            'Closes the serial port
70  END
```

Finally, enter RUN on the computer and execute. The HP LaserJet Printer will print "LASERJET COMMUNICATION OK!"

If you have followed these steps carefully, your Apple /// and HP LaserJet Printer are communicating with each other.

If there is no communication, check the following:

- Ensure cabling is seated properly.
- Ensure printer is on-line.
- Ensure printer is working properly through self-test and test print.
- Ensure the computer is working properly by running an application you know works.

Appendix H

ESCAPE SEQUENCE SUMMARY

Introduction

This appendix lists all of the escape sequences included in this Operator's Manual. Refer to your Technical Reference Manual for additional escape sequences and explanations for their use.

~ Underlining

Turn on automatic underlining--^{E}c**&dD**
Turn off automatic underlining--^{E}c**&d@**

~ Character Fonts

Portrait orientation--^{E}c**&l0O**
Landscape orientation--^{E}c**&l1O**
Select symbol set--^{E}c**(# #--Upper-case letter**
Set fixed spacing--^{E}c**(s0P**
Set proportional spacing--^{E}c**(s1P**
Set font pitch--^{E}c**(s # H**
Set font height--^{E}c**(s # V**
Set upright style--^{E}c**(s0S**
Set italic style--^{E}c**(s1S**
Set font stroke weight--^{E}c**(s # B**
Set font typeface--^{E}c**(s # T**

~ Page Length, Top Margin, and Text Length

Set page length (size)--^{E}c&l # P
Set top margin--^{E}c&l # E
Set text length--^{E}c&l # F

~ Margins

Set left margin--^{E}c&a # L
Set right margin--^{E}c&a # M

~ Line Spacing

Lines-per-inch spacing--^{E}c&l # D

~ Downloading Character Fonts

Assign Font ID--^{E}c*c # D
Print--^{E}c(# X
Permanent--^{E}c*c # d5F
Purge--^{E}c*c # d2F

~ Specialized Printer Control

Reset--^{E}c E

~ Cursor Positioning

Move to row number--^{E}c&a # R

~ Miscellaneous Features

Portrait or landscape orientation--^{E}c&l # O
Select number of copies--^{E}c&l # X
Automatic envelope feed--^{E}c&l3H
Automatic manual feed--^{E}c&l2H

GLOSSARY

BAUD RATE

Baud rate is the rate at which information is transferred between the computer and the printer. To communicate properly, the computer and the printer must both be configured at the same baud rate. The **LaserJet** and **LaserJet+** printers are configured at the factory for 9600 baud, but the baud rate may be changed to match your computer system by following the instructions in Appendix C of your Technical Reference Manual.

CHARACTER FONT

A character font is a set of characters with specific characteristics. These characteristics are defined in terms of orientation (portrait or landscape), symbol set, spacing, pitch, point size, style, stroke weight, and typeface. Differences between character fonts are determined by differences in characteristics, for instance in the symbol set, character height, and stroke weight used.

CHARACTER SPACING

Spacing refers to the amount of space (width) each printed character is given. There are two types of character spacing--either fixed or proportional spacing is designated for each character font. Fixed spacing refers to character spacing where the horizontal space occupied by each character is the same. (For example, a "W" occupies the same amount of space as an "I".) Most typewriters use fixed spacing. Proportional spacing refers to character spacing where the horizontal space occupied by each character is based on the character's width. (For example, a "W" occupies more space than an "I".) This manual is printed using a proportionally-spaced font.

DEFAULT FONT

The default font refers to the character font that the **LaserJet** printer uses when it is reset or powered-up. The printer's resident Portrait Courier font operates as the default font unless an optional font cartridge with a different default font is installed in the printer.

DEFAULT SETTINGS

Default settings refer to the printer's standard operating settings used for printing after the **LaserJet** is reset or powered-up. The standard margin, line spacing, and text length settings, as well as all other programmable settings, are referred to as the printer's default settings. These standard settings can be changed by sending escape sequences to the printer. Some software packages change the printer's default settings.

DOWNLOADING

Downloading character fonts refers to the process of transferring character fonts from font discs to the printer's memory. Downloading character fonts is possible with the **LaserJet+** only. Character fonts are downloaded so that they may be used for printing--once a font is downloaded, it can be used for printing just as though a font cartridge containing that font is inserted in the printer.

ESCAPE SEQUENCE

Escape sequences are strings of several characters that act as commands to let the printer know what tasks to perform. For instance, escape sequences can be used to arrange information on a page (set margins, or line spacing, for example), or to select character fonts for printing.

The method of sending the escape sequence depends on the computer, computer language, or software package you are using. Most software packages have escape sequences already embedded in the software--this means that escape sequences do not have to be entered directly. Refer to your Technical Reference Manual for additional escape sequences not included in this manual.

FORM FEED

Form feed is a command used to print data stored in the printer's memory. The **LaserJet** printer has a FORM FEED key on the operator control panel which can be used to perform this task. Many software packages use commands to automatically send form feed commands to the printer--page break commands are examples of these. Form feed must be used to print partial pages of data stored in the printer's memory.

LANDSCAPE ORIENTATION

Landscape orientation refers to printing from left-to-right across the length of the page (as opposed to portrait--printing from left-to-right across the width of the page). The term "landscape" is derived from pictures of landscape, which are usually horizontal in format.

LINE SPACING

Line spacing refers to the number of text lines that are printed per vertical inch of a page. For instance, a line spacing setting of 8 will print 8 lines of text for every vertical inch of the printable area of a page.

MACROS (LaserJet+ Only)

A macro is a user-defined command that combines several commands for simplification purposes. For example, a macro can be defined to set the page length to 66 lines, the left margin to

column 10, and the right margin to column 70. Once that macro is defined, calling or executing the macro performs the operation of setting the page length and margins automatically. For information on using macros with the **LaserJet+**, refer to your Technical Reference Manual.

PAGE FORMATTING

Page formatting refers to the arrangement of information on a page. Formatting your page involves setting margins, line spacing, and text length, for example. Escape sequences are used to send formatting commands to the printer. However, most software packages perform page formatting tasks without requiring the use of escape sequences.

PITCH

Pitch refers to the number of characters that can be placed in a horizontal inch of text. Either fixed or proportional pitch settings are designated for each character font. Fonts using fixed pitch print a uniform number of characters per inch. For example, a pitch setting of 12 will print 12 characters for every horizontal inch of text. Fonts using proportional pitch print a varying number of characters per horizontal inch depending on the relative width of each character printed.

POINT SIZE

A point is a unit of measurement that equals 1/72 inch. The height of characters is measured in points.

PORTRAIT ORIENTATION

Portrait orientation refers to printing from left-to-right across the width of the page (letter-style). This is the opposite of landscape orientation, which is printing from left-to-right across the length of the page. The term "portrait" is derived from portraits of people, which are usually vertical in format.

RESET

The term reset refers to returning the printer to its standard operating state. The printer is reset anytime it is powered-up, or any time the escape sequence "EcE" is sent to the printer. The **LaserJet+** can also be reset by pressing the HOLD TO RESET/CONTINUE key on the operator control panel. Resetting the printer returns the printer to its default operating settings and its default character font.

RESIDENT FONTS

The standard **LaserJet** and the **LaserJet+** contain character fonts that are permanently stored in the printers' memories. The **LaserJet** contains two resident character fonts, and the **LaserJet+** contains an additional font in addition to these two. For information concerning the printers' resident fonts, refer to Table 4-F on page 4-53

ROMAN-8/ROMAN EXTENSION

Hewlett-Packard's standard symbol set is Roman-8. Roman-8 is a combination of the USASCII symbol set plus the Roman Extension symbol set (Roman Extension is a full set of European and special symbols). Roman-8 is an eight-bit symbol set. See Appendix B in the Technical Reference Manual for tables of these symbol sets.

STROKE WEIGHT

Stroke weight refers to a bold, medium, or light print density, or darkness.

STYLE

Style, or character style, refers to either upright or italic print.

SYMBOL SET

Symbol sets are groups of characters contained in the printer's memory which allow you to print different sets of characters. Refer to Appendix B of the Technical Reference Manual for tables of symbol sets.

TEXT LENGTH

Text length refers to the number of text lines which appear on a page. Different text length settings vary the bottom margin. Text length is not synonymous with page length, which refers to the physical length of a page.

TYPEFACE

Typeface refers to the printed design of characters. For instance, Courier, Helv, and Letter Gothic typefaces all print characters of a different design.

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SOUTH AFRICA
Supplies: 802-5111:
53-7954: 28-4178

*Sandton. Transvaal
Phone 11/802-511

SPAIN
*Mirasierra. Madrid
Phone: 91/734-1162

SWEDEN
*Spanga
Phone: 8/750-2000

SWITZERLAND
Supplies: 057/31-22-54
or 31-22-59

*Widen
Phone: 57/31-21-11

TAIWAN
*Taipei
Phone: 2/712-0404

UNITED KINGDOM
Supplies: 0734/79-2863
or 0734/79-2959

*Altrincham
Phone: 61/928-6422

*Winnersh, Wokingham
Phone: 734/784-774

UNITED STATES
For assistance before
your purchase, to
locate an HP dealer,
or to obtain your
local Phone-In Software
Assistance number:
800/FOR-HPPC

Hardware maintenance
information or Dealer
Repair Center locations:
800835-HPHP

Computer Supplies:

-All states except
California, Alaska, and
Hawaii:
800/538-8787

-In California, Alaska,
and Hawaii:
408/738-4133 (collect)

*Santa Clara, CA
Phone: 408/988-7000

*Los Angeles, CA
Phone 213/970-7500

*Englewood, CA
Phone: 303/771-3455

*Atlanta, GA
Phone: 404/955-1500

*Naperville, IL
Phone: 312/357-8800

*Rockville, MD
Phone: 301/948-6370

*Andover, MA
Phone: 617/682-1500

*Novi, MI
Phone: 313/349-9200

*Raleigh, NC
Phone: 919/851-3026

*Paramus, NJ
Phone: 201/265-5000

*Valley Forge, PA
Phone: 215/666-9000

*Houston, TX
Phone: 713/776-6400

*Richardson, TX
Phone: 214/231-6101

*Bellevue, WA
Phone: 206/643-4000

VENEZUELA
*Caracas
Phone: 2/239-4133

WEST GERMANY
Supplies: 07031/142829
or 07031/2223133

*Boeblingen
Phone: 7031/667750

*Full Field Repair
Center capabilities.

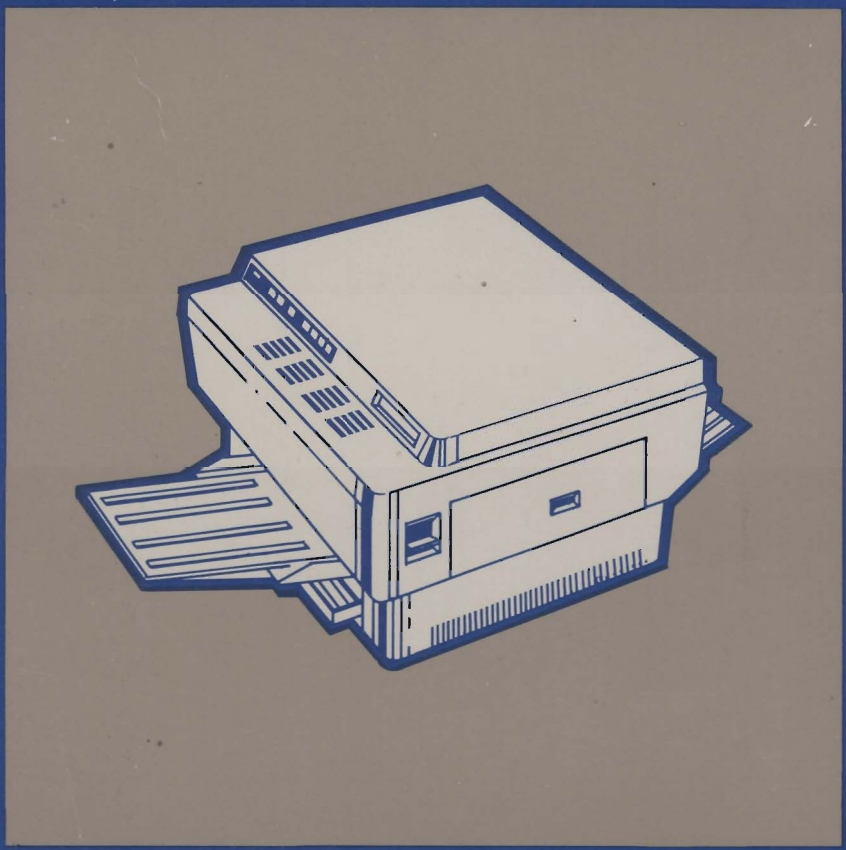
PRINTER STATUS

Number	Indication
00	Printer Ready
02	Wait
05	Self-Test (non-printing)
06	Self-Test (printing) (staggered characters)
07	Reset (LaserJet+ only)
15	Test Print (striped pattern)

OPERATOR SERVICEABLE CONDITIONS

Number	Indication
11*	No paper in cassette–add paper
12*	Printer engine power off–upper main body of printer open
13*	Paper jam
14*	No EP cartridge installed
PC*	Request for different size paper cassette
PF*	Manual paper feed request–printer ready for manual feed
PE*	Envelope feed request–printer ready for envelope feed
FC*	Check font cartridge
FE	Font cartridge removed

* These errors are cleared by the **CONTINUE** switch.



HEWLETT PACKARD

Part No. 02686-90914
May 1985